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MONOGRAPH

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TERRITORIAL DEVELOPMENT OF THE USE LAND IN COASTAL REGIONS: DEFINITION, ASSESSMENT AND TRANSFORMATION DIRECTIONS

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The systematic theoretical and methodical approaches to the definition of territorial development of the use of land in coastal regions, formed factors that influence territorial development. The analysis of the main directions and features of the territorial development of the use of the lands in regions is carried out. Identified methods and models used to assess the territorial development of land use in regions.

Recommended for specialists in the field of cadastre and land management, evaluation activities, lecturers, postgraduates, students of higher education establishments.

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WEN MINGMING (CONCLUSION; 1;1.2; 1.3; 2; 2.1; 2.2; 2.3; 3; 3.1; 3.2; 3.3; 4; 4.1; 4.2; 4.3; 7; 7.1; 7.2; 7.3; 7.4).

K. A. MAMONOV (Introduction; 1; 1.1; 5; 5.1; 5.2; 5.3; 5.4; 6; 6.1; 6.2; 6.3)

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INTRODUCTION

The transformational processes taking place in the state, ambiguous trends in its development, require a rethinking of approaches to the formation and use of land at the regional level and the provision of territorial development. In addition, in recent years, the level of land use efficiency, which is affected by spatial, urban, investment and environmental factors, decreases. With the provision of modern territorial development at the regional level, the influence and interaction between the presented factors are not taken into account. There are certain problems in determining the territorial development of the use land in coastal regions, justification of its implementation, features of the formation of spatial, urban, investment and environmental factors.

Current conditions land use regions require a rethinking of approaches to the definition of their territorial development. Globalization, the movement towards European institutions, the negative impact of external factors, domestic economic instability, optimization of relations in the territorial systems of different levels to determine the predominant nature of ensuring territorial development. Over the years 2004-2016 the slowdown in the rate of growth of gross regional product from 12.1% to 2.4%, respectively [7]. For 2016-2017, the increase of volumes of capital investments in the regional aspect by 27%, slowing the rate of growth of index of industrial production by 2.4%, increasing the index of construction output by 8.9%. However, in the regional aspect environmental situation continues to deteriorate. For 2015-2016, the growth of emissions of pollutants and carbon dioxide into atmospheric air from stationary sources of pollution by 7.7% [7]. Consequently, the topic of the monograph is relevant, and its development is timely in nature.

In modern conditions, set the fragmentation of theoretical approaches to the definition of territorial development land use in coastal regions, where the attention is focused only on certain aspects, in particular the spatial, urban, investment, or environmental, or a combination of some of them. The absence of implementation of a systematic approach to solving problems of formation of theoretical and

methodological basis for the definition and evaluation of territorial development land use, development of an appropriate mechanism for its achievement.

Modern state land cadastral system of Ukraine is characterized by the presence of the complex problems that are associated with regulatory inconsistency, lack of a unified system of management of land relations, the low level of application of modern geoinformation technologies and the introduction of the system of land administration.

In such circumstances, the relevant issue is the solution of the complex problem of increasing efficiency of land use. For the sake of territorial development of the use of land in the region in the context of transformation of land cadastre system identifies areas that are associated with the formation of the system of land administration, extend the application of geographic information systems, improving the system of collection and use of geospatial information, providing 3D visualization of the cadastral information.

Implementing the system approach is the formation of theoretical and methodological basis is characterized by the definition of territorial development land use of the region as an aggregate of spatial, urban, investment, and environmental factors whose interaction leads to the achievement of qualitative new state of land relations in comparison with the past, given the social, institutional, managerial characteristics and the level of engagement of stakeholders operating in the area of land use in coastal regions.

For the sake of territorial development of the use of land in the region, of particular importance is the assessment of its level. This creates a quantitative basis for development of methodical recommendations to increase the efficiency of land use.

The purpose of the study is to determine the theoretical and methodological provisions and practical aspects of the territorial development of the use of the land in coastal regions, taking into account the influence of spatial, urban, investment and environmental factors.

To achieve this goal, the following tasks are addressed:

1. Determination of territorial development of land use in coastal regions.

2. Justification of spatial, urban, investment and environmental factors influencing the territorial development of land use in regions.

3. Determination of transformation processes taking place in the sphere of territorial development of land use in coastal regions.

4. Formation of methods and models that provide territorial development of land use in coastal regions.

5. Characteristics of tools for the formation of territorial development of land use in coastal regions.

6. To build a multilevel system of factors influencing the territorial development of land use in regions.

7. To determine the criteria for selecting the factors of territorial development of land use in regions.

8. To create a system of indicators for assessing territorial development of land use in regions.

9. To define criteria for evaluation of indicators of territorial development of land use in regions.

10. Develop a methodological approach for integrated assessment of territorial development of land use in regions.

11. To offer directions for selection of spatial, urban, investment and environmental indicators.

The monograph solves the actual scientific and practical problem in determining the directions of territorial development of the use of land in coastal regions, taking into account the influence of spatial, urban, investment and environmental factors.

The results of the study can be used in the field of land formation and use, their assessment, territorial development in regions, in scientific and educational activities.

1 Theoretical and methodological provisions on the definition of territorial development of the use of land in coastal regions

1.1 Determination of territorial development of the use of land in coastal regions: an analysis of the theoretical positions

Modern conditions of use of the lands of the regions require a rethinking of approaches to the definition of their territorial development (TD). Globalization processes, movement towards European institutions, negative influence of external factors, internal economic instability, optimization of ties in territorial systems of different levels determine the dominant nature of territorial development. During 2004-2016 there was a slowdown in the growth rate of the gross regional product from 12.1% to 2.4%, respectively [264]. During 2016-2017, the volume of capital investments in the regional aspect is increasing by 27%, the growth rate of the index of industrial production is slowing down by 2.4%, the construction product index is growing by 8.9%. Along with this, in the regional aspect, the environmental situation worsens. For 2015-2016 there is an increase in emissions of pollutants and carbon dioxide into the air from stationary sources of pollution by 7.7% [264].

In defining the notion of «territorial development of the use of land in coastal region» the formation of a categorical apparatus is particularly important for the concept of «development». In existing scientific developments there are certain differences and variations in the views on the definition of the concept. From the point of view of ensuring and achieving a qualitative new state in the system in comparison with the past, development in the works [142, 254] was considered. A similar approach has been developed in the development [257, p. 867], which focuses on the processes of transition from one state to another and the results of this process, which is generalized in development. Within the framework of the presented approach deserves attention the theoretical positions, which are presented in the work [102, p. 213]. Thus, development is considered on the basis of quantitative and qualitative changes in the system in the long run, occurring under

the influence of external and internal factors and do not go beyond the internal nature of the system presented. A similar approach has been developed in works [83, 110, 111]. In the framework of the presented approach, theoretical positions in which development is considered as a dynamic multivariate cyclic process that has a spiral shape and is manifested through quantitative and qualitative shifts in the structure of the system while maintaining its integrity, and whose stability is ensured only under conditions of its controllability from over the system [105]. The representative of the approach presented by law can be considered as the theoretical and methodological developments which are presented in the work [53]. Moreover, the main focus is on ensuring and the need for movement for the formation of new features, structural characteristics of objects, which results in evolution, improvement, improvement, progress, growth and expansion [53]. A similar view is presented in work [228].

It should be noted that development has an evolutionary character, which leads to positive changes and results in an excellent response in the system [348, p. 253]. By dividing the position of this approach, changes in the system are of particular importance, where time factor is the key to development [408]. The evolutionary transition from one state (lower) to another state (higher) is provided on the basis of the emergence of the contradiction of the old system and new directions, the struggle of «contradictory, mutually exclusive, opposing tendencies» [409]. On the change of the quality state for development, the focus is on development [341]. In the context of the definition of development, attention is focused on the process in which the system increases its ability to meet the needs of its elements and other systems that are in the external environment in relation to it. At the same time, the development of an individual becomes important. [9].

In contrast to previous developments, some scholars focus on shaping trends that provide development, taking into account the peculiarities of creating forms and transforming matter [286]. Moreover, development is singled out:

1) non-organic matter (its physical and chemical forms);

2) organic matter (its biological form);

3) social matter (its socio-economic and political forms);

4) consciousness (such forms as science, morals, ideology, legal consciousness, religion, etc.) [286].

Functional aspects of development are noted in works [291, 363]. Describing functional directions of development, in the developments [99, 127], the main focus is on the possibilities of ensuring the transition from simple to complex, occurring as a result of the contradiction in the internal environment and the influence of external factors. In this context, the point of view, presented in work [26], where the process of transition into various forms for forming the directions of development is carried out by changing the various organizational conditions, economic nature, deserves attention.

In the context of providing development in the system of relations between people and social groups is concentrated in the works [275, 418].

In some scientific developments [426] the factors that provide it are substantiated to determine development. In this case, the main characteristics of development are distinguished:

- movement (promotion) from simple to complex;
- the presence of changes in different economic nature;
- transition from one state to another;
- increase in the scale of the phenomenon (quantitative growth);
- structure improvement (qualitative improvement);
- leakage under the influence of various factors, needs, interests, economic contradictions;
- irreversibility;
- directionality;
- regularity;
- hopping, cyclicality;
- long term;
- improvement of adaptability to external changes [112]. Dividing the position of the approach presented, some authors determine the following development

factors:

- irreversibility;
- directionality;
- regularity;
- orderliness;
- active role of internal self-organization mechanisms [231].

In the framework of the presented approach, the following factors are highlighted:

- investment;
- innovative;
- technical;
- technological [12, p. 5].

In the cyclical aspects of development focused attention in the work [39]. Within the framework of the presented approach, the main focus is on the processes of formation and implementation of development trends over the relevant period of time, where the changes are cyclical.

As a system that includes a set of interacting elements (contradictions, stages and stages, reversible and irreversible processes, translational growth, internal factors), it is proposed to consider development in development [325]. The need to form a system for the development of land relations is noted in the developments [27, 90, 139, 244, 359, 377]. Within the framework of the system approach, the development of land relations is provided through:

- unity and logical sequence of methodological approaches;
- geographical determinism;
- taking into account the regional natural-climatic, economic, social and other conditions;
- preparation of design decisions from the national to the regional and local levels [284].

The institutional approach, which focuses on organizations, government institutions, local authorities, whose functioning provides for the development of land, is presented in works [24, 29, 69, 104, 161, 165, 252, 277, 285, 389, 392, 470].

At managerial directions and aspects in the system of land relations for ensuring their development attention is focused on the developments [22, 43, 68, 85, 160, 223, 242, 283, 292, 344, 371, 383, 400, 407, 424, 425, 433]. It should be noted that the results of the study of international experience in land resources management, which will ensure the development of land relations in Ukraine [79, 96, 98, 115, 136, 143], are of particular importance in scientific developments. Herewith the following directions are determined:

- formation of a single cadastral real estate system;
- improvement of the land management system by creating a single institution responsible for the presented process;
- the use of modern tools for the management of land relations.

In this context, the introduction of a modern integrated land administration system, the essence of which is to provide real estate management, taking into account the directions of the formation, distribution, evaluation and use of land, is of great importance. The importance of introducing a land administration system is indicated in the works [37, 429, 453, 461, 479, 480, 509, 510, 511].

Providing of management of land relations, increasing the efficiency of their formation and implementation, the necessity of using modern geoinformation technologies is indicated in the author's works [178, p. 390-396; 179, p. 132–135; 180, p. 86–91; 181, p. 4–6; 184; 185; 191; 201, p. 283–286; 202, p. 60–68; 204; 206, p. 142–144; 208, p. 64–65; 209, p. 82–83; 210, p. 83–87; 211, p. 171–173; 212, p. 140–141; 213, p. 82–84; 217; 221; 485, p. 148–150; 486, p. 208–209].

The steakhtholder approach for forming the concept of land use development is characterized by the definition of the concept of «stakeholder» and their groups in the system of land relations. In particular, as individuals or groups of people who direct their efforts to achieve the goal is considered in the work [462, p. 34]. The

functional features of stakeholders are indicated in the development [456, p. 27]. A similar point of view is presented in [3, 119, 152, 466, 474].

Within the framework of the proposed approach, the point of view that is presented in the paper [459]. It states that stakeholders are identified «because of actual or potential damage and the benefits they feel or expect to experience as a result of the firm's inaction or its inactivity» [459, p. 65]. By integrating the target nature of the activity of stakeholders, their functional purpose in development [493], stakeholders are an important link in the functioning of business entities that are responsible for the effectiveness of their functioning. On the system of qualitative characteristics that influence the interaction of stakeholders the attention is concentrated in the work [295]. In this case, the main features and trends that affect the interaction of stakeholders are determined:

- mutual benefit;
- continuity of effort and continuous improvement;
- long-term time horizons;
- solutions based on real time and teamwork;
- knowledge Exchange;
- open communication;
- dispute resolution mechanism;
- identification of conditions under which relations change [295, p. 188]. To balance the interests of stakeholders to ensure the development of land relations, insists on the work [348, 391, 393].

The need to use modern geographic information systems to ensure interaction between stakeholders in the land relations system is indicated in the development [245]. The level of influence of stakeholders on the formation of spatial information in the system of land use of cities is determined in [438]. In the framework of the stakholder approach to ensure the development of land relations, attention is drawn to the provisions presented in the developments [59, 60, 62]. In particular, certain groups of stakeholders that interact in the land relations system to provide urban development activities are identified:

Group 1: landowners (legal entities and individuals with land plots, determine the possibilities of implementing town-planning directions);

Group 2: land users (legal entities and individuals using land plots implement urban planning directions)

Group 3: state bodies that form and implement land relations, urban planning policy at the state level, create regulatory support;

4 group: local authorities, forming and implementing land relations, urban planning policy at the local level, determine the regulatory and legal framework, part of their authority;

Group 5: the territorial community, which affects and realizes the right of ownership of land, ensures the functioning of the urban planning sphere

Group 6: financial institutions (banking and other financial institutions that ensure the formation and lending of financial resources for the needs in the land and urban planning sectors of cities)

Group 7: investors who invest financial resources in the use of land resources of cities and urban development activities;

Group 8: public organizations that influence the formation and implementation of land and city planning policy at the non-state level;

Group 9: organizations implementing information policy in the field of land relations and urban planning» [60, p. 38–39]. An integrated approach to assessing the influence of town-planning factors on the use of urban land, based on correlation and regression analysis and the hierarchy analysis method, which made it possible to formulate and implement measures to improve land use efficiency, which takes into account the influence and level of interaction between stakeholders [60, 199], is worthy of attention.

In the system of land relations of the regions, in accordance with the current legislation (Laws of Ukraine «On Land Management» dated 22.05.2003, № 858-IV, «On Voluntary Association of Territorial Communities» dated 05.02.2015, № 157-VIII, «On Regulation of Urban Planning Activity» dated 17.02.2011, № 3038-VI, «On Property Valuation, Property Rights and Professional Appraisal Activities in

Ukraine», dated 12.07.2001, № 2658-III, Law of Ukraine «On the State Land Cadastre» Dated 07.07.2011, № 3613-VI, Resolution of the Cabinet of Ministers of Ukraine «On the Urban Cadastre» dated 25.05.2011, № 559) their groups are defined:

- public authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local governments in the land use system;
- legal entities and individuals in settlements in the land use system of the regions;
- landowners;
- land users;
- territorial communities are united;
- customers of building products carry out development of territories;
- construction enterprises providing land development;
- design organizations providing construction projects;
- survey organizations, which form materials and data on engineering geodetic, engineering geological other surveying works and information on the established restrictions on the use of the territory in approved projects;
- economic entities of valuation activity interacting in the field of land use of regions and registered in accordance with the procedure established by legislation (individuals are business entities, as well as legal entities regardless of their organizational and legal form and form of ownership, engaged in economic activity, including one appraiser, and who received a certificate of the subject of the valuation activity);
- agricultural enterprises, institutions and organizations, private peasant farms and farms;
- subjects of territorial development for the formation and distribution and use of lands of the natural reserve fund are determined by land and water areas with natural complexes and objects that have special environmental, ecological,

scientific, aesthetic, recreational and other value, which in accordance with the law granted the status of territories and objects of natural reserve fund;

- subjects of territorial development in relation to the formation, distribution and use of lands for health purposes, having natural therapeutic properties, which are used or can be used for the prevention of diseases and treatment of people;
- subjects of territorial development regarding the formation, distribution and use of recreational lands, used for recreation of the population, tourism and sporting events;
- subjects of territorial development in relation to the formation, distribution and use of lands of historical and cultural purpose, which are located cultural heritage sites, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological territories, open air museums, memorial museums-farmsteads;
- subjects of territorial development regarding the formation, distribution and use of forest lands, which are covered with forest vegetation, as well as not covered by forest vegetation, non-forest lands that are provided and used for the needs of forestry;
- subjects of territorial development in relation to the formation, distribution and use of lands of the water fund, which are determined by seas, rivers, lakes, reservoirs, other water objects, bogs, as well as islands not occupied by forests; coastal protective strips along the seas, rivers and around the reservoirs, except for the lands occupied by forests; hydrotechnical, other water facilities and canals, as well as land allocated to the strips for them; coastal strips of waterways; artificially created land plots within the water areas of sea ports;
- subjects of territorial development in relation to the formation, distribution and use of industrial lands, which are provided for the placement and operation of the main, subsidiary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, engineering networks, administrative buildings, other structures;

- subjects of territorial development in relation to the formation, distribution and use of land transport, which includes land, provided to enterprises, institutions and organizations of railways, road transport and road transport, sea, river, aviation, pipeline transport and urban electric transport to perform their assigned tasks in relation to operation, repair and development of transport objects;

subjects of territorial development on the formation, distribution and

land use communications provided for air and cable telephone and telegraph lines and satellite communications;

- subjects of territorial development in relation to the formation, distribution and use of lands of the energy system provided for power generating facilities (nuclear, thermal, hydroelectric power stations, power plants using wind and solar energy and other sources), for objects of transport of electricity to the user;

- the subjects of territorial development regarding the formation, distribution and use of land of defense are provided for the placement and permanent operation of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military formations formed in accordance with the legislation of Ukraine;

- public organizations of invalids of Ukraine, their enterprises (associations), institutions and organizations;

- religious organizations of Ukraine, the statutes (regulations) of which are registered in the manner prescribed by law, exclusively for the construction and maintenance of religious and other buildings necessary for the provision of their activities;

- establishments of education regardless of ownership form regarding the formation, distribution and use of the land of the region;

- co-owners of an apartment building to serve such a house and ensure satisfaction of the housing, social and everyday needs of the owners (co-owners) and tenants (tenants) of apartments and non-residential premises located in the apartment building;

- organizations and companies providing information support to the processes of forming, distributing and using the lands of the regions;

- subjects of territorial development in relation to substantiation and ensuring the achievement of rational land use;

- protection of agricultural land, forest lands and shrubs from unjustified exclusion for other needs; protection of land from erosion, landslides, flooding, waterlogging, secondary salinization, drying, compaction, pollution by production waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; preventing the deterioration of the aesthetic state and the ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and standardization in the field of land conservation and fertility reproduction; the use of technogenically polluted land;

- organizations providing security in the area of forming, distributing and using the land of the region;

- financial organizations and institutions providing financing for the sphere of land use of the regions;

- foreign investors and other subjects of foreign economic activity, carrying out activities in the field of land relations of regions;

- domestic investors, carrying out activities in the field of land relations of regions [300, 302, 305, 311, 312, 316].

Summarizing the above, the theoretical and methodological approaches to the definition of the category «development» are formed (Annex A, table A.1).

Thus, as a result of the study, the rationale for the notion «development of land use of regions» was proposed, which is defined as a system of interrelated actions conditioned by social, institutional, and managerial peculiarities, which leads to the achievement of a qualitatively new state of land relations in comparison with the past, taking into account the directions and level of interaction between different groups of stakeholders operating in the field of land use of the regions.

Territorial aspects influence the development of land use in the regions. In this

context, it should be noted that territorial development is multidimensional and includes the influence of various factors. In particular, according to experts, in the field of regional demographic policy in the territorial development of regions there are processes that are characterized by a decrease in population, their significant migration, which is associated with low socio-economic conditions, uncontrollability and spontaneous demographic development, lack of targeted demographic policy, reduction qualitative characteristics of human potential [372].

In the processes of growth of regional powers of their own, especially in terms of the creation and development of united territorial communities, the use of land, which is the main source providing, in particular, the creation of opportunities to replenish local budgets, acquires particular importance.

Given the current conditions, the unresolved complex of problems, it is important to form and implement areas of territorial development of land use in the region, ensuring their prediction. Along with this, in existing scientific developments there are no uniform approaches to the definition of territorial development of land use in the region. In particular, the importance of economic and geographical factors affecting the territorial development of the regions is indicated in work [372]. At the same time, the formation and implementation of the demographic policy is of particular importance, at the present stage it has a destructive character. There are processes associated with a reduction in population, its migration to other countries as a result of internal and external imbalances, the deepening of negative phenomena.

The importance of economic and geographical factors for ensuring the territorial development of a region is also pointed out in work [350], where it is noted that «the essence of geography is to study the connections of phenomena ... not only in space, but also in time, not only next to each other, but also in the sequence of their development stages» [350].The determination of geospatial factors for territorial development is presented in the elaborations [230, 250, 382, 422].

In the study [106] external factors affecting the territorial development of the regions:

- macroeconomic factors, taking into account the level of inflation, unemployment, the size of energy tariffs;

- formation and use of the regulatory framework;

- directions and features of state regulation of territorial development of the region;

- ensuring intergovernmental relations;

- influence of external economic factors.

Along with this, to ensure the territorial development of the region, spatial, urban planning, and environmental factors are not indicated. In addition, focusing only on the economic aspects of territorial development leads to imbalances and inhibition of the presented process.

To ensure regional development, some scientists build appropriate models:

- ecological-economic: natural resources are formed, the directions of their use are determined, taking into account their impact on the ecological state, industrial and economic relations are turned out;

- innovation and investment: determines the direction of the formation and implementation of investments, given the level of their innovativeness;

- innovation: the directions and features of the formation of scientific and technological potential, multipliers of innovative development of regions are established;

- cluster: characterized by territorial and sectoral proximity, research centers, access to knowledge, information, technology and innovation, investment attractiveness, the level of public-private partnership, closed cycle;

- mobilization and innovation: determined the directions of formation of regional and innovative potentials;

- sustainable development socialization, government regulation, social responsibility, environmental friendliness, safety, informatization, property, corporate system, market regulation, allocation of resources, intellectualization, transnationalization [379]

In the presented study, the main attention is focused on the economic and

innovation-investment factors ensuring the territorial development of the regions. However, it reduces the complexity and reliability of the development, since the territorial development includes a wide range of factors that are combined into groups:

- spatial;
- town planning;
- environmental;
- investment.

In determining the development of regions, implementing an integrated approach, scientists establish the interaction between the social, economic, resource and environmental potentials of the territory [38].

The social and economic components of regional development are indicated in [360, p. 32-33].

It should be noted that in the context of the territorial development of a region, the development [34] deserves attention, where the importance of spatial characteristics is noted: «The concept of regional and local development most often refers to the spatial scale of development or actions on a specified scale of a territory. ... this question is reduced not so much to spatial arrangement, as to the «grassroots» character of the dynamics of development [34, p. 57].

Territorial development is associated with the categories of progress, modernization, degradation, stagnation, which characterizes its level [360, p. 13]. It is not clear how the categories interact while providing TR of the regions, do not take into account the spatial and other characteristics.

On stakeholder factors that ensure interaction between «self-government bodies, regional and state subjects of management, ensuring a rational combination of social, economic and environmental elements of people's living space to fully and affordably meet the diverse needs of all segments of the population» [324, p. 22].

In ensuring the territorial development of the regions, the points of view of V. Powell and L. Smith-Dor, which characterize it from the standpoint of the formation and use of «socially integrated, small, decentralized production units» [276], deserve

attention. The advantages of the presented approach are the possibilities of taking into account social, industrial, state, and managerial factors interacting on the basis of the formation and implementation of an integrated system. This allows us to conclude on the application of a systematic approach to determining the directions of TD.

The disunity of theoretical approaches to determining the territorial development of land use in the region has been established, where the focus is only on certain aspects, in particular, on spatial, urban planning, investment or environmental, or a combination of some of them. The presented approaches do not allow to systematically solve the problem of creating a theoretical and methodological basis for determining and evaluating the territorial development of land use, and developing an appropriate mechanism for its maintenance.

As a result of the analysis of existing theoretical and methodological provisions, the definition of territorial development of the use of land in coastal regions is proposed, which is characterized as a set of spatial, urban, investment and environmental factors, whose interaction leads to the achievement of a qualitative new state of land relations in comparison with the past, taking into account social, institutional, management peculiarities and the level of interaction between stakeholders operating in the use of land in coastal regions.

1.2 Regulatory support of territorial development of land use in coastal regions

The definition of territorial development of land use in coastal regions depends on the regulatory framework. According to some authors, the system of regulatory support in the field of regional development is not systemic [395, p. 322–323]. In addition, issues of the formation and functioning of institutions, the delimitation of their powers for the sustainable development of regions have been solved, a system for implementing regional policy in the context of modern transformations and the creation of new associations (united territorial communities) have not been

developed. In this context, developments deserve attention [55, 80].

The Law of Ukraine «On Promoting the Development of Regions» [314] defines that stimulating the development of regions is a complex of legal, organizational, scientific, financial and other measures aimed at achieving sustainable development of regions based on a combination of economic, social and environmental interests in the national and regional levels, maximizing the effective use of the potential of the regions in the interests of their inhabitants and the state as a whole.

Characteristics of the main provisions of the Law of Ukraine «On stimulating the development of regions» are presented in Annex B, table B.1.

As a result, the characteristics of the main provisions of the Law of Ukraine «On Stimulating the Development of Regions» have been determined; to stimulate development, the focus is on stimulating the development of regions, organizing its state incentives, determining the depressiveness of territories and developing ways to overcome it, financing development and organizing monitoring and reporting.
The formation of a state regional policy is based on the implementation of the principles, priorities and directions of implementation (Annex B, table B.2).

The formation of the state regional policy is based on the implementation of the principles, priorities and directions of implementation, namely:

1) legality;
2) cooperation;
3) parity;
4) openness;
5) subsidiarity;
6) coordination;
7) unitarity;
8) historical continuity;
9) ethnocultural development;
10) sustainable development;
11) objectivity.

In order to ensure territorial development, normative and legal acts have been developed that determine the procedure and features of local self-government. In accordance with the Law of Ukraine «On Local Self-Government in Ukraine» [308] it was established that local self-government in Ukraine is a guaranteed state right and the real ability of a territorial community - residents of a village or voluntary association of villagers, villages, independently or under the responsibility of bodies and officials of local self-government, to resolve issues of local importance within the Constitution and laws of Ukraine [307].

The principles of local government are defined:

- democracy;
- legality;
- publicity;
- collegiality;
- a combination of local and state interests;
- selectivity;
- legal, organizational and material and financial independence within the limits of authority determined by this and other laws;
- accountability and responsibility to the territorial communities of their bodies and officials;
- state support and guarantees of local self-government;
- judicial protection of the rights of local self-government [307].

The powers of local governments in the field of land relations are defined, namely:

The jurisdiction of the executive bodies of village, town and city councils includes:

a) own (self-governing) powers: preparation and submission to the council of proposals for setting the land tax rate, the size of payment for the use of natural resources, withdrawal (redemption), as well as provision for development and for other needs of land owned by territorial communities; determination in the established order of the size of reimbursements by enterprises, institutions and

organizations, regardless of the form of ownership for environmental pollution and other environmental losses; the establishment of payments for the use of utility and sanitary networks of the respective settlements; preparation and submission for approval of the council of projects of local environmental protection programs, participation in the preparation of national and regional environmental protection programs; preparation and submission to the council of proposals for making decisions on the organization of territories and objects of the natural reserve fund of local importance and other territories subject to special protection; making proposals to the relevant state bodies to declare natural and other objects of environmental, historical, cultural or scientific value, natural, historical or cultural monuments protected by law, preparing and submitting proposals to the council for making decisions on declaring them in places of mass reproduction and raising offspring of wild animals of the «season of silence» with restriction of economic activities and the procurement of objects of the animal world; land charges;

b) delegated powers: monitoring compliance with land and environmental legislation, the use and protection of land, natural resources of national and local importance, the reproduction of forests; coordination of local land authorities; coordination of applications for permission to special use of natural resources of national importance; resolving land disputes in accordance with the law; taking necessary measures to eliminate the consequences of emergency situations in accordance with the law, informing the population about them, engaging enterprises, institutions and organizations, as well as the population, in the manner prescribed by law determination of the territory for waste disposal in accordance with the legislation; monitoring the activities of business entities in the field of waste management; preparation of conclusions on the provision or withdrawal of land plots in accordance with the procedure established by law, is carried out by the executive authorities and local governments; organization and implementation of land management, coordination of land management projects; monitoring the implementation of activities stipulated by the documentation on land management; the creation and maintenance of local environmental automated information and

analytical systems, which are an integral network of a nationwide environmental automated information and analytical system to ensure access to environmental information; monitoring the compliance of legal and natural persons with requirements in the field of handling household and industrial waste and the consideration of cases of administrative offenses or the transfer of their materials to other state bodies in case of violation of waste legislation; provision of information from the State Land Cadastre in accordance with the law [307].

It should be noted that in recent years, to ensure the development of territories with regard to the use of lands in coastal regions, institutional changes are aimed at forming united territorial communities. The characteristics of the main provisions of the Law of Ukraine «On the voluntary association of territorial communities» are presented in Annex B, table B.3.

As a result of the analysis of the main provisions of the Law of Ukraine «On the voluntary association of territorial communities», the directions and features that influence the formation and functioning of united territorial communities are determined:

- principles of voluntary association of territorial communities;
- subjects of voluntary association of territorial communities;
- the basic conditions for the voluntary association of territorial communities;
- the order of voluntary association of territorial communities;
- the order of voluntary accession to the united territorial communities;
- forms of state support for the voluntary association of territorial communities and joining the united territorial communities;
- financial support by the state of the voluntary unification of territorial communities of villages, towns, cities, and joining of regional communities;
- a perspective plan for the formation of the territories of the communities of the Autonomous Republic of Crimea, region.

In addition, to ensure territorial development, reasonable forms of cooperation between the united territorial communities:

1) delegation of one of the subjects of cooperation with other subjects of

cooperation to perform one or more tasks with the transfer of relevant resources to it;

2) implementation of joint projects, provides for the coordination of activities of subjects of cooperation and accumulation of resources for a certain period with a view to joint implementation of relevant activities;

3) co-financing (maintenance) of the subjects of cooperation of enterprises, institutions and organizations of communal ownership - infrastructure facilities;

4) the formation by subjects of cooperation of common utilities, institutions and organizations - joint infrastructure facilities;

5) the formation by the subjects of cooperation of a joint management body for the joint fulfillment of the powers determined by law.

Cooperation shall be terminated in the case of prior notification by the subject of cooperation of its other subjects with payment of compensation to them in accordance with the terms of the concluded contract [313].

Directions and features of the organization of cooperation of the united territorial communities are presented in Annex B, table B.4.

Directions and features of the organization of cooperation of the united territorial communities are determined by:

- initiating cooperation;
- negotiations on the organization of cooperation;
- established institutions;
- public discussion and approval of the draft cooperation agreement;
- cooperation agreement;
- delegation of individual tasks;
- implementation of joint projects;
- the formation of a joint governing body;
- government incentives for cooperation;
- financing cooperation;
- monitoring cooperation.

Ensuring territorial development is determined by determining the directions

of functioning of local governments based on the Constitution of Ukraine. According to her, the «material and financial basis of local self-government is movable and immovable property, revenues of local budgets, other means, land, natural resources owned by territorial communities of villages, towns, cities, districts in cities, as well as their joint ownership objects in the management of district and regional councils» [144]. In addition, the directions and features are set:

- property management of a territorial community;
- approve programs of socio-economic and cultural development and monitor their implementation;
- approve the budgets of the respective administrative-territorial units and control their implementation;
- establish local taxes and fees in accordance with the law; ensure the holding of local referendums and the implementation of their results;
- form, reorganize and liquidate utilities, organizations and institutions, as well as monitor their activities;
- solve other issues of local importance that are assigned by law to their competence [144].

The formation and use of local budgets is determined by the Tax Code of Ukraine, which defines local taxes and fees, the powers of local authorities [288].

It should be noted that the local government system consists of:

- territorial community;
- village, town, city council;
- rural, town, mayor
- performers of the village, settlement, city council;
- elders;
- district and regional councils, which represent the common interests of territorial communities of villages, towns, cities;
- public self-organization bodies [307].

Defined powers in the field of land relations and environmental protection of local governments, which are presented in Annex B, table B.5.

Powers in the field of land relations and environmental protection of local governments are characterized by their own and delegated areas. They make it possible to determine the control, organizational, institutional, technical functions that influence the territorial development of the use of land in coastal regions.

The State Strategy of Regional Development for the period until 2020 was developed by the Cabinet of Ministers of Ukraine, where the relevant problem aspects and features are identified:

- a gradual increase in the concentration of economic activity at both the national and regional levels;

- uneven development of territories, growth of interregional socio-economic imbalances, significant differentiation of development of districts and cities, in part of which (more than 30 percent) for a long time there has been a simultaneous decrease in the level of economic activity and a decrease in the population;

the formation over a long period of an inefficient system of state management of regional development and an opaque mechanism of financial support for the development of regions;

- the lack of a clearly defined state policy in the field of regional development;

- the outdated mechanism of interrelations at the level of «state – region» and the regions among themselves;

- an imperfect system of territorial organization of power and delay in reforming local self-government and administrative-territorial structure;

- the technological base and monofunctionality of the industry in the Donetsk and Luhansk regions are lagging behind;

- raw nature of the export of products;

- imperfect economic structure;

- dependence on the external market, in particular energy resources;

- the growth of intraregional imbalances in infrastructure development;

- provision of public services in the field of education, culture, health and the environment and others;

- stratification of the population by income level, unemployment, social

discontent of the inhabitants of the regions, the creation of a basis for manifestations of separatism [81].

An integrated approach to regional development was proposed (Annex B, table B.6).

The integrated approach to ensuring regional development includes sectoral, territorial, managerial and instrumental components, demonstrates the need for an integrated approach, which includes a set of factors and indicators affecting the territorial development of regional land use.

Among the goals of ensuring territorial development, territorial socio-economic integration and spatial development are of particular importance. It includes:

- fulfillment of tasks and implementation of measures aimed at solving actual problematic issues of the Donetsk and Lugansk regions, the Autonomous Republic of Crimea and the city of Sevastopol;
- prevent the deepening of regional disparities in the population's access primarily to basic social, communal, administrative, transport, information and other services;
- creating conditions for regional cooperation [81].

It should be noted that certain functional aspects to ensure territorial development. Along with this, the projected specific directions and factors characterizing the spatial characteristics of the territories.

Spatial regional development includes:

- fulfillment of tasks and implementation of measures aimed at solving actual problem issues in the Donetsk and Lugansk regions, the Autonomous Republic of Crimea and the city of Sevastopol;
- providing a comfortable and safe living environment for humans, regardless of their place of residence;
- development of interregional cooperation [81].

In the system of territorial development of regions, special attention is paid to innovation and investment and intellectual capital that affect land use.

The territorial development of land use in regions is characterized by the corresponding state, directions, and their types (Annex B, table B.7).

The results of certain characteristics of the state, areas and types of territories indicate the need to take into account for ensuring the territorial development of the use of land in the regions of the peculiarities of their development, institutional, social, engineering, transport and environmental areas.

The territorial development is influenced by the regulatory and legal framework, which determines the directions and features of the use of land in the regions. In particular, special attention is focused on the Land Code of Ukraine, which defines the category of «land» as national wealth, which is under the protection of the state, guaranteed the right of ownership, the use of which corresponds to the interests of the society [118].

For the use of land, their categories are defined:

a) agricultural land;

b) lands of residential and public buildings;

c) lands of natural reserve and other nature conservation purposes;

d) lands for recreational purposes;

e) recreational lands;

e) lands of historical and cultural purpose;

e) forest lands;

f) water fund lands;

g) industrial, transport, communications, energy, defense and other lands [118].

The directions and features of the use of land of the regions according to their categories, the characteristics of which are presented in Annex B, table B.8.

Based on the analysis, it was determined that in order to characterize the areas and features of the use of lands of the regions, their categories are determined:

- agricultural land;
- lands of residential and public buildings;
- lands of nature reserve fund and other nature conservation purposes;
- health lands;

- recreational lands;

- historical and cultural lands;

- forest lands;

- water fund lands;

- lands of industry, transport, communications, energy, defense and other purposes;

- industrial lands;

- lands of industrial parks;

- lands of transport;

- railway land;

- lands of sea transport;

- lands of river transport;

- lands of automobile transport and road facilities;

- air transport lands;

- pipeline lands;

- urban electric transport lands;

- lands of communication;

- earth energy system;

- lands of defense.

It should be noted that to ensure the use of the lands of the regions, measures are being taken to:

- organization of the development and implementation of national and regional programs for the conservation, reproduction and protection of soil fertility;

- development and implementation of soil-friendly and environmentally safe technologies;

- providing observation of changes in the soil quality indicators;

- soil monitoring;

- ensuring the formation of national, regional and local information data banks on the state of the soil of lands development and promotion of the introduction of an economic incentive mechanism for the application of soil protection technologies

and improvement of soil fertility;

- maintaining an informational data bank on the soil state of lands [301].

Land use in the regions is based on the use of directions for the formation and implementation of a land management system, a characteristic of which is presented in Annex B, table B.9.

To determine the directions of the formation of territorial development of land use of the regions, taking into account the peculiarities of the implementation of land management, the main focus is on:

- organization and planning of land management;
- implementation of land management;
- land management documentation;
- topographic, geodetic and cartographic works in the implementation of land management;
- land inventory in the implementation of land management;
- soil, geobotanical and other land surveys in the implementation of land management;
- soil assessment in land management;
- land assessment in the implementation of land management;
- natural and agricultural zoning of land in the implementation of land management;
- technical and technological support of land management;
- provision of land management consultancy services;
- land management schemes and feasibility studies on the use and protection of land of administrative and territorial units;
- land management projects to establish (change) the boundaries of administrative-territorial entities [305].

The use of land of the regions depends on the level of their assessment and peculiarities of the lease. The main areas of land valuation are presented in Annex B, table B.10.

The use of land of the regions depends on the results of the assessment, which

takes into account information on the assessment of soil, economic and monetary valuation of land [310].

The use of regional lands is influenced by factors determining their functional purpose, characterized in accordance with the Procedure for the normative monetary valuation of land in settlements, approved by the Ministry of Agrarian Policy and Food of Ukraine. So, we determine the coefficient characterizing the functional purpose of the land in accordance with its category [293]. This takes into account the coefficients characterizing the number, geographical location, status and location of human settlements. It is necessary to point out the definition of functional planning, engineering infrastructure, engineering geological, historical and cultural, natural landscape and sanitary and hygienic factors [293].

To ensure the territorial development of land use in the regions, the results of the normative monetary value of a unit of arable land for agricultural purposes (table 1.1) are determined.

Table 1.1

Results of a standard monetary assessment of a unit of arable land in regions [294]

Region name	Standard monetary assessment of 1 hectare, UAH.
Vinnytsia region	27078,28
Volyn region	21607,36
Dnipro region	27078,28
Donetsk region	31167,66
Zhytomyr Oblast	21165,27
Transcarpathian region	27520,38
Zaporizhzhia region	25254,64
Ivano-Frankivsk region	26194,09
Kiev region	26194,09
Kirovograd region	32107,11
Lugansk region	27078,28
Lviv region	22049,46
Nikolaev region	27078,28
Odesa region	31167,66
Poltava region	30283,47
Rivne region	22049,46
Sumy region	26636,19
Ternopil region	28901,92
Kharkiv region	32549,20
Kherson region	24370,45
Khmelnitsky region	29841,37
Cherkasy region	33930,75
Chernivtsi region	32991,29
Chernihiv region	23873,10

Consequently, based on the results of the determination of the normative monetary valuation of agricultural land, it was established that the greatest value was characterized by:

Cherkasy region - UAH 33930,75;

Chernivtsi region- UAH 32991.29;

Kharkiv region - UAH 32549,2;

Kirovograd region - UAH 32107,11;

Odesa region - UAH 31,167.66;

Donetsk region- UAH 31,167.66;

Poltava region - UAH 30283.47

The lowest value was determined by the regions:

Zhytomyr region - UAH 21,165.27;

Volyn region - UAH 21607,36;

Lviv region - UAH 22049.46;

Rivne region - 22049,46 UAH.

In Annex B, table. B.11 certain urban factors affecting the direction and features of the territorial development of land regions:

- zonal;
- determine urban planning activities of the regions;
- functional planning, which determine the urban development activities in the populated areas of the regions;
- structural planning;
- planning and restrictive;
- engineering training and equipment areas;
- transportation support;
- historical and architectural.

To ensure the territorial development of land use in regions, areas and features of environmental development are characterized. This determines:

- the state of the environment or its objects - land, water, mineral resources, atmospheric air, flora and fauna and the level of their pollution;

- biological diversity and its components, including genetically modified organisms and their interaction with environmental objects;

- sources, factors, materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) that affect or may affect the state of the natural environment and human health;

- threats of occurrence and causes of environmental emergencies, the results of the elimination of these phenomena, recommendations on measures aimed at reducing their negative impact on natural objects and human health;

- environmental forecasts, plans and programs, activities, including administrative, state environmental policy, legislation on the protection of the environment;

- the costs associated with the implementation of environmental measures from the funds of environmental protection, other sources of funding, economic analysis carried out in the decision-making process on issues relating to the environment [309].

In addition, the order is taken into account and the behavior with waste is determined (Annex B, table B.12).

As a result of the analysis, it was established that to ensure the treatment of waste in the context of the implementation of environmental measures to ensure the territorial development of land use in the regions, directions were proposed and features were identified:

- waste management directions;

- rationing in the field of waste management;

- state accounting and certification of waste;

- maintaining a register of objects for the formation, treatment and disposal of waste;

- maintaining a register of waste disposal sites;

- monitoring of waste generation, storage and disposal sites;

- functional factors to reduce or prevent the generation of waste [298].

In the system of territorial development of land use in the region to ensure the

implementation of environmental areas of particular importance are measures to counter emergency situations (Annex B, table B.13).

Thus, to ensure the implementation of environmental trends, the proposed measures to counter emergency situations in the system of territorial development of land use in the region include:

- alerts about the threat or occurrence of emergency situations;
- information on the occurrence and prevention of emergency situations;
- shelter population in the protective structures of civil protection;
- evacuation measures;
- engineering protection of territories;
- radiation and chemical protection of the population and territories;
- medical protection, provision of sanitary and epidemic well-being of the population;
- biological protection of the population, animals and plants;
- psychological protection of the population man-made safety measures;
- fire safety measures [140].

The territorial development of land use of regions is affected by the level of their investment attractiveness. For this, the directions and features of use are determined:

- funds, target bank deposits, shares, shares and other securities (except for bills of exchange) used in the field of land relations;
- movable and immovable property (buildings, structures, equipment and other material values) that is at the disposal of regional authorities;
- intellectual property rights used in land relations;
- a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («know-how»);
- rights to use land, buildings, structures, equipment, and other property rights;
- other values;

- capital investments directed to the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations [306].

Thus, as a result of systematization of the existing legal and regulatory framework for determining the territorial development of regional land use, the need has been established to apply a systematic approach to its characteristics, taking into account the multidimensional nature and characteristics of territorial development and land use at the regional level. In addition, special attention is focused on the factors that determine the direction and assessment of the territorial development of land use in the region. In particular, based on regulatory and legal provisions, it is proposed to form groups of factors: spatial, urban planning, investment and environmental. Defined groups of factors allow you to build a system of indicators for assessing the territorial development of land use in the region and form:

The contours of the regional system of development of land relations.

1. Catalysts for building information and analytical support for territorial development of land use in coastal regions, based on the principles of completeness and reliability.

2. Dominating directions on solving the problem of increasing the efficiency of land use for the territorial development of regions.

3. Problem aspects occurring in the field of land relations and characterizes the level of destruction of the traditional land use model.

4. Directions for the introduction of modern land use models to ensure the territorial development in regions.

5. Methodological aspects that allow to combine the positive directions of the existing theoretical and methodological approaches and develop an integrated toolkit for the implementation of modern methods and models to ensure the territorial development of land use in coastal regions.

6. Scientifically based areas of territorial development of the region arising from the internal nature of land relations, their technical and technological levels and the prevailing socio-economic relations, taking into account the environmental features of functioning.

1.3 Characteristics of programs and factors affecting the territorial development of land use in coastal regions

Spatial, urban planning, investment and environmental factors influence the territorial development of regional land use. In this context, developments deserve attention [173, 174, 261, 262, 263]. It is necessary to point out a certain system of spatial, urban planning, investment factors affecting the use of urban land [260]. The author's work pointed to the need to determine the factors presented in the land use system through the prism of valuation procedures, cadastral information, and monitoring [175, 176, 177, 182, 183, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 203, 205, 207, 210, 214, 215, 216, 218, 219, 487].

In development [236], directions and features of town planning are determined to ensure the management of territorial development. Moreover, this process determines the influence of environmental and social factors, creates a system of territorial development of the city. To ensure territorial development, balancing the influence of socio-economic and town-planning factors is determined, where the instruments are «the development and observance of the requirements of city-planning documentation at the regional and local levels, namely: territory planning schemes; master plans of settlements; land management plans; regional and local building regulations; urban cadastres of settlements» [97].

Ecological factors and the directions of their formation and interaction in the system of territorial development are focused on works [162, 229, 431, 432].

In works [52; 64; 82; 101, p. 5, 255; 345] to form a system of territorial development, the factors of management of urban planning are determined.

For the development of land relations in the regions of Ukraine, appropriate programs have been developed, the characteristics of which are presented in Annex C, table C. 1.

As a result of the analysis of the main provisions of regional programs for the development of land relations in Ukraine, the directions of their formation and implementation were determined: justification of ways and means to solve the

problem; program tasks; the main directions of development of land relations.

Moreover, the main attention is focused on the formation of information and analytical support for land relations at the regional level, based on land inventory, creating directions for their distribution, taking into account economic, environmental and social aspects of regional development. It should be pointed out on the improvement and implementation of the regulatory and legal framework for the territorial development of regional land use.

Thus, on the basis of the study, the factors influencing the territorial development of land use in the region are determined - spatial, city-planning, investment, and environmental. They create the basis for building a multi-level system of indicators, developing a methodological approach to assessing the territorial development of regional land use and methodological recommendations for its provision.

2 International experience in territorial development of land use in regions

2.1 Territorial development of land use in regions: international aspects and features

To ensure the territorial development of land use in the region, the analysis of international experience is important. It should be noted that the largest share in the land structure of the regions is agricultural land. Consider the international experience in the use of agricultural land.

In this context, the experience of Germany deserves attention, where the appropriate regulatory and legal framework has been formed for the implementation of land policy in the context of ensuring territorial development, land use is carried out on the basis of a federal act in compliance with the ecological balance of the territories [13].

In the Netherlands, land use is carried out depending on the purpose of the land when it is impossible to carry out any other activity in the territory represented.

The experience of Great Britain, where the land market is owned by the royal family, is worthy of attention. However, it can be freely sold under rather complicated procedures for changing its purpose [380].

In Italy, in order to ensure efficient use of agricultural land, market formation is carried out in accordance with their intended purpose and stakeholders interacting in the field of land relations. In addition, the state has a significant influence on this process, ensures the implementation of opportunities and access to preferential credit resources for obtaining land.

In Israel, the system of land relations is regulated by the state and exercises a high level of control over its use [444].

In China, there is no market for agricultural land, where it is forbidden to sell it. Along with this, opportunities are created for their treatment with the determination of optimal sizes for increasing the efficiency of their use [445].

In Bulgaria, land use is carried out through the prism of the impossibility of

selling land to foreign individuals and legal entities, where the share of foreign capital exceeds 50% [133].

In the system of agricultural land use in international practice, rental relations are of particular importance. In particular, in most countries that provide territorial development of land use, the formation of rental relations are long-term:

- The Netherlands - 6 to 12 years;
- Luxembourg - 6 to 9;
- France - 9;
- Portugal - 10 years or more;
- United States – 5-10;
- China – 30-50 [70].

In addition, in the field of rental relations, a high level of agricultural land was attracted:

- Belgium - more than 68% of the total land used by farmers;
- France - 50-52%;
- England - 37%;
- United States - 40%;
- The Netherlands - 38%;
- Germany - 30 - 36%;
- Italy - almost 19%;
- Denmark - 18% [46].

In the context of land use in the region, the evaluation aspects of their definition are of particular importance. So for the evaluation of land in the United States are determined by the following factors: the structure of land use, farm size, level of intensification, location of the farm and others. Information support is formed on the basis of the soil map, where the results of the valuation, the data on the level of crop yields on various soils, the level of production costs, the prices generated for agricultural products, the distance of the land plot from infrastructure and sales sites, the demand for products [394]. In this case, a scoring is used, the results of which reflect the level and characteristics of land use and land administration. So, in the

USA economic assessment of lands is carried out, taking into account regional features of their formation and use.

In Germany, economic and agroclimatic assessment of land is carried out based on the use of a point method. When evaluating land, the following steps are implemented:

- determination of coefficients for assessing the quality of the soil, taking into account the peculiarities of their use;

- determination of land fertility using appropriate coefficients;

- the formation of spatial characteristics of land, the level of regional prices and wages;

- determine the average land use ratio.

A similar assessment mechanism is implemented in the UK, which takes into account the economic and agro-climatic features of agricultural land.

In France, data from the land cadastre are used for evaluation, where the results of land accounting and quality are determined. In addition, for in the assessment system takes into account the geomorphological features that appear on the basis of land inventory [394].

In Italy, land valuation also uses cadastral information with the determination of the corresponding cadastral value, taking into account correction factors.

When using regional lands in different countries, the main focus is on the functional purpose (Argentina, USA), balanced ecological land use (Germany, France, Belgium, the Netherlands, Spain, Italy, UK), institutional and regulatory features (USA, Germany, France Spain, Italy, United Kingdom, etc.), the use of modern land use systems (landscape-specific to the land use of agriculture, ground management complex, soil-farming system and contour organization of the territory, No-till (minimizing tillage), precision farming, biological farming, organic agricultural production – Germany, Great Britain, Switzerland, Denmark, Netherlands, USA, Italy) [2, 100, 151, 490].

When using lands of settlements in regions for ensuring the territorial development of land use, Western European cadastral systems are of particular

importance. They are formed in the relevant areas: land register, cadastral maps and legal records. Ownership accounting techniques vary, although each country has a register of real estate plots. Such a registry may be the Land Registry itself (land registry) or an integral part of it. The inventory (or a set of cadastral survey results) and the Land Registry, as a rule, are maintained by a single organizational service, less often - these services are different, but they cooperate with each other in the exchange of data for mutual control and the formation of a multi-purpose inventory [399].

Common features of Western European cadastral information systems are that they provide systematic coverage of the entire territory and continuous updating of data. For a land information system this is the only guarantee of its effectiveness. Also worth noting is the similarity of the technology of maintaining information in the registers. As a rule, land plots are characterized by the type of land use, area, type of buildings, location, owner information and links to other registries and information systems containing additional information about the territory and owner. The data presented in conjunction with other information systems allow obtaining multilateral information about the owners and the sites [399].

The study of areas and features of land use of settlements is indicative of the experience of the Netherlands. The main legislative act in the field of representation is the Civil Code of the Netherlands, where land and cadastral registration is carried out by one organization - the Cadastre. It includes notary fees that create or transfer real rights to land. The connection between cadastral and land registration is carried out through the cadastral number. The basis of cadastral registration is a land plot. Structures and infrastructure under or above the surface are not registered directly as objects. Information on such structures can be obtained on the basis of the rights and obligations that relate them to areas on the surface [473].

The cadastral dataset contains the boundaries and numbers of parcels, the outlines of buildings, the name of streets and house numbers. The contours of railways, transport networks and telecommunication networks are reflected in the

topographic part of the cadastral map, and information about them is not included in the inventory data set [472].

Properties in the Netherlands can be registered in the existing cadastral system on the basis of the following rights:

a) property;

b) limited ownership;

1) superficies;

2) long-term lease;

3) servitude.

c) joint ownership.

In the registration system, each property has a unique code [472].

Property rights in the Netherlands relate to land plots, including the space above and below the plot for the height and depth that the user has the ability to apply. The use of space above and below the surface is permitted to third parties as long as it is high enough or low, and does not interfere with the user of the ground part.

Owners may be restricted in the use of the site by limited rights, such as superficies, long-term lease, servitude, or social restrictions [472]. If the land is not established rights, the rules of vertical and horizontal connection.

Vertical connection means that the owner of the site has all the structures and structures attached to this site. Horizontal interconnection - in accordance with the Dutch Civil Code, structures in the ground are part of the property according to the rule of vertical interconnection, unless this structure is part of another property. Along with this, it is impossible to build a structure that will belong to another property without the consent of the owner of this property.

The rules of vertical and horizontal accession are a consequence of the actual situation and are not approved by rights, therefore, in many cases lead to conflict situations [472].

It should be noted that the right of superficies is the real right of ownership or acquisition of a building, structure or vegetation in, on or above real estate owned by another person. The design must cross the surface level (at least partially). The

owner of the servitude is the owner of the structure. The right of servitude is applied when the owner of the structure and the land is different persons. The geometry of the spatial extent of such a right is not supported in cadastral registration. A special case of superficies is its right to cables and pipelines. In this case, in cadastral registration, it is not presented as a limited right of ownership, but as a legitimate message, as the need for cadastral registration to the fact that a land plot is restricted, but it is not a right. A legitimate message may refer only to a part of a plot, but spatial information about the location of the cable or pipeline in the cadastral database is not supported. It is allowed to add relevant graphic information to the documentation, but this is not mandatory [469].

The right of superficies affects the code «OS», the right of ownership, limited by the right superfetsiya affects the code of «EVOS». The right of superficies to cables and pipelines affects the code «OL», and if such a right is enshrined only in part of the land, then - the code «OLD».

The legal status of structures below or above the surface can also be established by a long-term lease. Such a tool is not special for 3D models, but can sometimes be used. They decide to impose the right of long-term lease on a part of the land plot or on a part of the vertical column of the land plot - that is, on its above-ground or underground parts. The geometry of the space on which the long-term lease is imposed is not supported in the cadastral registration and can only be attached as documentation drawings. The right of long-term lease is applied, for example, in the metro in Amsterdam. Its spatial length in the cadastral and land registration is unknown, only the drawings [469] are attached to the documentation.

The tenant is assigned the code 'EP', and the landlord – «EVEP».

Another right is the servitude, which acts as a restriction, the imposition of a land plot in favor of another land plot - the dominant one (KV code). However, sometimes the dominant land plot is difficult to allocate, such as, for example, for a pipeline, and an easement is established in favor of the owner of the pipeline. Such a restriction is tied to the subject to whom it is beneficial. Easements are not

registered in the register as a limited right of ownership and are not displayed spatially in the cadastral system [472].

The peculiarity is that not the actual object is registered, but only the right, which imposes restrictions, i.e. characteristic of the right, and not the object is present in the information in the database. Consequently, the right of servitude is assigned to the owner of the underground object.

The right of common property is the right to land or structure, which is registered like a condominium law. It is used when several owners jointly own property located within one or several land plots in order to receive profit in shares approved by the contract.

Joint ownership defines the obligations of each co-owner to transfer to another co-owner access to the use of jointly owned property. One of the co-owners may transfer part of their rights to another user, regardless of their property. The peculiarity of such a right is that it is assigned to the land plot, and not to the owners (as in the right of servitude) [472].

The right of common property is applied in the registration for such objects as underground parking, swimming pools, tennis courts and the like.

In international practice, certain features on the reflection in the cadastral information of underground real estate objects. In particular, since 2003, communication cables are real estate objects, they are always owned by the owner of a permit to use them [469]. This user is the owner of the land on which the cable comes to the surface. In the cadastral system, ownership of communication cables is recorded as limited ownership. The code 'TC' or 'TCD' is set to all areas where communication cables are located.

Since 1998, the codes «OB» and «OBD» have been entered to report the presence of underground objects under land plots. In the database, such a code indicates that there is an underground structure under the surface of the site.

«OB» code that is associated with the land and the subject who is responsible for the underground object. This code shows the actual situation, and not the rights or restrictions associated with it. Although an object such as a restriction is

registered, it does not have any legal consequences. The boundaries of underground objects affect visibility code «2», which means that the boundaries are not visible on the surface (above) [472].

For infrastructure objects, not the objects themselves are registered in the cadastral system, but only rights that restrict land users [468]. So, in the cadastral system it is impossible to determine exactly the vertical and horizontal location of the cable or pipeline within the land, although you can use the codes of invisible on-site contours of underground objects.

The contours of objects that are below the surface are indicated in the topographic part of the cadastral database using a specific classification and visibility code [469].

The main disadvantages of the Dutch cadastral registration in the case of 3D property models are that they are designed on the surface and the spatial extent of the rights is not available in the cadastral registration. In addition, the actual situation is not properly reflected in cadastral registration, for example, showing (3D) the contours of physical structures above and below the surface.

Summarizing the existing theoretical concepts, certain shortcomings of the registration of underground objects of real estate [473]:

- the right is registered in the cadastral system, however, the functionality of the object to which the right relates is left unattended (underground infrastructure, metro station, underground parking)

- 3D spatial information about underground objects (geometry, location) is not available in the cadastral system;

- the use of a special code can only inform that there is an object under the land plot, but there is no information about the characteristics of such an object.

The disadvantages of registering underground infrastructure are the following:

- rights for infrastructure objects are established by the right of ownership, restriction of rights and legal communications. All of them are set at the intersection of land, and not on the infrastructure itself. Consequently, these rights apply to land plots, and not to infrastructure facilities;

- there is no generally accepted way to register the legal status of infrastructure facilities, since it is not approved at the national level;

- infrastructure facilities are divided into several sections that they cross [469].

So, information on the whole infrastructure facility will be unavailable, even the location of the infrastructure facility in the cadastral system is unknown. At such a request, the system will display land plots crossed by such an object. If we assume that the new plots will be generated, a situation may arise when not all the plots under which the infrastructure object passes, documents are drawn up and the infrastructure object is interrupted in the cadastral system; when dividing a plot, it is not known exactly to which part of the land plot the restriction related to the infrastructure object applies.

In Denmark, there are four main registries of real estate, which are subject to various authorities:

- cadastral registry;
- land registry (land register)
- building and housing register (BDR)
- registry evaluation (SVUR).

The cadastre of Denmark is subordinated to the National Agency for Land Management and Cadastre, which is a division of the Ministry of the Environment. The main objective of the Danish cadastre is to support an efficient land market and provide the basis for proper land management [471].

The land registry is a register of rights to real estate, subordinated to the Ministry of Justice. It contains legal data on property rights, the name of the owner of the land, information on pledges and servitudes. Since 2000, the Land Registry has been fully converted to electronic form, although property rights remain only analogous. The land registry uses real estate identifiers established by the cadastre.

Municipalities (number 275) are responsible for two types of real estate registration: buildings and housing (BDR) and evaluation (SVUR). The Ministry of Economics and Internal Affairs is responsible for these two registrations [471].

The cadastral registry in Denmark consists of four parts:

- Register of real estate and land;

- cadastral map;

- sheets of measurements related to the boundaries;

- register of control points used in cadastral surveys.

The cadastral register of sites and property is an administrative register containing information about the sites (identifier, its area, road area, protected forest areas, coastal protection zones, dune protection zones, the number of individual land units that make up its total area).

The cadastral map is an overview, which shows the registered boundaries of land plots and roads, which are not considered as cadastral plots, although they form a complete spatial separation of the territory, that is, the roads do not cross land plots. All land plots and roads on the cadastral map have district identifiers. In addition to the plots, the cadastral map also contains other information - various boundaries (the central line of rivers and currents more than 3 m wide, if the flow of water is the boundary of the road, railway lines, edge of the lake, coastline, county boundary) or the area of public restrictions for free use of land (protected forest, coastal protection zone) [472].

In the cadastre of Denmark, the borders that are not visible in the field do not need to be reflected on the cadastral map (all borders are delimited by field boundary marks in the field). Therefore, new parcel boundaries are created to indicate the servitude area on the cadastral map. Instead, an analog drawing may be included in the property right. The spatial extent of the infrastructure is not defined in the cadastral registration, but information about it can be obtained in the Land Registry (Land Registry) [471].

In Denmark, three organizations provide real estate registration:

- Municipality: registration assessment and registration of buildings and housing.

- Cadastre: registration of plots and real estate.

- Land Registry: registration of real property rights, restrictions and property items.

The laws of Denmark are based on the principles of international law on property: the right of ownership is established on the plots and is not limited in the vertical dimension. Horizontal division (legal or actual) in the property may be established by restrictions, which are determined in accordance with private and public law.

Rights in accordance with private law, which can be used to establish a horizontal division of property - most of the common ownership (condominiums) or servitudes. Denmark has a legal structure, similar to the right to the surface, which refers to buildings on leased land. The spatial limitations of these rights are not specified directly in the inventory [471].

Public servitudes (restrictions related to public law) are registered in the land registry, to which public authority the servitude belongs. The location of these restrictions in most cases is not represented in the cadastral map and is not available in the corresponding system.

At the present stage in Denmark, great importance is attached to environmental laws. In this regard, information on protected forests, protection zones of dunes, coast and polluted land plots is maintained by cadastral registration. Restrictions on prohibited zones are determined by the ownership in the land registry. All this information is spatially maintained on a cadastral map. These zones do not necessarily have to coincide with the boundaries of the sites, this means that environmental restrictions can be imposed only on part of the site, without the need to create new boundaries of the site. The spatial extent of these restrictions is shown (in 2D) on the cadastral map. In the context of 3D mapping, the most important restriction of public law is that of soil contamination. However, current property registrations do not contain 3D information on soil contamination [503].

In the current Danish legislation, the land is limited only by vertical limits, horizontal boundaries are established only by restrictions [503].

Norway’s cadastre is an information system that is based on land plots. Both the national and local governments have developed rules that guarantee certainty of

the boundaries of real estate and leased land, are appropriately sized and mapped, and have updated and complete records.

Although land registration in Norway was regulated, starting from the 13th century, it was only after 1978 that the Land Sharing Act entered into force that a single property registration system was introduced throughout the country. However, this law covers property in two-dimensional space. This complicated the identification and registration of underground structures. The municipality of Oslo together with the Land Registrar developed a cadastre that could cover three-dimensional objects [507].

In 1987, the municipality of Oslo approved a cadastral system called the Oslo Method, based on an agreement between the city and the local court. The resulting system created the conditions for the registration of 3D objects. The presented inventory determines the conditions for the allocation of areas below and above ground [507].

On January 1, 2010, a new cadastre law came into force in Norway. According to the new law, certain conditions for the formation of spatial «construction sites» («construction parcel») and the establishment of rights to them, that is, «rights to structures», which are characterized as rights to property that is not on the surface of the earth (underground, above ground , under water, etc.). They can be installed below the surface of the earth or above the surface (usually structures built on poles) [506].

The general principle of registering above certain rights is based on the «Oslo method», according to which the entire land of a municipality is divided into fixed numbers of large territories, each of which contains the main registration number. These territories are then divided into sections and numbered in succession with the numbers of sections. Within the municipality, a plot is identified by a uniquely identified territory, it has a corresponding number (eight digits). At the national level, four more digits have been added to identify the municipality [508].

The Land Division Act in Norway regulates the land management and administrative templates for the land allocation process, and which requires the new plot to be properly identified.

Allocation of land begins with a statement from the owner of the property. A map showing the new frontier should be attached to the application. The local building authority decides whether the allocation should be allowed in accordance with existing land use and local development and construction plans. Allocation permission will not be granted if the area is too small to build a house. It is also necessary to have a conclusion on the access road, water supply and sewage disposal, before final permission is given. Then the area is measured (shooting is performed) and a new border is fixed. The process always includes the alignment in the field of the borders of the new land tenure with the existing plots [508]. In Norway, a 3D cadastre is being actively developed to ensure land use.

The cadastral system of Sweden consists of land laws (the Land Law), property formation (the Real Property Formation Act), practicality of servitudes (the Utility Easements Act), the Joint Facilities Act, the Land Management Code (the Land Survey Code) and the Real Estate Register (the Real Property Register), which includes the Land Register.

Since January 1, 2004, new legislation for the multidimensional definition of real estate (3D Cadastre) [468] entered into force in Sweden. The law was prepared by a committee appointed by the Swedish government in 1994 to investigate the potential for solving problems of the use of different types of land. During 2004-2008 240 3D property units are formed.

The rules for the formation of three-dimensional property units came into force on May 1, 2009, which are included in the current legislation, in particular the Land Law and the Property Formation Act. This means that multi-spaced property units are formed by cadastral procedure and are subject to the requirements of the land inspection [468].

It should be noted that before permission is given to form multidimensional units, it is necessary to fulfill several specific conditions. The first condition is that

property units must contain, or be assigned for maintenance, a building or some other structure, and not simply consist of air and soil mass. A multidimensional property unit does not always consist of a building or structure, it may also cover a part of a building or some other building. This means that a building can be divided into different units of property (property), always under the condition that these units, like other property (property), are defined [469].

In this context, a prerequisite is that the 3D property unit is provided with access to the surface of the earth [467] on the basis of established servitudes when the property unit is formed or have access. Examples of units that may not be suitable for determining 3D property units: it is located in a rocky cave without accessibility to the ground or at the top of a building in the absence of a lift or stairs.

The following criteria are set for 3D property [467]:

- the right of ownership is determined;
- ownership, regardless of land ownership, within the boundaries of the site;
- 3D model of property (property) is an object for a loan;
- public authorities, credit institutions and other interested persons who are able to obtain information about the rights established on property;
- the purpose of the 3D property transformation is the formation of opportunities for the use of this property.

To avoid empty property units of space, 3D property is associated with real constructions. In contrast to the system operating in Norway, the building can be divided into different property units, refers to the problem of condominiums.

The Real Estate Register in Sweden consists of the following parts [467]:

- The main register.
- Cadastral index card.
- Register of coordinates.
- Register of plans.
- Register of blocks.
- Address Register.
- Register of General Engineering Structures (GA-register).

According to the Land Code of Sweden, real estate includes communications located above or above the ground and are in permanent use. The real estate unit also includes other structures that are outside the real estate unit, if they are intended for permanent use as a servitude in favor of this property and do not belong to the unit of real estate on which they are located. So, in the register of Sweden you can get information about underground utilities, since they are independent real estate units.

In the GA-register, the unit of account is a common engineering structure, which is created according to the rules set forth in the Law on Joint Structures or in the Law on Public Structures.

Easements for engineering structures are established by cadastral survey and are registered in the real estate register. Registration is carried out on the basis of the decision of the cadastral authority on engineering structures.

The property formation procedure is implemented on the basis of the cadastral information, which is entered into the Real Property Register. This applies to the formation or re-formation of multi-dimensional property units. In the section «3D-information» information is determined, which is indicated by the presence of one or more 3D spaces of a property unit and deepened by one or several intervals. In the «Location» section for the property unit, it contains 3D information, specific information for each space (underground level, structure, bridge, tunnel, etc.), center coordinates, minimum and maximum heights, a horizontal area and the identity of the property unit [483]. Some features are entered in the Real Property Register, as well as in the cadastral index map to identify multidimensional property units, which has the appropriate number.

The main disadvantage of the existing cadastral system with 3D objects is that there are no tools and methods for measuring and displaying the boundaries of three-dimensional property units in the system. Therefore, the spatial characteristics of 3D objects are unknown in the cadastral system.

In the cadastre and land law, multifunctional use of 3D is not supported. In particular, according to the Land Code of Israel, the property right to a plot extends from the center of the Earth and radially goes into outer space, including everything

that is built and cultivated within the limits of space. In this regard, there is a need to find a legislative and cadastral solution for registering rights for multi-use [450].

The government of Israel in 1999. Decided to improve the efficiency of land use. To this end, the Land Management of Israel has set up a group of experts, one of whose tasks was to develop ways of cadastral registration of spatial rights and the development of an appropriate draft decision (R & D project).

The main goal of this project is to approve a model for registering rights to land in spatial definition by solving problems:

- 3D definitions and registration of spatial sites;

- proposals for amendments to the Land Law, planning and construction rights, to the Law on Land Management;

- formation and storage of geometric data that can be added to a 2D cadastral system for its conversion into 3D models;

- development of appropriate software for visualization of the 3D inventory

- change of the existing land management procedure for recording the spatial extent of the land plot [450].

The expert group has developed four areas for the development and improvement of the legislative framework and the cadastral system:

a) directions for «Improving Land Law», aimed at ensuring transformations in the area of underground and above-ground space of a land plot, on the basis of legislative limitation of rights to use 3D. Individual rights are limited to a specific height and depth relative to the surface of the site within the limits of operation possibilities. Thus, a new type of law is formed in the law – «the right to use», which is spatially different from the «right to property». However, the emergence of such a right can be defined as a restriction of the constitutional right to property, therefore the «right to use» is applied subject to certain conditions [499]:

- not contrary to the laws of the State of Israel;

- used to achieve a specific goal;

- within a single extent.

Moreover, a specific goal is to increase the efficiency of land use of the country;

b) the direction of «Condominium Registration»;

c) the direction of «Object registration», which consists in the definition of «object registration» for spatial objects, is completely separated from the existing land registration. This type of registration should apply only to features. This is the easiest way, but it leads to additional procedures. The problem arises of defining links between the existing registration system and a separate spatial object registration system;

d) the direction of the «space piduchastku» («Spatial Sub-Parcel»), which provides that each spatial object is an independent unit of land relations with certain rights and duties [498].

A significant number of developments is devoted to solving the problems of creating «3D inventories». Cadastral systems that are able to take into account three-dimensional real estate objects, to one degree or another, exist in Norway and Sweden. Projects operate in Denmark, the Netherlands and Israel. Such countries as the USA, Canada, Australia, Greece carry out scientific research in the field of three-dimensional accounting of real estate objects.

In general, solving the issues of introducing three-dimensional registration of real estate, you should pay attention to the following: using the «3D plots», the concept of property rights is changing and there is a need to make significant changes to legislative acts that require a significant investment of time. It should also be clearly understood which «vertical boundaries» should restrict the rights of the owner or user of a surface area from the operation of its above-ground and underground space. Important changes are needed for a new definition of the concepts of servitudes and joint ownership.

Legislation does not set the main directions of the necessary changes, and adapt to the existing practical experience. This leads to a constant backlog of law from practice.

The cadastral system in each country uses its own conversion mechanism to account for 3D models.

The modern direction of formation of information about real estate and land is its introduction and use in the 3D cadastre. The term «3D inventory» can be interpreted in many ways, the solution is from a full 3D inventory that maintains the volume of the lot to the current inventory, in which, information is limited to being supported in 3D situations. Consider several options for implementing information about real estate and land in modern land and cadastral systems:

- 3D signs in the existing cadastral system;
- hybrid solution;
- full 3D inventory;
- inventory of engineering networks.

3D signs in the current cadastral system indicate the saving of 2D inventory with external links to (digital or equivalent) characteristics of 3D situations. Difficult 3D situations are recorded using specialized solutions within the current registration capabilities, as long as each registered right can be determined with reference to 3D models. The difference with the hybrid inventory is that the 3D models are maintained separately, not combined with the cadastral geographic dataset.

Application in current cadastral systems of 3D models is used by developed foreign countries. Such a system does not provide complete information about the objects, but the presence of references to objects that are not visible in the cadastral system creates conditions for taking into account the presence of underground objects.

A hybrid solution as a way to create an inventory is characterized by the preservation of 2D inventory and the integration of registration of 3D models into the existing system of cadastral geographic datasets. This leads to a hybrid solution of legal registration (2D section) and registration of 3D models. Cadastral registration of 3D models provides perception, but is not legally linked: according to cadastral information, it is necessary to obtain from existing documents (documents, measurement letters) defined in the land registration. In such cases, both sellers and buyers will have to agree on a description of the amount to which the new owner is entitled. Such a description can then be used for 3D registration. A

3D representation can be either the volume to which a person is entitled (the first alternative), or a physical object (the second alternative) [472].

The first alternative characterizes 3D rights registration, is already defined, and uses the appropriate models. An alternative is considered as a tool to display in the 3D aspect of rights (that is, visualization of rights in 3D, as part of a cadastral geographic dataset that can be defined in the system).

The second alternative is the registration of directly physical objects to which the structures are joined in the cadastral dataset in the same way as buildings in the current cadastral registration. In the case of 3D legal volumes (the first alternative), the site is the starting point of registration (limited rights are established on this site), in the case of 3D physical objects (the second alternative) the physical object is the starting point for registration. In both alternatives, legal and cadastral concepts of property and property are not changed, as in a full 3D cadastre: rights are always set and registered on 2D plots, as long as the site owner can be restricted in the use of the plot, limited by rights and legal norms. Therefore, the rights for 3D property models are set in the same way as in the Netherlands and Denmark. The difference lies in the way these rights are registered and displayed in the cadastral system [472].

Full 3D cadastre means the transfer of the concept of law in 3D space, divided into volume sections. The legal basis, protocols of real estate agreements and cadastral registration, in this case must support the establishment and transfer of 3D rights. A 2D cadastral map does not impose any restrictions on 3D rights, that is, rights granted to persons on volumes not related to the external configuration. It should be noted that rights and restrictions are associated with volumes. The indoor units will be real estate objects defined in 3D, to which the subject may have absolute right. A full 3D cadastre needs a change in the legal system, cadastral and technical structures.

However, in modern conditions, the real estate object is in its essence also 3D. Two alternatives are possible for a full 3D inventory. In the first alternative, volumetric areas are established only in 3D models and therefore it is still possible to identify areas characterized by surface limits. The first alternative begins with a

conversion due to the reflection of areas in the third dimension (the area with a certain boundary on the surface turns into an infinite (or virtually indefinite) that intersects with the surface at the location of its borders).

In the complex implementation of a full 3D cadastre (second alternative), only real estate objects that it defines are three-dimensional areas (limited in all dimensions) that form a complete separation of space. In the second alternative to a full 3D inventory, it is no longer possible to name a person by the endless columns of a site defined by boundaries on the surface that have clearly defined characteristics [472].

In recent years, the development and implementation of a 3D cadastre, which characterizes the future development of modern cadastral systems, has been carried out in developed international systems.

When characterizing a 3D cadastre, it should be noted that the paradigm of the formation of the land itself - property as an object of the state land cadastre - is changing. Therefore, it is necessary to introduce the definition of not only 3D cadastre, but also 3D property, 3D real estate objects [469].

So, a 3D cadastre is defined as a cadastre that registers and characterizes the rights and restrictions of not only the land plot, but also the units of 3D property.

The 3D property unit (3D property) is the time of space that is necessary for the use of a land plot (property) and which is subject to the right of ownership in accordance with the law [472].

Given the above, we can conclude that the issue of developing the 3D inventory becomes more and more relevant every year. The development of a 3D cadastre contributes to the implementation of 3D registration, which includes not only a certain part of the territory, but also the corresponding space covered by the right of ownership under the law. Creating a 3D cadastre allows you to get a clearer, objective, reliable, visual land cadastre information on real estate, which is aimed at ensuring the territorial development of land use in the region.

3D inventory allows you to improve the main tasks of the cadastral registration:

a) 3D registration provides information on the 3D extent of rights, limited rights and legal information, allows the integration of 3D information in a cadastral geographic dataset;

b) 3D inventory compiles digital information about 3D situations. Digital information ensures the exchange and integration of information within cadastral offices, municipalities and provinces, creates the conditions for determining 3D situations in an interactive mode;

c) 3D cadastre allows interaction with other registration systems, for example, with the cadastral system of engineering communications;

d) owners of infrastructure constructions will benefit from clear registration of the location of infrastructure facilities.

As a result of the analysis of existing theoretical provisions, determining the main limitations in the existing cadastral situation. Firstly, the three-dimensional space where the law applies is not registered and is not available in the cadastral registration. Secondly, structures and other processes under land plots are also not registered in the Unified Book. Since there is no connection with the three-dimensional representation of reality, cadastral registration cannot properly reflect the real situation. Therefore, the three-dimensional approach includes at least two aspects: on the one hand, it gives a view of the spatial component of limited rights, and on the other hand, it allows you to save spatial, as well as non-spatial information about structures associated with the land.

A study of the structure of rights to real estate in different countries shows that the possibility of three-dimensional separation of real estate has been created. Analysis of the practical implementation of the main legal institutions allows us to divide them into the following legal models: ownership, lease, superficiality, easement. Almost all of these models satisfy the needs of potential investors in the exercise of their property rights to real estate under the ground [240].

However, owners who exercise their rights to three-dimensional real estate are interested in a reliable guarantee of their rights and receive comprehensive information about potential investment objects. A guarantee is presented and

information is provided by unambiguous localization of real estate in space and an adequate image of them in documents establishing law. Realization of such an opportunity for all real estate objects on a single spatial basis leads to the realization of the idea of creating a three-dimensional cadastre of real estate objects [240].

For the formation of the cadastral system, the main direction of creating spatially linked data is to determine the significance of the land. At the same time, information is generated about ownership and other rights to land, about a loan, taxation, assessed value and the like. The presented data can be used in combination with other types of information, for example, the population, enterprises, buildings and structures, data on which can be correlated with certain 3D. In addition, all this information is determined geographically, by linking land to a common spatial coordinate system [399].

Ensuring the integration and interaction between different users of land information has led to the formation of a significant number of information systems based on the cadastre (cadastral land information systems). This system is part of the legal and fiscal information system, which includes data on ownership rights, fiscal information related to valuation and taxation. The combination of legal and fiscal information in one system is important, since cadastral data about the site is the spatial basis of information databases. It reflects a retrospective of the development of the cadastre in Europe, at the highest level of which are state land information systems based on land cadastral data [399].

The International Finance Group, within the framework of Commission 7 «Cadastre and Land Administration», continues to study cadastral issues. In 1994, the Commission established a Working Group to develop a concept for the future cadastre in 20 years («Cadastre 2014»).

The emphasis of «Cadastre 2014» is aimed at the importance of completeness (completeness of information) of the cadastre and the inclusion of public and private rights in the cadastre. In accordance with the presented definition, Cadastre 2014 is a methodically organized public register of data on all legal land objects in a particular country or region based on a survey of borders [476].

The key concepts of the new definition of the cadastre are the land object and the legal land object, which reflects the whole range of changes in the legal, social, political and technological spheres of society. In addition, the land object is characterized as a plot of the earth's surface, within which there are homogeneous conditions. Legal land objects are described by the legal content of rights and restrictions of rights and borders that define the boundaries of the rights and restrictions [240].

As a result of the analysis of international experience, the directions and features of the territorial development of land use in the region are identified, where special attention is focused on modern tools and the possibilities of presentation in 2D and 3D in the formation of cadastral information, creates the information basis for territorial development.

2.2 The system of land administration as a modern direction in the development of land relations

In international practice, a land administration system is used to develop land relations. It is defined as one area of the land, real estate, the amount of space, air above the surface, everything that is under and next to the object.

In the context of the definition of land administration, the point of view that is presented in [429] deserves attention. It is characterized as «processes related to land ownership, land value, land use and land development carried out by the government (government) using public or private sector institutions». The land administration system includes:

- institutional arrangements;
- regulatory framework;
- processes, standards, land information;
- management and dissemination of systems and technologies necessary to support distribution, land markets, assessment, management of the use and development of interests in land [429].

The land administration system is based on a set of international regulatory documents:

1. Land administration guidelines: with special reference to countries in transition – United Nations Economic Commission for Europe – United Nations.

2. United Nations-FIG Bathurst Declaration on Land Administration for Sustainable Development.

3. Land administration in the UNECE region. Development trends and main principles.

4. Land administration for sustainable development.

5. ISO 19152:2012 Geographic information – Land Administration Domain Model (LADM).

6. INSPIRE. D2.8.I.6 Data on Specifications Cadastral Parcels – Technical Guidelines 3.1 [460, 461, 479, 480, 509, 510].

The introduction of an integrated system of land administration in Ukraine, according to experts, is determined by problematic aspects that are associated with:

- the lack of a common system in the management of land relations and the use of land resources;

- departmental fragmentation of structures whose activities are related to land information; each structure collects the data it needs;

- separate maintenance of land and urban development cadastres and a register of rights to real estate, which complicates the development of a unified land policy, the processes of preparing common decisions and the provision of services, duplication of data;

- unsystematic, unrelated separate solutions to issues of ownership, assessment, use, development of land by various organizational structures;

- the limited use of modern information technologies, including geographic information technologies, creates obstacles to the implementation of a unified policy and the interconnected effective work of departments, services and users [429].

To implement the integrated system of land administration in international practices, geographic information systems are used, it is a comprehensive toolkit that

allows for analysis, taking into account the spatial, urban, investment and environmental features of land ownership, assessment, use and development of land.

The need for the application and development of geographic information systems and technologies to ensure land relations in the system of territorial development of regions is indicated by foreign scientists [76, 77, 117, 241, 404, 411, 448, 452, 456, 457, 464, 465, 475, 477, 494, 505].

To ensure the management of land relations in international practices, public administration systems are used, the characteristics of which are presented in table 2.1.

Table 2.1

Systems of state administration of land relations management (systematized by the author)

Name of the system of state administration	Countries	Characteristic	Benefits	Disadvantages
1	2	3	4	5
classic	France, Germany, Austria, Italy, Spain	formed on the basis of the implementation of the principle «general to private», where general principles are developed and state measures are taken to create a land management system, implemented on specific land plots, the quality of agricultural lands is determined, crop yields on arable lands and forage land productivity are taken into account [481]	allows you to determine the main directions of formation and implementation of the public administration system, build a unified system management where changes occur «top to bottom»	significant influence of government on the formation and implementation of land policy, the complexity of the implementation, in particular, given the need for their implementation at the level of specific land.
transitional	USA, Australia, Canada	is determined by focusing on the formation and use of a particular land plot, the assessment of its spatial parameters, the principle from «private	takes into account the directions and features of land use at the level of the land plot, allows for specific changes	there are certain problems in determining and accounting for territorial, economic, environmental

Continuation of table 2.1

1	2	3	4	5
		to general» has been implemented [481]	that affect the formation of public policy	and social requirements [353].
integrated multifunctional	Sweden, Finland, Latvia, Lithuania, Estonia, Netherlands	aimed at creating a multi-purpose cadastre, the formation and use of which is carried out by applying geoinformation and navigation systems, the changes occurring at different levels of land use are taken into account, where the interaction between the infrastructure of the multifunctional land administration system, the spatial data infrastructure, spatial information about the activities of state, municipal and private sectors [353]	allows you to build a unified system of state management of land relations, given the multifunctionality of the interaction of spatial data, the structure of land relations, the interaction of various groups of stakeholders using modern Geoinformation and navigation systems	the complexity of its formation and use, the need to improve the system of spatial and information support.

The presented systems of state administration of land relations in developed countries are being transformed into a modern integrated system of land administration. This system allows the interaction between the functions of land administration:

- land ownership;
- assessment;
- use;
- land development.

In this context, land relations management is ensured, taking into account the peculiarities of land ownership, use and development, and the results of their

assessment. So, the principle of multifunctionality of land relations at all levels of land management is being decided.

The characteristics of the functions of land administration are presented in table 2.2.

Table 2.2

The characteristics of the functions of land administration according to [429, 460, 461, 479, 480, 509, 510]

Function name	Characteristic
1	2
land tenure	determined by processes and institutions related to securing land rights and investing in land to ensure distribution, accounting and security. The main directions of the implementation of the land ownership function: registration of property rights to land; registration of land under contracts (purchase, sale, mortgage and leasing); registration of land by social events (death, birth, marriage, divorce, shutdown and inclusion in the number of management groups); formation of new land plots or property (division and consolidation) determination of the boundaries of land.
land valuation	characterized by processes related to the valuation of land and property rights. The objects of land valuation are: territory administrative-territorial units or their parts, territories of assessment districts and zones, land plots or their parts or a combination of land plots and rights to them, including land shares (units), within the territory of Ukraine. In addition, real estate, property rights are included in the assessment. Land valuation is based on the principles of: legality, compliance with the laws of Ukraine, other regulatory legal acts in the field of land valuation; unity of methodological and information space in the field of land valuation; the continuity of the land valuation process; accessibility to use land valuation data; equality before the law of subjects of valuation activities in the field of land valuation. Evaluation is carried out using the following methods: valuation; economic assessment; monetary value [310]. The proposed methods are used in domestic practice with the use of international experience, where individual and mass assessment are widespread.

Continuation of table 2.2

1	2
land use	determined by the processes and institutions associated with land use management determined by processes and institutions related to land use management through the adoption of planning policies and land use rules at the national, regional and local levels; enforcement of land use regulations; land use conflict management and litigation. Land use management is carried out through spatial planning in urban and rural areas. Urban land use planning is carried out by developing and approving master plans for settlements, zoning plans for territories and detailed plans for the territory. As an effective tool for managing land use in the countries of America and Europe, «zoning» is widely used, which extends to agricultural land. Planning the use of agricultural land is a component of land management, as a set of socio-economic and environmental measures aimed at regulating land relations and the rational organization of the territory, business entities carried out under the influence of social and industrial relations and the development of productive forces. A common means of managing land use is land use documentation, including land use projects for land use [429].
land development	determined by the processes and institutions associated with the construction of a new physical infrastructure; implementation of construction planning; land acquisition for public use; expropriation; land use change by granting planning permission; construction and permission to use land; distribution of development costs. Urban development is a general term that covers a wide range of activities from planning new urban areas to the construction of individual structures or buildings. For a specific development project, the process may contain a number of measures and procedures, including the acquisition of land, planning permission or building permission, detailed design, evaluation and approval of the planning project, construction supervision, conclusion of contracts and construction. In rural areas, the focus is more on sectors such as agriculture, forestry, and general environmental protection [429].

So, in the territorial development of land use in the region an important place is occupied by the land administration system, where its functions are comprehensively implemented and interact (land ownership, assessment, use, land development). In modern land administration systems, geographic information systems are widely used as tools for the formation, processing and application of information on the territorial development of land use in the region.

2.3 Definition of land: legal and theoretical aspects

Given the international experience of territorial development and use of land in the region, the definition of land is of particular importance.

According to [58], land is the most important part of the natural environment, characterized by space, topography, climate, soil cover, vegetation, subsoil, waters, which is the main means of production in agriculture and forestry, as well as a spatial basis for the location of enterprises and organizations all spheres of the state's life.

The most used legal definition of land in domestic legislation comes down to its surface, which covers the soil layer and territorial basis, which is facilitated by the implementation of the top layer of the earth with several functions: settlement, economic, environmental, socio-cultural, health-improving, communal and other, related to the life support of man and society.

In the current legislation of Ukraine, land as an object of legal regulation is considered in several meanings. So, according to Clause 3, Article 2 of the Land Code of Ukraine, objects of land relations are lands within the territory of Ukraine, land plots and rights to them, including land shares (units). In this context, lands within the country are objects of land relations to the allocation of specific land plots and determination of rights to them. In turn, individual land plots and land rights are independent objects of land relations [288].

It should be noted that in accordance with paragraph 1 of Article 2 [118] land relations are public relations for the ownership, use and disposal of land, not land.

The Land Code of Ukraine provides for the possibility of owning not land, but exclusively a land plot. In accordance with Article 79 [118], it is characterized as part of the earth's surface with established boundaries, a specific location, and rights defined with respect to it. The ownership of the land plot extends to the space above and below the surface of the plot to the height and depth necessary for the construction of residential, industrial and other buildings and structures. As a result of the study, it was established that the concept of a land plot refers to the earth's surface, and the underground space is its integral part to the extent necessary for the

construction of facilities. The specific depth of use of the underground part of the land by the Land Code of Ukraine is not provided, therefore, there is reason to believe that it is not limited. In three-dimensional boundaries, the land is a «pyramid», or, as is commonly called in foreign literature, a «column».

So, the main feature of the land is the presence of established vertical boundaries. The legislation does not provide for the possibility of limiting the horizontal levels of railway and the use of its underground part separately from the ground. Therefore, the space used for the construction and operation of underground real estate in accordance with the legislation of Ukraine is not a railway, and the phrase «underground land» is incorrect and meaningless.

Thus, the underground space under the current legislative standards in Ukraine can be described as follows:

a) legal status - part of the land;

b) the form of ownership is in that form of ownership, land;

c) the ownership, use and disposal rights of the railway belong to its owner or user.

In the land legislation of Ukraine there are no legal norms for the underground part of the land plot, while the term «part of the land plot» is defined in legislative acts (for example, under sublease, pledge). To account for the three-dimensional boundaries of the railway, it can be divided into two parts: ground, above ground and underground. By geometric characteristics, all these parts can be represented by limited volumes of space and are closely interrelated. For example, you can use the ground part without using the aboveground space above it, and vice versa. Therefore, to allocate rights to the underground space, it is proposed to consider the «underground part», along with its ground - equal parts of software.

In the case when the land owner or land user uses the entire land (land, aboveground and underground parts), they do not allocate specific rights to one of these parts. But, if the owner or user for his full-fledged management, the aboveground part and the aboveground space are sufficient, then the underground part is outside the process of its use, and this, according to Article 5 [118],

contradicts one of the principles of land legislation - ensuring the rational use of land. The provision of underground space by one land owner or land user to another created the conditions for increasing the efficiency of land use and obtaining additional financial results for participants in land relations.

To determine the possibilities of legal support of the underground spaces used for the placement of real estate and infrastructure, it is proposed to define part of the land as an object of ownership in accordance with domestic and foreign legislation.

In the land law of Ukraine, the problem of determining an important inalienable category of the land market - part of the land plot - remains unattended. According to Clause 1, Article 2 [118], objects of land relations do not count part of the land plot. Moreover, in the Land Code of Ukraine there is no norm at all on the characteristics of a part of software. Along with this, the practice of transferring rights to a part of the land plot and participation in market relations of just such a unit of real estate is used.

At the legislative level, only the legal regime of the «share of the land plot» and «part of the railway in the common law and property» is defined, however these categories cannot be equated with the concept of «part of the land plot». The concept of divisibility and indivisible railway, which are defined in the legislation of foreign countries, is not described in the Land Code of Ukraine.

Therefore, it is advisable in accordance with paragraph 1 of article 183 [413] to determine that things are divided into divisible and indivisible. Divisible is a thing that can be shared without losing its intended purpose. Thus, it can be argued that to alienate part of the land subject to the above norms, namely, to separate part of the property subject to the conditions for the divisibility of things. This approach is justified in the case of underground facilities - if the underground part of the railway is outside the economic interest of the owner of the land and does not participate in the process of using the land for its intended purpose, the owner has every reason to alienate the underground part of the land in a convenient way.

However, under the present conditions, there is no real mechanism for selling part of the railway because land surveyors and land management lawyers solve such

situations in different ways, the discussion of the problem of alienation of part of the land today is transferred only to the procedural plane, ignoring the priority issue, namely, the problem of definition and legislative fixing the very concept of «part of the land as an object of ownership». Today, this problem has not been solved in Ukraine either at the legislative or theoretical level [168].

It should be noted that international practice solves the problems presented. In particular, the Land Code of Sweden enshrines the concept of divisibility of land plots and the allocation of part of the land plot as an independent object of land relations. Swedish law provides that part of the land can be allocated as an independent railway and can be rented or can become part of the common property.

So, as a result of the analysis, it was found that in Ukraine there are no provisions governing the division of the land, its alienation as part, negatively affects the effectiveness of relations management to ensure the territorial development of land use in the regions. Therefore, an important area is the improvement of regulatory support for the definition of land, taking into account the direction and characteristics of the division of the land.

Existing scientific developments lack common approaches to the definition of land in the context of ensuring the territorial development of their use. In particular, some scientists [85, 225, 226, 369, 390] focus on the functional features of their use. Moreover, it is important to increase the efficiency of land use in the region, given the environmental, economic, natural and landscape conditions. Corresponding directions of increasing the efficiency of land use are determined:

- regulation of land use;
- ensuring the rational use of land and their protection in the system of territorial development;
- the formation of an environmental safety system for the use of land in the region;
- ensuring guarantors of the exercise of land rights;
- land use improvement;

- balancing spatial and urban development areas of territorial development of land use in the region;

- increasing investment attractiveness of land;

- ensuring interaction between various groups of stakeholders operating in the land relations system of the region;

- the formation of areas of rational soil treatment.

The regulatory aspects of land definition are concentrated in [19, 45, 50, 51, 154, 246, 342, 343, 364, 414]. At the same time, infrastructural and informational aspects of land use are characterized.

Characterizing the conceptual apparatus for the definition of land, in some scientific developments [126, 164, 235] a systematic approach is implemented, where economic, social, technical and organizational characteristics are distinguished. Moreover, land is considered as a complex category, which is formed on the basis of a set of characteristics that affect the territorial development of the region. In this context, the development of scientists [267, 270, 271, 272, 279, 281, 282, 356, 384, 385, 386, 388, 393, 428, 429, 458, 502, 503, 510] that define the earth as a system category, formed by integrating spatial, geographical, functional, target, urban, environmental characteristics, is considered in conjunction with real estate. This approach allows us to take into account modern transformation processes in the field of land relations, where the main focus is on the interaction of spatial, urban, environmental and investment factors. Using a systematic approach combines modern theoretical and methodological approaches and practices aimed at developing comprehensive tools for assessing the territorial development of land use in the region. It should be noted that the implementation of the presented approach and the definition of land as a system category also makes it possible to level methodological and institutional contradictions associated with a diverse interpretation of the presented concept and the creation of various government bodies that ensure the implementation of common functions aimed at the formation, distribution, assessment and use of land and make a certain imbalance in the system of land relations.

In contrast to the previous approach, some scientists define the earth from the perspective of its individual components and characteristics:

- as a means of production [11, 19, 103, 168, 237, 353, 361];
- as a spatial characteristic of territorial development [57, 118, 288, 384, 446];
- as an object of property relations [42];
- as an object of integration of economic and environmental characteristics [14, 87, 88, 155, 346, 347, 365, 366, 402, 427];
- as an object of social relations, ensures the security of territories [6, 63];
- as a natural resource [89, 171, 349];
- as a combination of resources [238, 443];
- as a factor ensuring urban development [25, 61, 62, 169, 289, 290, 308, 315, 316];
- as a factor affecting the ecological state of the region [8, 23, 47, 108, 114, 125, 145, 374, 375];
- as a factor of investment attractiveness of the region [36, 94, 120, 121, 124, 157, 222, 265, 268, 327, 328, 329, 330, 331, 333, 334, 337, 338, 358, 397, 495].

Thus, on the basis of research and the systematization of scientific provisions, it is determined that land is a multidimensional category, the formation of the categorical apparatus of which is based on the application of a systematic approach, regulatory support, taking into account spatial, urban, environmental and investment characteristics, affects the territorial development in regions. In the study, the definition of land on the basis of a systematic approach made it possible to propose directions for solving institutional problems by creating a unified state body for land management based on the formation and implementation of a land administration system. The definition of land in accordance with the modern conditions of their use at the regional level requires the transformation of legal support, especially regarding the definition of land as a component, is included in real estate, regulation of the division of land, its alienation as part of real estate.

3 Methods and models used to ensure the territorial development of land use in regions

3.1 Methods used to ensure the territorial development of land use in regions

In the system of territorial development of land use in regions, methods are applied. According to the Law of Ukraine «On the Basics of State Regional Policy», the priorities of state regional policy are: «creating an effective system of environmental protection by taking into account the environmental component in regional development strategies, assessing, leveling and reducing the technogenic and environmental load on the environment in the regions; the introduction of effective instruments of state support for interregional integration, the implementation of interregional programs and projects; improvement of material, financial, informational, personnel and other resource support for the development of regions, assistance to the exercise of powers by local authorities» [304], where the solution of issues of improving the system of land relations management is important.

In modern conditions, spatial factors determine the territorial development of land use in the region. In particular, according to the level of use of agricultural lands, namely for their development, Zaporizhzhya, Kirovograd, Nikolaev, Odessa oblasts are characterized by the highest values - more than 80%. The lowest values of the agricultural land development indicator are observed in the regions: Transcarpathian, Ivano-Frankivsk, Rivne region - more than 37, 46 and 48%, respectively. A similar situation is observed with the level of development of territories.

Open wetlands in Ukraine mainly occupy areas with low-lying swamps, which are mostly represented in: Volyn, Rivne, Chernihiv regions.

Dry open lands with special vegetation cover a small proportion of the total area and are located in the Kherson region, to a lesser extent - Donetsk, Zaporizhzhya, Lugansk and Sumy regions.

The presented analysis includes spatial factors affecting the territorial development of land use in the region and are determined when constructing appropriate models and applying methods.

To assess the level of territorial development of land use in the region, appropriate methods are used that are associated with spatial characteristics. The methods presented are substantiated in [454, 463, 489, 491].

In developments, spatial econometrics is defined as a toolbox that allows you to establish spatial relationships and form quantitative parameters for decision-making in the field of land use.

In [403, 447] spatial econometrics was defined as a set of methods for generating spatial data and establishing the dependence and spatial heterogeneity (heterogeneity) of data.

The use of tools of spatial econometrics was developed in [326, 423].

Spatial econometrics allows you to determine the direction of spatial interaction and spatial structure by building models. It creates opportunities for the scientific substantiation of methods and models that allow to obtain quantitative representations of the patterns of land use taking into account spatial branching on the basis of information support using mathematical tools. In the framework of this area, mathematical models and methods for analyzing geographically distributed information are developed and studied, allowing for the spatial transformations of objects and their impact on the use of land in regions.

In recent years, analytical software and tools that are used for modeling are of particular importance for the formation of the territorial development of land use in regions. In this context, one should point to the determination of the spatial dependence by the use of autocorrelation, which is aimed at assessing the relations between two random variables. If there is a systematic character in the spatial distribution of a variable, it is characterized by spatial autocorrelation [448].

The value of autocorrelation depends on the structure of the arrangement in the space of polygons:

- if adjacent polygons are located close and have similar values - a positive spatial autocorrelation is observed;

- if adjacent polygons are close, but have dissimilar values, negative autocorrelation is detected;

- if the distribution of polygons is random, then autocorrelation characterizes the lack of a clear structure in the space of polygons.

The proposed analytical methods for establishing quantitative relationships between factors are determined in the system of territorial development of land use in the region by applying: a matrix of spatial weights, the Moran index and the Geari coefficient (table 3.1).

Table 3.1

Description of analytical tools for assessing the impact of spatial, urban, investment, environmental factors on the use of land in the regions, identifying patterns and relationships between them in the monitoring system for land use

Analytical Tool Name	Characteristic
Spatial Weight Matrix	when studying the relationships between objects, spatial weight matrices are used, which represent the results of determining the dependence of the corresponding factors. Based on various measures, matrices of limit neighbors, nearest neighbors, matrixes of distances, distances taking into account the size of the object are used. Spatial weight matrices are quadratic, that is, if there are n observations, the weight matrices contain n2 potential relationships. The main diagonal of the matrix consists of zeros, the influence of the object on itself. The matrix of limit neighbors is constructed to take into account the relationships of objects with neighbors that border it. The matrix of nearest neighbors takes into account the values of indicators at a given distance. The distance matrix reflects spatial weights and can take into account the size of objects.
Moran Index	determined by the model, which takes into account the number of polygons in the study region; the value of the interval or relative variable for the polygon; the value of the interval or relative variable for the polygon; the average value of the interval or relative variable x for all polygons; spatial weight matrix element for a pair of polygons; sum of all elements of the spatial weight matrix. The value of the Moran index varies from -1 to 1, which determine either negative or positive autocorrelation [220].
Geary Coefficient	determines the level of autocorrelation and dependencies are established, its value varies from 0 to 2 [220].

It should be noted that in order to establish the relationships between factors, identify the relevant laws between them, the characteristics of spatial, urban

planning and other relationships, it is proposed to use correlation-regression analysis. This allows you to create information support for the territorial development of land use in regions.

Correlation-regression analysis is applied in the following areas:

- the formation of information-analytical, spatial, urban environmental, investment support for the use of land in regions;
- identification of factors affecting land use;
- determination of indicators used to form the information support for the territorial development of land use in regions;
- the construction of mathematical models of the influence of indicators on the integral criterion of territorial development of land use;
- determining the degree of influence of indicators on the integral criterion of territorial development of land use in regions based on the use of correlation and determination coefficients;
- checking mathematical models for adequacy by applying appropriate criteria;
- interpretation of the results;
- development of measures to increase the efficiency of land use in regions to ensure territorial development.

It should be noted that as a result of the application of correlation and regression analysis, corresponding mathematical models are constructed, the adequacy of which is checked by applying the criteria (Annex D, table D.1).

Given the spatial characteristics of the territories, to ensure the territorial development of the use of land in the region, valuation methods are applied that take into account the results of normative and expert land valuation, soil appraisal, and the level of urban development of the territories.

Methods of structural elements determine the direction and features of the application of components of the land use structure, allows you to build models and develop appropriate measures to identify deviations in territorial development.

In the system of territorial development, monitoring of land use is carried out, the implementation of the results of which in practical activities is formed by using

the technology of its implementation. In existing scientific developments and monitoring practices, the focus is mainly on monitoring activities of agricultural lands. Transforming the technologies presented, the dissertation proposed functional directions for the formation of information support for monitoring the use of land in regions:

- analysis and generalization of existing information support on the state and use of land;
- soil and environmental survey of land;
- research of spatial and urban planning information characterizing the state and level of land use;
- formation of a geodatabase on the state and use of land;
- conducting field experiments on the level of land use and the interaction of spatial, urban, environmental factors affecting land use;
- conducting special, crisis and scientific monitoring of soils, provides a comprehensive study and control of soil properties;
- conducting a comprehensive analysis and assessment of changes in the state and use of land;
- identification of negative phenomena and crisis areas;
- substantiation and planning of measures to eliminate the negative impact of land use factors;
- development of directions for improving land use efficiency.

The application of the results of monitoring the use of land in the process of regulating land relations is proposed, when conducting a monetary assessment, determining the size of land payments, developing measures to protect land resources, and rational and ecological use of them.

At each of the stages presented, appropriate tools are used. In particular, to analyze and generalize the existing information support on the state and use of lands, study spatial and urban planning information characterizing the state and level of land use, create a geodatabase about the state and use of land, geographic

information systems are used that allow you to create a single database, analyze and identify «problematic» land use zones.

Soil-ecological survey of lands is carried out on the basis of directions and results of soil assessment, which is an assessment of their quality according to the main natural properties, which are permanent and affect the state and level of land use, given spatial, urban, environmental, climatic conditions.

Based on the provisions of the Law of Ukraine «On Land Assessment», along with soil scoring, it includes:

- the formation of information support in accordance with state standards, norms and rules;
- conducting a study of the state of the land, which is carried out at least once every 7 years;
- soil scoring is carried out by legal entities that are developers of land management documentation [310].

Along with this, the presented Law defines the general provisions on soil appraisal, which is aimed at studying the state of agricultural lands. However, in modern conditions of transformational changes taking place in the sphere of land relations, areas and levels of land use, there is a need to conduct soil appraisal for the lands of urban agglomerations. According to the author, the formation of a single database of land appraisal results is of great importance.

To conduct field experiments on the level of land use and the interaction of spatial, urban, environmental and investment factors affecting land use, the following areas were identified:

- study planning;
- development of a program to conduct research on the status and characteristics of land use;
- determination of methods and technologies for conducting experiments on the level of land use and the interaction of spatial, urban, environmental factors affecting land use;
- selection and research of the state and level of land use.

The monograph offers directions for the formation and use of tools for information support for the application of environmental factors affecting the use of land in regions (Fig. 3.1).

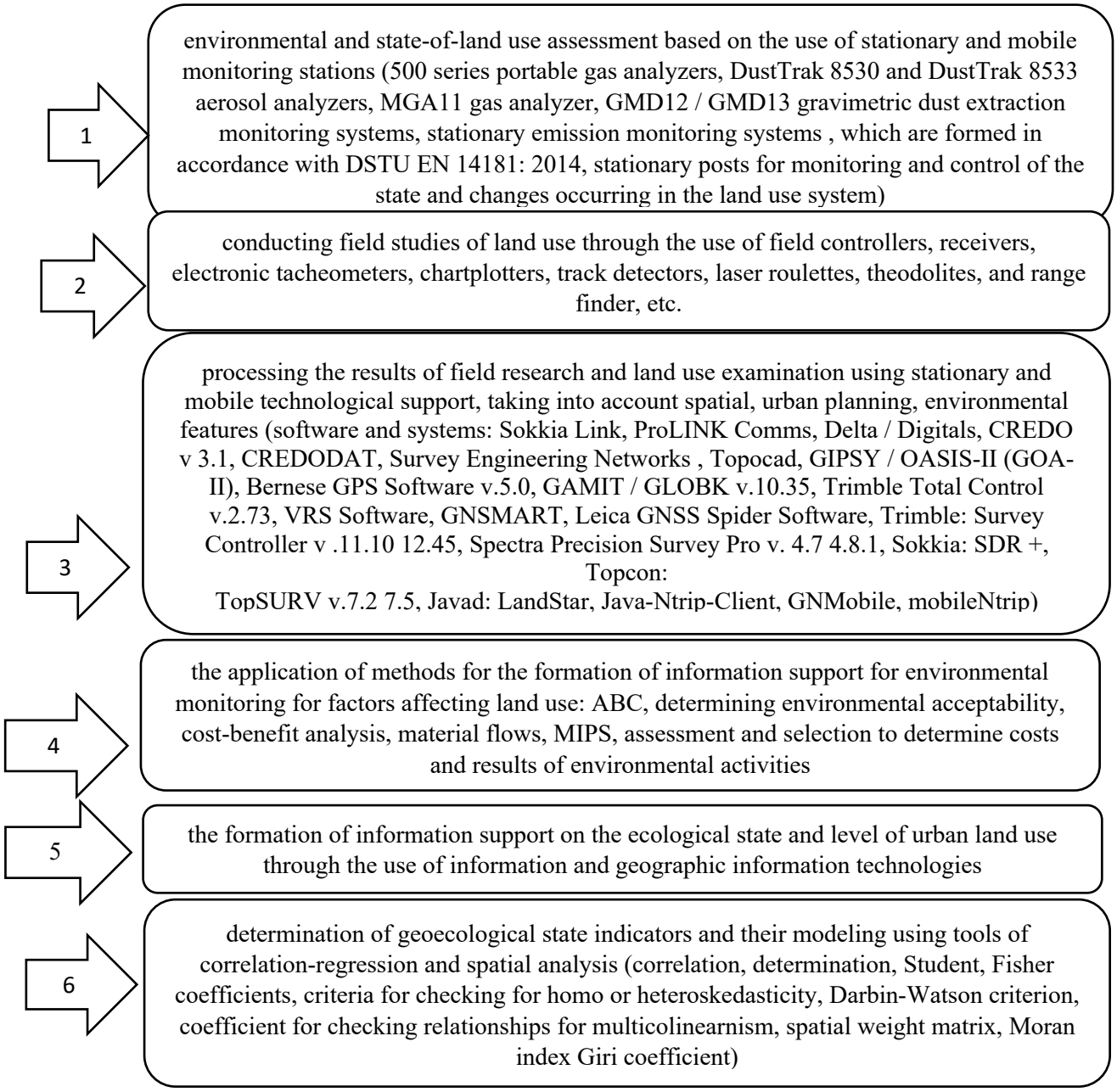

Fig. 3.1 – Toolkit for the formation of environmental factors, affecting the use of land in regions

To conduct field experiments on the level of land use and the interaction of spatial, urban, environmental and investment factors affecting the use of land, geodetic equipment is used: field controllers, receivers, electronic tacheometers,

chartplotters, track detectors, laser roulettes, theodolites, traffic lights, etc. Using equipment presented , an information basis is being formed for researching the state and level of land use. The existing information is processed in the appropriate software (Annex D, table D.2).

In this context, it should be noted that in recent years the importance of mobile software systems that create the conditions for conducting monitoring studies of land use using mobile phones has been increasing: Java-Ntrip-Client; GNMobile mobileNtrip. These complexes are determined by ease of use and insignificant financial resources for their use.

While ensuring the territorial development of land use, the point of view is presented in [271], where:

- urban planning assessment, where the focus is on determining the value of land in settlements and is based on the methods and procedures for performing normative and expert monetary valuation, based on the thesis that monetary valuation is capitalized rental income from a land plot;

- land management assessment related to the determination of the value of agricultural land, including soil appraisal, economic, regulatory monetary and expert assessment.

Among the important factors affecting the territorial development of land use in the region, there are:

1. Political stability (both at local and national level).

2. The stability of the urban development policy of local authorities in the field of territorial development (sustainable urban development).

3. the development of legal institutions, the functioning in the state of the primary and secondary real estate markets, in particular the land market, derivatives market (rent) and land security rights (mortgage market).

4. The ability to freely obtain information about the land market, in particular relatively free land for further development, the absence of unreasonable restrictions on the procedures for acquiring property rights and building land for their further

development by the owner, reliable information on the prospects for the development of adjacent territories.

5. Structural and territorial factors (spatial access factors, the level of security of engineering, transport and social infrastructure).

6. General indicators of the economic situation in the country (growth dynamics of the money supply, GDP and its structure, amount of loans granted, interest rates, inflation and economic growth), indicators of the level and pace of economic development of economic agents (firms and households), individual satisfaction vital needs, socio-demographic indicators that affect the situation on the demand and supply of land by type of desired economic development.

7. Current information indicators of land use value (land price, rent, land tax) in large cities of Ukraine and the world [270].

To ensure the territorial development of land use in the region, the application of system analysis methods that are implemented in [30, 32, 33] is of particular importance. In the presented developments, the system analysis method is transformed in the form of tools aimed at assessing the effectiveness of the use of territories, which includes the following steps:

1. The design parameters for the intensive use of the territory of the reconstructed quarter are formed.

2. The design functional parameters of the use of the quarter are determined.

3. The indicators of output are estimated.

4. Characterized by the costs of production activities.

5. The design indicators of economic efficiency of the use of the territory are calculated [31].

To apply the method of system analysis, the ABS model is used, which is considered as a complex system that includes subsystems:

- functional-spatial;
- constructive;
- technological [1].

The proposed model allows you to build a hierarchical system that includes interconnected elements to ensure the prospects for territorial development, determine its prospects and solve architectural and construction problems, is open.

Using a systematic approach, the study proposes to use methods that determine the quality of life of the population, in which are evaluated:

- an absolute indicator of quality, which is due to a combination of functional and aesthetic characteristics of urban development objects;

- relative indicator of quality;

- coefficient of weight of the property indicator;

- a comprehensive quality indicator, which expresses the quantitative characteristics of the quality of the object, determined taking into account the relative indicators of properties and significance factors [170].

The proposed methods allow, based on a systematic approach, to determine a comprehensive indicator of the use of land in the regions, taking into account urban planning, investment, environmental features.

In the context of the formation of the influence of environmental factors on territorial development, information support is being formed by applying chemical, radiation, bacteriological, and thermal methods for observing pollution levels. Also used: unified software and hardware, the formation of networks of automated stations for monitoring the state of the environment, the development of a permanent parametric model of the state of the environment, the formation of an information center for environmental monitoring [129].

The scientific development [274] defines tools for generating information on environmental factors, which consist of a forecasting system, scenario and risk analysis, characterization of technical means, implementation of environmental assessment procedures, creation of an environmental portfolio, determination of the ecological balance of IOW, assessment of environmental indicators.

As a tool for generating information on environmental factors, it is proposed to use methods whose characteristics are presented in table. 3.2.

Table. 3.2

Methods of generating information on environmental factors in the system of territorial development of land use in regions

The name of the method	Characteristic
ABC	Formation and research of environmental monitoring objects is carried out in accordance with their potential negative impact on the environment. The value A corresponds to objects with a high potential negative impact, B is the average potential impact, C is low. This method allows you to determine the level of environmental impact and creates opportunities for making decisions on counteracting negative phenomena.
Determination of environmental acceptability	Characterized by a definition of the analysis of objects depending on the impact of the production potential of the urban environment on the environment for decision-making and creating opportunities to counter negative impacts.
Cost Analysis - Benefits	Determined by the costs and benefits received, respectively, from the implementation of environmental projects, the determination of the influence of factors on the ecological environment, the development of measures aimed at improving the efficiency of the ecological state of the territories of settlements.
Material flows	Determined by the characteristics and research of a set of factors, including: emissions into the atmosphere and water, the level of energy consumption, the area under landfills, the noise level. This method allows you to determine the impact of a set of factors on the environment.
MIPS	Characterized by the level of pressure on the environment as a result of consumption of material resources. The use of this method allows you to determine the level of environmental friendliness.
Assessments and choices to determine the costs and results of environmental activities	Aimed at the formation of a decision-making matrix based on the assessment and selection of costs to obtain the results of environmental activities. For the analysis, the alternatives with the highest utility coefficient for decision-making on environmental activities and the impact of environmental factors are determined.

As a result of the analysis, methods for the formation of information support for environmental factors (ABC, determination of environmental acceptability, cost-benefit analysis, material flows, MIPS, assessment and selection to determine the costs and results of environmental activities) were determined.

To form environmental factors, tools are used that are functionally aimed at identifying and monitoring:

- atmospheric air, affects the state and level of urban land use (500 series portable gas analyzers, DustTrak 8530 and DustTrak 8533 aerosol analyzers, MGA11 gas analyzer, GMD12 / GMD13 gravimetric dust extraction systems);
- all types of emissions and pollutants (monitoring systems for research on emissions from stationary sources generated in accordance with DSTU EN 14181:

2014. Emissions of stationary sources. Quality assurance of automated measuring systems);

- the level of urban land pollution (stationary monitoring and control posts on the state and changes occurring in the land use system).

An important method of generating information on environmental factors, their impact on the territorial development of land use in the region is an environmental audit.

During an environmental audit, data is generated, criteria are determined, and an appropriate conclusion is drawn up. Environmental audit is carried out in the following areas:

- the formation of information and analytical support based on data on the state of the environment, environmental transformations that occur in the respective territories;

- definition and characterization of indicators of the ecological state of urban land use;

- examination of the existing documentary base of the ecological state of urban land use;

- development of measures to improve the environmental status of land use.

An important direction in creating a monitoring system for the ecological state of urban land use is environmental review, which includes:

- the formation of tasks for the implementation of the project related to the assessment and characterization of the ecological state;

- characterization of technological solutions, determination of equipment for the implementation of measures on the ecological state of the territories;

Evaluation of the draft environmental solutions to improve the efficiency of urban land use.

The objectives of the environmental audit are:

- «Collection of reliable information on the environmental aspects of the production activities of the environmental audit facility and the formation on its basis of an environmental audit report;

- establishing compliance of environmental audit facilities with the requirements of legislation on environmental protection and other environmental audit criteria;

- assessment of the impact of the activities of the environmental audit facility on the state of the environment;

- assessment of the effectiveness, completeness and validity of measures taken to protect the environment at an environmental audit facility» [303].

To assess the influence of spatial, urban, investment and environmental factors on the territorial development of land use in the region when constructing appropriate models, it is proposed to use the method of analysis of hierarchies. This method is implemented in the following steps:

1. Definition of a system of factors affecting the territorial development of land use in the region. The dissertation proposed the use of spatial, urban, investment and environmental factors.

2. Establishment of the level of influence of factors on the territorial development of land use in the region based on pairwise comparisons using the expert assessment method.

3. Construction of the T. Saati scale used in the method of analysis of hierarchies (table 3.3):

Table 3.3

T. Saati scale, which is used in the hierarchy analysis method

Scale value	Scale level
1/9	no influence
1/7	minor
1/5	low
1/3	inconsequential
1	moderate
3	significant
5	tall
7	significant
9	absolute

1. Matrix Development (A_{I_T}) (3.1), to establish the quantitative parameters of spatial, urban, investment, environmental indicators and determine their impact

on the generalizing criterion of territorial development of land use in regions based on the results of pairwise comparison and T. Saati scale:

$$A_{I_T} = \begin{Bmatrix} 1 & T1/T2 & T1/T3 & T1/T4 \\ T2/T1 & 1 & T2/T3 & T2/T4 \\ T3/T1 & T3/T2 & 1 & T3/T4 \\ T4/T1 & T4/T2 & T4/T3 & 1 \end{Bmatrix} \quad (3.1)$$

where T_1, T_2, T_3, T_4 – spatial, urban planning, investment and environmental indicators affecting the territorial development of land use in regions.

Determination of the geometric mean for each row of the matrix of indicators affecting the territorial development of land use in regions:

$$T_{1k1} = \sqrt[4]{1 \times \frac{T_1}{T_2} \times \frac{T_1}{T_3} \times \frac{T_1}{T_4}}. \quad (3.2)$$

$$T2_{k2} = \sqrt[4]{\frac{T2}{T1} x 1 x \frac{T2}{T3} x \frac{T2}{T4}}. \quad (3.3)$$

$$T3_{k3} = \sqrt[4]{\frac{T3}{T1} x \frac{T3}{T2} x 1 x \frac{T3}{T4}}. \quad (3.4)$$

$$T3_{k4} = \sqrt[4]{\frac{T4}{T1} x \frac{T4}{T2} x \frac{T4}{T3} x 1}. \quad (3.5)$$

2. Determination of the geometric mean sum for indicators affecting the territorial development of land use in regions:

$$k_i = T1_{k1} + T2_{k2} + T3_{k3} + T3_{k4}. \quad (3.6)$$

3. Assessment of the components of the normalized vector for indicators affecting the territorial development of land use in regions:

$$\text{first component } T_1 = \frac{T1_{k1}}{k_i}. \quad (3.7)$$

$$\text{second component } T_2 = \frac{T2_{k2}}{k_i}. \quad (3.8)$$

third component $T_3 = \frac{T3_{k3}}{k_i}$. (3.9)

fourth component $T_4 = \frac{T4_{k4}}{k_i}$. (3.10)

4. Determination of weights (k_{vi}), characterizing the influence of spatial, urban, investment and environmental indicators on the territorial development of land use in regions according to the values of the components of the normalized vector.

In the system of territorial development of land use in the region, the method of neural networks is used, which allows you to determine the relationship between factors, affect it and obtain predicted values of indicators.

A feature of the application of neural networks are: firstly, parallelization of information processing; secondly, the ability to learn, that is, to create generalizations. The term generalization refers to the ability to obtain a reasonable result on the basis of data that did not occur in the learning process. These properties allow neural networks to solve complex (large-scale) problems that are considered difficult to solve [410].

As a result of the study, the methods that are applied in the system of territorial development of land use in regions in accordance with the functional areas (conducting an environmental and land use examination, field research, their processing, the formation of information support on the environmental state and level of land use, determining spatial, urban planning , environmental and investment indicators and their modeling). The presented methods are implemented on the basis of: geodetic and photogrammetric and other measuring equipment, stationary and mobile software of software systems, methods of generating information support for factors affecting the territorial development of land use in regions. To assess the influence of factors on territorial development, methods of correlation and regression analysis, mathematical modeling, and hierarchy analysis are used.

3.2 Models of territorial development of land use in regions

1. In the territorial development support system, land use models in regions are applied. Summarizing the existing theoretical and methodological approaches, the following models are identified:

2. «Traditional» – based on the application of the existing land management system, characterized by the definition of real estate and land as separate categories. At the same time, various public authorities (the State Committee for Geodesy, Cartography and Cadastre, the State Property Fund of Ukraine, etc.) are managing the land relations of Ukraine, which reduces the level of formation, distribution, assessment and use of land in regions. There is no single system for the formation of cadastral information on the state and use of land. At the same time, the main attention is focused on the possibilities of implementing land relations in various areas of management. In the presented system, regulatory support is formed, however, at a low level, there is a relationship between the use of land resources at the national, regional and local levels. The factors influencing this process are determined, however, their interaction is not of a systemic nature. The existing scientific, personnel and financial support for land management. The presented system is characterized by significant control by state authorities. Thus, the «traditional» model of land use in the region ensures the growth of the effectiveness of land relations in the short term. There are certain imbalances and imbalances in the formation of a unified system of formation, distribution, assessment and use of land with different directions of cadastral information and land relations management. The «traditional» model of land use does not create conditions for ensuring the territorial development in regions.

3. Model based on a land administration system. A single system of interaction is being formed between the functions of the formation, distribution, assessment and use of land in regions. In the framework of the proposed model, real estate is considered as a system category, which includes, among other things, land, where the influence of spatial, urban, investment and environmental factors is

determined. The presented model allows you to create a unified information system with the implementation of the possibilities of applying geographic information systems and technologies and the only body providing land relations management. A model based on the land administration system ensures the territorial development of the region. In addition, strategic long-term administration of 10-15 years, long-term priority administration for 10-15 years, administration for short-term strategic goals of 3-5 years, administration for operational goals of 1-3 years are determined. At the same time, informational support is formed on: geospatial location of land resources, ecological situation of the environment; natural resource potential; priorities of economic development of territories; engineering and technical infrastructure; standard of living of the population and demographic situation; legal support of land management [279]. It should be noted that in the framework of the presented model, technological areas are determined, which are characterized by: collection and systematization of factors; identification of priority factors; development of land administration options; assessing land administration options [279].

4. A model that takes into account legal, organizational, financial, logistical and urban factors, determining the level of interaction between legislative bodies and local governments, bodies on land resources and state control over the use and protection of land, land management and design organizations, urban planning and construction organizations and enterprises. This creates the appropriate regulatory support. Along with this, the level of interaction between the formation, distribution, assessment and use of land in the region is determined. There are certain contradictions in ensuring interaction between the represented bodies, organizations and enterprises. The presented model can be applied to implement specific tasks in the territorial development system in regions. In particular, for the effective use and organization of the protection of historical and cultural lands [86].

5. A model that takes into account the influence of spatial factors on land use. Allows you to determine the set of spatial factors affecting the territorial development of land use in regions. The construction of the model depends on the

availability of spatial information and the possibilities of its application. In this regard, there are certain difficulties in the formation of the spatial information presented. In modern conditions of Ukraine, compared with developed countries, the low rate of implementation and use of information and geographic information systems and technologies, there are problems in the formation of spatial information at each stage of territorial development of land use in regions.

6. A model based on providing greater autonomy in matters of regional management, formation and distribution of land resources. It includes the provision of greater authority to local authorities. Within the framework of the presented model, the rate of response to the influence of external and internal factors also increases. Along with this, there are problems associated with the low level of training of personnel operating in the field of land relations, the level of technical support for the process of formation, distribution and use of land. Granting greater authority to local authorities can also lead to imbalances in social, political, budgetary and other spheres, which reduces the effectiveness of decision-making. Within the framework of the presented model, in order to solve problematic issues, training of personnel for local authorities, raising their technical and technological level, monitoring the state of land relations and their management level is of particular importance.

7. A model based on the implementation of the principle of coherence and synchronization of actions of all levels of government and administration. It provides for the determination of state priorities for the development of the country, the development of regional strategies for the development of land relations, their implementation taking into account state policy. Within the framework of the presented model, clear horizontal and vertical ties are being built between state authorities and local governments, interregional and intermunicipal ties are being formed. The disadvantages of the model include the occurrence of problems in making decisions on the formation, distribution and use of land if imbalances arise at the corresponding stage of regional and state administration.

8. A model for leveling the level of development of regions in the sphere of formation, distribution and use of land. Allows reducing asymmetries in the development of regions, ensuring support for poor regions. Along with this, experience shows that the implementation of the presented model leads to further asymmetries in the development of regions, the spread of areas of depression. The implementation of this model is carried out at the expense of richer regions than poor. The latter, in the future, get used to appropriate assistance and do not provide the implementation of incentives and promising areas of territorial development.

9. A model based on the concentration of significant resources in successful regions. It allows to ensure the further development of successful regions, to implement investment and innovative programs in the field of land relations. However, interests of other regions are not taken into account and, possibly, incentives for their development are leveled, regional imbalances and asymmetries are aggravated.

10. The partnership model for managing the territorial development of land use in the region, which provides for partnership between regional policy actors, relevant institutions, authorities and the private sector, research and practice [167]. Along with this, certain difficulties arise in ensuring the interaction between the represented subjects of regional policy, the complexity and ambiguity of existing relations that affect the formation, distribution and use of land in regions.

11. A model based on the implementation of the cluster approach, which provides for the creation of economic opportunities in the relevant sectors related to the sphere of land relations [420]. The presented model allows us to ensure the development of business entities on the basis of concentration of resources for increasing decision-making efficiency. Along with this, the complexity of existing relations at the regional level, economic problems with the possibility of concentration of resources for the implementation of projects, the imbalance of external and internal relations between business entities leads to a decrease in the effectiveness of land relations at the regional level.

12. The resource model, which is characterized by the determination of directions and increasing the efficiency of use of land resources and their other types, aimed at the formation, distribution and use of land in the regions. Within the framework of the presented model, the importance of land resources and the capabilities of business entities that become subjects of regional policy are growing. However, according to some experts, the implementation of this model may be effective on the basis of intersectoral partnership [132].

A model for sustainable land use that includes:

- factors (socio-economic, environmental, regulatory, technical and technological, natural);

- subjects (legislative power, executive power, local self-government, contractors, landowners, land users);

- interests of subjects (determining the directions of state land policy, ensuring interaction with various institutions, approving national programs, implementing state land policy, organizing and implementing land management, developing normative legal acts, state control, land taxation, managing territories, providing information support, performing work land management, compliance with legal requirements, wages, technical their conditions and problems, the implementation of the right to land, security of tenure, environmental security, land use efficiency);

- scenarios (Status quo, environmental, economic, social);

- sustainable development [232].

The model of sustainable land use allows you to build a system of interaction between its elements, however, difficulties arise in the formation of information support at each stage of the model. The presented model provides sustainable territorial development of land use in regions.

A functional model of a land management system that includes functional aspects and builds a chain of functions - priority measures - goal:

- environmental functions - land conservation, environmental restrictions, land monitoring - environmental conservation;

- legal - certification of rights, guarantee of rights, control - compliance with legal requirements;

- technical - setting boundaries, inventory, removal - technical support for land management;

- economic - land valuation, economic, resource saving - achieving an economic effect;

- social - accessibility and development of territories - achieving a social effect;

- organizational and managerial - planning, organization, financing and control - ensuring the implementation of land management measures;

- spatial and organizational - zoning, land redistribution, organization of territories - creation of a functional space;

- regulatory - restrictions, fines, incentives - regulation of land use;

- technological - automation, introduction of the latest technologies - achievement of technological progress;

- aesthetic - landscape construction - the creation of cultural landscapes [232].

The functional model of the land management system allows us to determine the complex of functional areas and factors affecting their formation and use. The activities and goals at each functional level are substantiated. However, there are difficulties in ensuring integrated interaction between the functional elements of the model. In addition, acts of them are not characterized by specific criteria, in particular, to achieve technological progress.

Within the framework of a generalizing functional model, local functional models are distinguished:

- a model that evaluates the quality of a specific urban area;

- model of the territorial organization of functional relations in the city, taking into account the interaction of the territory's own attractiveness (local properties and conditions of its availability);

- a mathematical model that takes into account the interaction between economic, investment and spatial factors that affect urban development;

- a model of the intersectoral input-output approach, in which the overall output of the economic sector, the total output of the economic sector, the zonal technical coefficients of the destination (receiving zone), the distance-based financial sensitivity parameter, the cost of moving from the origin of the trip i to the destination are determined zones, final demand for sector output in the zone of the corresponding sector;

- a model of the natural-technogenic subsystem of the urban planning system, which takes into account the complexity of the territories in the design practice, the stability of the territory, the anthropogenic impact created by the development of the territory, the violation of the stability of the territories, the development of territories [260].

To manage settlements in territorial development, the following aspects are taken into account: socio-demographic, economic, spatial, environmental [260].

It should be noted that within the framework of the functional model, the mechanisms for its implementation are determined:

- administrative law;

- socio-psychological;

- development of land relations;

- organizational;

- financial and economic [123].

Structural and logical model of the organization of land management, which includes the subsystem:

- land use, which is characterized by the technical, economic and environmental status, monitoring, permanent land use;

- design and management is determined by information parameters, areas of implementation of design and management decisions [232].

The proposed model allows you to create a land management system, however, in the context of implementation, indicators and criteria that characterize it are of particular importance.

A model of spatial planning for land use, which is characterized by a set of interrelated actions:

- determination of the purpose of the development policy;
- formulating a strategy to achieve a specific goal;
- determination of principles and tools for implementing the strategy;
- ensuring the interaction of economic, environmental and social trends in the formation of territorial development;
- development of formalized models of spatial development planning;
- implementation of planned activities for the implementation of planning models [91].

In the presented model, directions for ensuring territorial land use planning are defined, however, criteria for formalizing the process of territorial planning are not defined.

Summarizing the above, justified models of the territorial development of land use in regions (Annex D, table D.3).

So, the proposed models allow us to determine the organizational direction of the territorial development of land use in the region, taking into account spatial, urban, environmental and investment factors, evaluate their quantitative impact, offer tools for their integrated development assessment.

3.3 Toolkit for assessing the territorial development of land use in regions

In the modern conditions of Ukraine, as a result of the accumulation of a significant number of scientific developments and regulatory support for the development of regions, the use of their lands, the systematization of theoretical and methodological approaches to assessing the territorial development of land use in regions is of particular importance. They are characterized by fragmentation and the absence of a single system. An integral indicator of the territorial development of land use in the regions is not proposed. The monograph for conducting research systematizes the tools for assessing the territorial development of land use in regions.

The directions of assessment are determined: the territorial development of regions and the level of land use. In this context, it should be noted that the territorial development of regions is determined on the basis of an approach that takes into account the multidimensionality of the region in the following areas:

- investment attractiveness;
- quality of life;
- use of human resources;
- formation of infrastructure;
- the region's ability to support high-tech industries;
- interaction with regulatory authorities;
- formation of business infrastructure;
- interaction with public authorities [7].

A similar point of view is presented in the developments [417], which focuses on the multifactorial nature of regional development assessments, taking into account socio-economic conditions. Separating the provisions of the presented approach in development [248], the following generalized indicators are defined:

- aggregate social product;
- net production of the region;
- national income used;
- end products of the region;
- necessary and surplus product;
- performance indicators (material consumption, capital intensity, labor intensity).

A systematic approach to assessing the territorial development of regions was implemented in [71, 109, 396].

In the context of assessing the territorial development of a region, the point of view presented in [227] deserves attention. In it, assessments are carried out through the prism of established relationships between factors, characterized by:

- general economic characteristics;
- structural;

- socio-economic;

- economic and demographic;

- economic and environmental;

- financial and economic.

A similar approach is presented in the development [172], which explores the relationship between regional authorities, regional business structures, interested social groups, and the population.

To assess the territorial development of the region, a process approach is used by using indicators:

- motivation for the use of regional development tools;

- formation of interests of regional development entities;

- determination of the competitive advantages of regional development entities;

- assessments of social, environmental, economic and institutional effects;

- determination of values and resource component of regional development;

- formation of the structure of values, taking into account the tasks and goals of regional development [297].

A goal-oriented approach to assessing the territorial development of the region was implemented in [54, 335, 419]. A feature of the presented approach is the formation of assessment procedures in the context of certain goals of the territorial development of the region.

In some scientific developments [18, 159, 247, 351, 401, 497], special attention is focused on certain regional imbalances, which allows us to form directions for overcoming them. In this context, developments that are characterized by a set of interrelated actions in assessing the corresponding asymmetries deserve attention:

- determination of goals and objectives of the assessment;

- substantiation of requirements for information support;

- collection of information;

- implementation of the settlement analytical stage;

- formation of conclusions [21, 28, 41, 141, 367, 368, 421].

The spatial factors for assessing the territorial development of the region are

focused on in [17, 72, 137, 258, 259, 296, 354, 381, 398, 419]. This approach identifies spatial factors that influence regional development. This allows you to form an estimated basis for determining the level of territorial development in regions.

In the context of the presented approach, the point of view presented in [266] is noteworthy, where the following directions are determined that affect its spatial support:

- industrial and geographical location;
- agro-geographical position;
- market position;
- demographic position;
- recreational and geographical position.

The following indicators are determined:

- utility level;
- potentiality;
- market position [266].

The position of the functional approach, which describes the directions of the territorial development in regions, presented in the development [357]. The following indicators are defined:

- scientific and technical development;
- population level and social development;
- structural and institutional transformations in the economy, demonopolization of production, development of entrepreneurship;
- use of natural resources;
- use of secondary resources;
- financial indicators;
- foreign economic activity;
- development of special (free) zones.

Within the framework of the presented approach, the problems that hinder the territorial development of the region are identified:

- lack of a systematic approach to regional policy;

- the uncertainty of the strategic prospects for regional development;

- insufficient use of existing instruments of state regulation aimed at stimulating the development of regions, including depressed territories;

- low institutional and financial viability of local authorities in resolving issues of local importance;

- the lack of effective and efficient mechanisms for the formation of local budgets on the basis of state-guaranteed social standards for the provision of services to the population regardless of place of residence;

- incomplete formation and imperfection of the management model at the regional level [233, 256, 451].

An innovative investment approach to assessing the territorial development of a region, where the main focus is on the areas of formation and use of investments at the regional level for the implementation of innovative projects, has been developed in development [128, 323, 338, 442, 498].

The investment approach is presented in the development [65], which focuses on indicators of land investment attractiveness. In the framework of the presented approach, it is proposed to take into account factors: physical, social, economic, political [239].

Approaches to assessing the level of land use in the region are determined by the rhizo-aspectist. In existing practice, an expert approach is used to assess the level of land use. It is based on the application of a combination of methods:

- comparison of selling prices of similar land plots;

- correlation method;

- accounting for the costs of the construction of real estate on a land plot;

- capitalization of net income from the use of land;

- a combination of several methodological approaches for the conditional distribution of a built-up land plot into its constituent components (land plot, buildings, structures).

The results of the normative monetary valuation [371] will apply. The

presented approach is implemented by a set of interrelated actions:

- formation of information support for the assessment process;

- determination of the level of effectiveness of the directions of formation and use of land;

- selection and characterization of methods used to assess the level of land use;

- the formation of options and results of land valuation;

- formation and approval of a report on the results of land valuation;

- submission of the report for examination to the bodies authorized for its implementation.

The factors influencing the results of land valuation are determined:

- «The legal regime of the land;

- intended use and functional use of the land;

- terms of sale (free sale, forced sale)

- date of sale (time difference between sales operations associated with changes in market conditions);

- location (differences in the location of land in different climatic zones, settlements of various categories and within settlements in various city-planning and economic-planning zones according to urban planning documentation)

- physical characteristics (size and configuration of the land plot and its engineering and geological parameters: surface slope, soil condition, groundwater and flood regime, waterlogging, manifestations of dangerous geological processes, level of engineering training, nature and condition of real estate objects);

- the use of the adjacent territory (the functional use of the adjacent land, the population size, the level of engineering and transport infrastructure, the state of the environment)» [371].

To assess the lands, determine the effectiveness of their use in development [56], it was proposed to apply a multicriteria approach based on the determination of a generalizing environmental and economic indicator taking into account their spatial, infrastructural, environmental, and functional components. In the framework of the presented approach, the works [15, 84, 138, 249, 251, 376, 405] deserve

attention. Within the framework of the multicriteria approach, indicators are determined that determine the socio-economic [75, 362, 416], industrial and technical [416], socio-ecological and economic [376] land use efficiency.

The resulting approach is implemented in the development [4, p. 236–237], which is characterized by indicators that determine the results of land use. A similar point of view is presented in studies [5, 66, 153, 370].

The technical and technological approach to assessing the effectiveness of land use was implemented in studies [49, 78, 163]. Within the framework of the presented approach, a set of indicators is determined that characterize the technical and technological aspects and directions that affect the level of land use.

An approach based on determining the influence of energy indicators on the use of land resources was proposed in study [40].

To assess the land of cities, it is proposed to use indicators characterizing their urban development:

1. Accessibility to concentrated places of employment.
2. Accessibility to places of public recreation.
3. Provision of kindergartens.
4. Provision of schools.
5. The prestige of the area for living.
6. Water supply level.
7. The level of gas supply.
8. Power supply level.
9. Noise level.
10. The level of air purity.
11. Accessibility to public transport.
12. Accessibility to the center of the village.
13. Provision of trade and public catering facilities.
14. Provision of public services. Provision of cultural and sports facilities.
15. Groundwater flooding rate.
16. A variety of places of application of labor.

17. Difficult relief.

18. Soil quality [317, 355, 373].

A similar point of view is presented in the developments [135, 169, 273]. In the framework of the presented approach, factors are determined that affect the urban development of cities and formulate a policy regarding the use of land:

- Formation of a general plan for planning the territories of Ukraine;

- determination of the directions of formation of land plots, the allocation of territories in accordance with building codes, state standards and rules;

- characteristics of urban planning conditions and restrictions (in the absence of a zoning plan for the territory) or clarification of urban planning conditions and restrictions in accordance with the zoning plan of the territory;

- determination of the need for enterprises and public service institutions, their location;

- characteristics of expediency, volumes, sequence of reconstruction of buildings;

- the sequence and volume of engineering preparation of the territory;

- formation of a system of engineering networks;

- organization of transport and pedestrian traffic;

- comprehensive improvement and landscaping, the need for the formation of an ecological network;

- determination of the boundaries of coastal protective strips and beach areas of water bodies (in the absence of a zoning plan for the territory) [312].

It should be indicated at a certain level of information support for the formation of areas of urban development land use:

- on the state - the only digital topographic basis of the country's territory, the state border and the borders of administrative-territorial units, the General Planning Plan for the territory of Ukraine, the planning plan for individual parts of the territory of Ukraine, the results of monitoring the development of master plans, the information resources of industry cadastres and information systems on the use of territories, environmental, geotechnical, seismic, hydrogeological and other regional

the knowledge of the territory of the country, regulatory legal acts in the field of urban planning, building codes, state standards and rules;

- on the regional - the only digital topographic basis of the territory of the Autonomous Republic of Crimea and regions, the boundaries of the administrative-territorial units, the planning scheme of the territory of the Autonomous Republic of Crimea, regions and individual parts of the territory with objects of regional significance outside the settlements, the results of monitoring the status of the development of master plans for settlements, zoning plans for territories (zoning) and detailed plans, information resources of industry cadastres and information systems topics of environmental, engineering, geological, seismic, hydrogeological and other regionalization of the region, regulatory legal acts in the field of urban development, building codes, state standards and rules;

- on the city - the only digital topographic basis of the territory of the city, the boundaries of the settlement and its administrative-territorial units, the General plan of the city, plans for zoning of territories, historical and architectural reference plan of the city and detailed plans of territories, the boundaries of cadastral zones and quarters, the boundaries of economic -planuval zones of the normative monetary valuation of city lands, borders of land plots, cadastral numbers of land plots, land plots, purpose of land plots, type of functional study of land plots, normative monetary valuation of land plots, distribution of land between owners and users, restrictions on the use of land plots, engineering and transport infrastructure, buildings and structures, their legal regime, technical condition, architectural and historical-cultural value, monuments of historical and cultural heritage, a register of street names and other named objects of the locality, a register of addresses in the city on the basis of topographic plans and resolved th local self-government bodies on assignment and change of the Republic of objects on the territory of the city, approved urban development programs, schemes and projects for the development of infrastructure, the protection of historical, cultural and nature monuments, landscaping, landscaping and protection of the territory, investment programs and projects based on relevant decisions of local authorities self-government on their

approval (approval), other town-planning documentation, materials of project documentation, building permits (declarations), act control checks, documents for acceptance of objects into operation on the basis of decisions on approval (approval) of relevant documentation, issued permits for construction work, registered declarations of readiness of the object for operation and other documents on urban planning and construction objects, red lines and building regulation lines, environmental and engineering-geological characteristics of certain territories and land plots, the possibility of production of urban planning on them activities taking into account planning restrictions on the basis of relevant urban planning documentation, environmental data, hydrometeorological, radiological, sanitary-hygienic and other studies, regulatory acts in the field of urban planning, building codes, state standards and rules based on decisions on their approval in accordance with legislation [316].

A stakeholder approach to assessing land use based on certain areas and features of interaction between stakeholders is presented in [466, 474, 488].

The following groups of stakeholders are determined:

1st group: landowners (legal entities and individuals with land plots)

2nd group: land users (legal entities and individuals using land plots);

3rd group: state bodies that form and implement land relations create regulatory support;

4th group: local authorities that form and implement land relations determine the legal support included in their authority;

5th group: territorial community, which influences and realizes the right of ownership of land;

6th group: financial institutions (banking and other financial institutions providing the formation and lending of financial resources for needs in the land sector)

7th group: investors who invest financial resources in the use of land resources of cities;

8th group: public organizations that influence the formation and

implementation of land policy at the non-state level;

9th group: organizations implementing an information policy in the field of land relations [198].

To assess land use, an approach that takes into account functional characteristics is used. They determine the physicochemical properties of soils, nutritional status and level of pollution, productivity.

The systematic approach is based on the use of a set of interrelated indicators characterizing:

- ecological state (structure of land resources, structure of sown areas, rates of restoration of soil fertility, intensity of erosion processes, content of harmful substances, degree of maturity, litteriness, level of expenses for solving environmental issues);

- level of development of territories;

- level of investment attractiveness of land;

- economic in kind and value;

- social, related to the level of implementation of social issues affecting the level of land use.

The following issues are resolved as part of a systematic approach:

- «the formation of territories and the establishment of borders of settlements;

- demarcation of lands of state and communal property;

- inventory of non-agricultural land;

- the establishment of the boundaries of coastal protective strips of water bodies;

- allocation of territories of recreational, nature reserve and other especially valuable lands;

- determination of the boundaries of local territories;

- maintaining the state land cadastre

- preparation of land management projects that provide environmental and economic justification of crop rotation and land management;

- measures for the protection of land for the conservation, reproduction and

rational use of land resources» [35].

A systematic approach involves the interaction of state, regional and local authorities, given the complex nature of cadastral data [35].

The approach based on the results of mass assessment is based on the application of a set of interrelated actions and statistical methods for groups of objects and land plots at the corresponding date [449]. In the framework of the presented approach, the market value of land is determined and includes the following steps:

- the formation of information support for the formation and use of land;
- definition of signs, characteristics, factors affecting the formation and use of land;
- definition of tools for land valuation;
- obtaining the result of the assessment and interpretation of the results.

To implement the proposed approach, some experts identified the need for the use of geographic information systems and technologies, based on preferences:

- automation of the collection and processing of information, given the complex of interrelated spatial, urban and environmental factors;
- the possibility of conducting geographic information analysis using a mathematical apparatus;
- providing quick search, sorting and use of information on the cost characteristics of land;
- high-quality preparation of land valuation results [122]. The provisions of this approach are presented in the developments [20, 93, 130, 269, 449, 492].

The tax approach to assessing the formation and use of land, which provides for the determination of an objective tax burden for the mass assessment of their market value [243, 478, 482]. The advantages of the presented approach are:

- relevance to changes occurring in the internal and external environment;
- the ability to display market reality;
- development of measures to search for the effective use of land;
- create the basis for a constant search for directions to improve land use

efficiency.

In addition, the justification of the taxation system, land mortgage lending, socio-economic regionalization, the initial cost of sales transactions, market research for realtors and insurance companies is carried out [122]. The disadvantages of the presented approach include the complexity of its application, given the methods and models for determining the cost, taking into account the directions and features of taxation.

Existing scientific developments suggest approaches to assessing the territorial development of land use at the regional level. So, in [48], an economic assessment based on the application of a costly approach, taking into account environmental and economic factors, is substantiated. The costs of:

- land development;
- improving the quality of land;
- accumulation rates;
- labor productivity in land relations at the regional level.

Of particular importance is the composition of soils, in particular, the Autonomous Republic of Crimea:

- «Southern chernozems and their weakly and residually solonetzic cancellations of important loam and clayey clay;
- the southern chernozems laboset Valsugana and legalinst;
- dark-chestnut weakly solonetzic salikova and waikatolink and legalinst;
- dark brown solonetz in complex with (10-30%) waikatolink and legalinst;
- meadow-Chernozem and saline poorly the cancellation Valsugana and legalinst;
- meadow-chestnut alkaline Valsugana and legalinst;
- meadow-chestnut alkaline complex (10-30%) waikatolink and legalinst;
- meadow and slabosolenym cancel Valsugana and legalinst;
- chestnut meadow of medium and strongly saline saline Valsugana and legalinst;
- chestnut meadow solonetz saline in combination with saline (30-50%)

waikatolink and legalinst;

- the saline meadow and saline deep Valsugana legalinst;
- the saline meadow and saline shallow medium Valsugana and legalinst;
- alluvial chernozems and meadow-Chernozem Valsugana and legalinst» [48].

The weighted average cost of 1 ha of land is determined.

The normative approach to assessing the territorial development of land use in the region is based on the definition of differential (rental) income standards, which takes into account a set of regional factors:

- site location;
- remoteness from the main highways and infrastructure
- regional level of prices;
- wage level;
- the impact of the legal regime (restrictions, burdens) on land use;
- additional capital costs for land improvements;
- expenses due to tribuno-contour reasons [387].

Management aspects are defined in the system for assessing the territorial development of land use in the region are presented in [67, 92, 224, 234, 253, 406, 412].

This takes into account: spatial factors, economic, environmental, social.

In the system for assessing the territorial development of land use in the region, an approach is used that is characterized by land and resource potential [131]. A similar approach was developed in [107, 116, 134].

To assess the territorial development of land use in the region, the economic-mathematical approach proposed in the development [280] deserves attention. In the presented system, indicators are used that characterize the reliability of the results of an expert assessment:

- concordance coefficient;
- pearson criterion.

To assess the territorial development of land use in the region, the development [158, 219, 220, 430, 434, 435, 436, 437, 438, 439, 440, 441, 500, 501, 502, 510] in

which the spatial approach is implemented deserve attention. Its essence is to determine the spatial factors affecting the use of land, increase the efficiency of their use to ensure the territorial development of the region. The integrated assessment method has been implemented. The spatial models of the regional level are defined:

- include social and economic factors;
- administrative factors;
- physical factors [437].

Assessment of the territorial development of land use in the region depends on the directions of determining the geoecological state. In this context, the development [23, 44, 114, 145, 146, 147, 148, 149, 150, 193, 194, 195, 196, 197, 216], where an integrated assessment of the geoecological state of the region's land use is implemented, deserves attention. Moreover, certain factors affecting the geoecological situation: environmental, factors of land use in the region.

Constructed appropriate models for assessment, modeling of the impact of environmental and factors of land use in the region in a generalized indicator of regional development.

In the system for assessing the territorial development of land use in the region in development [36, 94, 124, 222, 327, 328, 329, 330, 331, 332, 333, 334, 337, 484, 495], an approach is taken to determine the investment attractiveness of lands. It is proposed to evaluate the investment attractiveness of lands through the prism of indicators:

- functional planning characteristics;
- spatial;
- environmental;
- historical and cultural;
- level of engineering support and land improvement;
- normative monetary value.

The analytical method, hierarchy analysis, correlation and regression analysis are used.

Summarizing the above, well-grounded theoretical and methodological approaches to assessing the territorial development of land use in the region (Annex D, table D.4).

Thus, as a result of the study, approaches to assessing the territorial development of the use of land in the region are identified, which form the appropriate tools:

Group 1: focuses on the assessment of the territorial development of the region (multidimensional, systemic, factorial, process, goal-oriented, based on the definitions of regional imbalances, spatial, functional, innovative and investment)

Group 2: focuses on assessing the use of land in the region (expert, multi-criteria, resultant, technical and technological, investment, approach based on determining the impact of energy indicators on land use, urban planning, stakeholder approach, taking into account functional characteristics, systemic approach, based on mass valuation, tax)

Group 3: a comprehensive assessment of the territorial development of land use in the region is carried out (costly, normative, managerial, land-resource, economic-mathematical, spatial, geoecological, determination of the investment attractiveness of the region's lands).

An approach is not proposed in the system for assessing the territorial development of land use in the region, comprehensively takes into account the influence of spatial, urban, investment and environmental factors, and allows developing a methodological approach for integrated assessment to determine a general indicator. This will help to identify problems in the system of territorial development and develop measures to improve the efficiency of land use in the region.

A specific approach is based on methods for the integrated assessment of the territorial development of land use in the region, the proposed mathematical models and methods that determine the factors of influence on territorial development, select them for the formation of relevant indicators, analytical and expert analysis methods, hierarchy analysis method. The value of the integral indicator of the territorial

development of land use in the region allows us to propose a suitable model and create a quantitative basis for decision-making.

4. Formation of factors impact on the territorial development of the land use in regions

4.1 Multilevel system of factors affecting the territorial development of land use in regions

To ensure the territorial development of land use in the region, to assess its level, it is proposed to build a multi-level system, covering spatial, urban, investment and environmental factors. Determination of the presented factors is based on the generalization of theoretical and methodological approaches, existing regulatory support and domestic and international experience in securing land relations.

Spatial factors (F_1) consist of the following factors:

- territorial (f^2_{11});
- functional(f^2_{12});
- social (f^2_{13});
- political (f^2_{14});
- the level of cartographic and geodetic support for land use in the regions (f^2_{15}).

Town-planning factors (F_2) are formed by the following factors:

- zonal (f^2_{21});
- functional planning ((f^2_{22});
- structural planning (f^2_{23});
- planning-restrictive (f^2_{24});

engineering preparation and equipment of the territories (f^2_{25});

- transportation support (f^2_{26});
- historical and architectural (f^2_{27});
- the functioning of the construction sector in the regions (f^2_{28});
- level of development of territories (f^2_{29});

Density of territories (f^2_{210});

- the level of application of spatial information in urban planning (f^2_{211});

- level of cadastral information formation in the area of land use in regions for urban development (f^2_{212}).

Investment factors (F_3) determined by the following factors:

- evaluation (f^2_{31});
- level of use of funds, assets and property rights (f^2_{32});
- intellectual (f^2_{33});
- stakeholdersin (f^2_{34});
- innovation (f^2_{35});
- territorial development in regions (f^2_{36});
- attract foreign investments in the sphere of land relations in regions (f^2_{37});
- public-private partnerships (f^2_{38});
- level of investment activity in the sphere of land use in the region by domestic investors (f^2_{39});
- the level of formation of special economic zones for making investments in the sphere of land use in regions (f^2_{310});
- level of provision of special regime of innovation activity of technological parks in the sphere of land use in regions (f^2_{311});
- the implementation of investment projects in the sphere of land use regions on the principle of «single window» (f^2_{312}) (Fig. 4.1).

Environmental factors (F_4) is composed of the factors:

- environmental development (f^2_{41});
- level waste management(f^2_{42});
- the level of valuation and accounting of waste management (f^2_{43});
- functional factors on the reduction or waste prevention (f^2_{44});
- the level of alert about the threat or emergency situations (f^2_{45});
- awareness about the origin and prevention of emergency situations (f^2_{46});
- the level of shelter population in protective structures of civil protection (f^2_{47});
- level of implementation of measures on evacuatnio(f^2_{48});
- the level of engineering protection of territories (f^2_{49});

- level of radiation and chemical protection of population and territories (f^2_{410});

- the level of health protection, provision of sanitary and epidemic wellbeing of the population (f^2_{411});

- the level of biological protection of the population, animals and plants (f^2_{412});

- the level of psychological protection of the population (f^2_{413});

- the level of technological safety (f^2_{414});

- the level of fire safety(f^2_{415}) (Fig. 4.1).

Visualization of a multilevel system of factors shaping territorial development land use in regions is shown in figure 4.1.

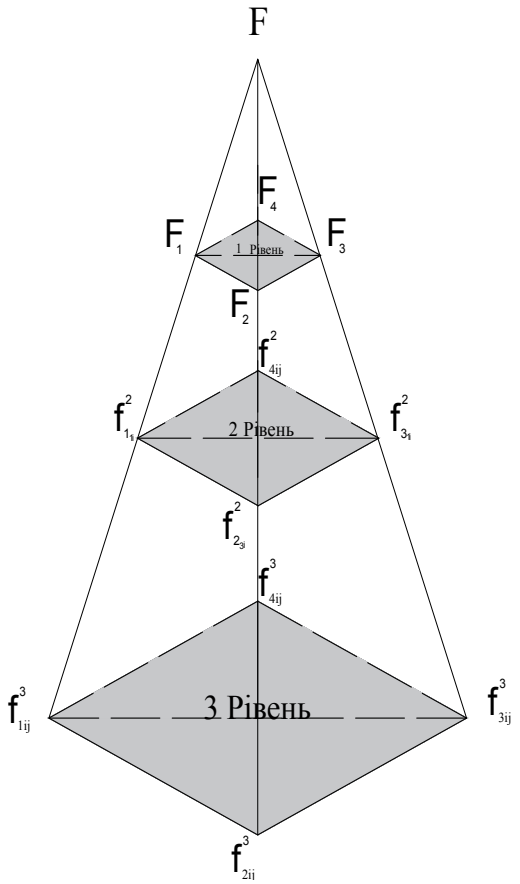

Fig. 4.1 – Multilevel system of factors of formation of territorial development of land use in regions: hierarchical aspect

As a result of the analysis of the multilevel factor system, it was determined that it consists of three levels that form a hierarchy of factors. The presented system

allows to determine the level of influence of factors for carrying out the integral estimation. In addition, the multilevel system takes into account a wide range of spatial, urban, investment and environmental factors that affect the territorial development of land use in regions.

4.2. Selection factors of territorial development land use in regions

In the system of territorial development of land use in regions apply a significant amount of spatial, urban, investment, and environmental factors influencing the process. It is also essential to make their selection (the third level) on appropriate criteria for the development of indicators assessment of territorial development land use in regions.

For the selection of spatial, urban, investment and environmental factors in the system of territorial development of the land use in regions proposed to apply the method of expert estimates.

For each group of factors defined criteria. Spatial factors consist of territorial factors, the criteria for selection which is:

- the level of incentives and development financing in the region (k_{tr1});
- the level of formation and development of the unified territorial communities (k_{tr2});
- the level of implementation of directions of territorial development in regions (k_{tr3}).

The selection of the territorial factors influencing the spatial regional development policy the use of land in regions, carried out on a quantitative basis (Annex E, table E.1).

A quantitative framework for the selection of the territorial factors influencing the spatial regional development policy of land use in regions is formed by defining relevant criteria, the range of values that vary in the interval from 0 to 1, the rationale for the selection and decisions. If the value of the selection criterion is in the range

from 0 to 0.49, the corresponding factor is excluded from the evaluation of the system of determining the level of territorial development land use in regions.

If equal to 0.5, it is impossible definitely to decide on the inclusion or not of factors. In this case, the additional training of a neural network. If the criteria value is in the range of 0.51 to 1, the factors included in the evaluation system defining indicators of territorial development land use in regions.

The criteria for selection of functional factors on the spatial regional development policy of land use in regions are:

- level land use region (k_{tr4});
- the level of spatial provision of use of land in regions (k_{tr5}).

A quantitative framework for the selection of functional factors on the spatial regional development policy the use of land in regions, presented in Annex E, table E.2.

Quantitative basis for selecting social factors influencing spatial regional development policy of land use in regions formed by the criterion level of security with objects of social infrastructure (k_{tr6}).

Quantitative basis for selecting social factors influencing spatial regional development policy of land use in regions formed by the criterion level of security with objects of social infrastructure and is given in Annex E, table E.3.

For forming the quantitative basis for the selection of political factors influencing the spatial regional development policy the use of land in regions, the criteria:

- the level of definition of directions of formation and implementation of policy for land use in regions (k_{tr7});
- the level of influence of political conditions on use of land in regions (k_{tr8});
- level of openness and freedoms in the system of land use in regions (k_{tr8}).

A quantitative framework for the selection of political factors influencing the spatial regional development policy the use of land in regions, presented Annex E, table E.4.

Quantitative basis for selecting factors of cartographic and geodetic support of land use in regions that influence spatial territorial development is formed by the criteria:

- the level of completeness of cartographic and geodetic support of land use in regions (k_{tr9});

- level of application of modern instruments in the field of cartographic and geodetic support of land use in regions (k_{tr10});

- level of interaction of actors in the sphere of formation of cartographic and geodetic support of land use in regions (k_{tr11}).

Quantitative basis for selecting factors of cartographic and geodetic support of land use in regions that influence spatial territorial development provided in Annex E, table E.5.

The selection of zonal factors influencing the formation and implementation of urban policy in the system of territorial development of land use in region is carried out according to the criterion of the level of formation and determination of zonal town planning factors (k_{tr12}).

Quantitative basis influencing the formation and implementation of urban policy in the system of territorial development of the land use in regions submitted submitted Annex E, table E.6.

The selection of the functional design factors shaping urban development factors of territorial development land use in regions and create the appropriate quantitative basis, based on the criteria:

- the level of performance of town-planning conditions affecting the use of land in regions (k_{tr13});

- the level of reliability and completeness of the planning decisions affecting land use in regions (k_{tr14}).

Quantitative basis for selecting functional design factors shaping urban development factors of territorial development land use in regions, presented in Annex E, table E.7. quantitative framework for the selection of the structural design factors that influence the formation of urban areas for territorial development use of

land shall be on the basis of the criterion of the level of territories, the structural and layout components (k_{tr15}).

The characteristic of this criterion is presented in Annex E, table. E.8. Selection of planning and restrictive factors that shape urban areas for territorial development land use in regions, by applying the criterion of the level of completeness and accuracy of information provision concerning their formation and use (k_{tr16}).

The definition of this criterion is presented in Annex E, table E.9.

Quantitative basis for selecting factors engineering training and equipment areas in the town planning aspect of the development territories in regions is formed based on the criteria:

- level engineering provision of the territories for the urban development of territories in regions (k_{tr17});
- level of implementation of the formation of the engineering provision of the territories for the urban development of territories in regions (k_{tr18}).

Characterization of specific criteria is presented in Annex E, table E.10.

The selection factors of urban transportation, influencing the territorial development of the use of land in regions, is carried out according to the following criteria:

- the level of transport support in the implementation of urban policy in the system of territorial development of land use in regions (k_{tr19});
- the level of implementation of activities transport support in the implementation of urban policy in the system of territorial development of land use in regions (k_{tr20}).

A quantitative framework for the selection of urban transport provision factors that impact on spatial development land use in regions, presented in Annex E, table E.11.

Selection of town-planning of historical and cultural factors of territorial development land use in regions are following criteria:

- availability of historical and cultural sites and their impact on spatial development land use in regions (k_{tr21});

- the level of formation of historical-cultural objects in the spatial distribution of land use in regions (k_{tr22});

A quantitative framework for the selection of urban historical and cultural factors of territorial development land use area are presented in Annex E, table E.12.

The selection of the urban factors that characterize the functioning of the construction sector in regions is carried out according to the criterion of the level of development (k_{tr23});

A quantitative framework for the selection of urban factors that characterize the functioning of the construction sector in regions, presented in Annex E, table E.13.

Quantitative basis for selecting the factors in the level of use of spatial information in urban planning the development of land use in regions is formed on the basis of the criterion of the level of completeness and reliability of relevant information (k_{tr24}) and are presented in Annex E, table E.14.

Selection factors the level of the cadastral information in the field of land use areas for urban planning by applying the criteria of completeness and reliability of presented information (k_{tr25}).

Quantitative basis for selecting the factors in the level of cadastral information in the field of land use in regions for urban development described in Annex E, table E.15.

This selection is carried out according to the criterion of the level of completeness ensure that the inventory information in the field of land use areas for urban planning (k_{tr25}).

On the formation of investment attractiveness of land in the region is affected by group specific factors. In particular, the selection of the evaluation factors affecting the formation of investment attractiveness in the system of territorial development of land use in regions, characterized by the criterion of the level of completeness of information provision of indicators of investment attractiveness of land in regions (k_{tr26}).

A quantitative framework for the selection of evaluation factors influencing the formation of investment attractiveness in the system of territorial development of land use in regions, presented in Annex E, table E.16.

Quantitative basis for selecting the factors in the level of use of funds, assets and property rights that influence the formation of investment attractiveness in the system of territorial development of the land use in regions is determined by applying the criterion of the level of use of the funds, assets and property rights (k_{tr27}), the characteristic value of which is given in Annex E, table E.17.

Selection intellectual factors influencing investment attractiveness in the system of territorial development of land use in the region, by applying the criterion of the level of use of the respective structural components of intellectual capital (k_{tr28}). Characteristics of quantitative basis for the selection of intellectual factors, influencing investment attractiveness in the system of territorial development of land use in regions, presented in table 4.1.

Table 4.1

Quantitative-based selection intellectual factors influencing investment attractiveness in the system of territorial development of land use in regions

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of use of structural components of intellectual capital that affect the investment attractiveness in the system of territorial development of land use in regions	0–0,49	Low level of use of intellectual property rights used in the field of land relations, low level of use of a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular type of production, but not patented («know-how»), low level of use of land use rights, buildings, structures, equipment, as well as other property rights, low level of use of other values	Not included
	0,5	Unsystematic use of intellectual property rights used in the field of land relations, unsystematic use of a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular production, but not patented («Know-how»), non-systematic use of land use rights, buildings, structures, equipment, as well as other property rights, non-systematic use of other values	Unce-rtainty not included, requires additional neural net-work trai-ning

Continuation of table 4.1

1	2	3	4
	0,51–1	High level of use of intellectual property rights used in land relations, high level of use of a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular type of production, but not patented («know-how»), a high level of use of rights, use of land, buildings, equipment, buildings, as well as other property rights, a high level of use of other values	Included

The quantitative basis for the selection of stakeholder factors influencing the investment attractiveness in the system of territorial development of land use in regions is carried out by applying the criterion of the level of interaction of relevant stakeholders (k_{tr29}).

Characteristics of the level of interaction of stakeholders affecting investment attractiveness in the system of territorial development of land use in regions are given in Annex E, table E.18.

Quantitative parameters of selection of innovative factors that form the investment attractiveness in the system of territorial development of land use in regions by the criterion of the level of formation and use of innovative factors (k_{tr30}) are given in Annex E, table E.19.

Characteristics of the criterion of the level of completeness of information support (k_{tr31}) on the selection of investment factors that ensure the territorial development in regions are given in table 4.2.

Table 4.2

Quantitative basis for the selection of investment factors that ensure the territorial development in regions

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of completeness of information support of investment	0–0,49	Low level of completeness of information support for determination of standardized values of the index of physical volume of gross regional product, index of agricultural products by region, extraction of water resources, volumes of	Not included

Continuation of table 4.2

1	2	3	4
factors that ensure the territorial development in regions		extraction of water resources, index of industrial production	
	0,5	The information support for definition of the standardized values of an index of physical volume of gross regional product is formed, index of agricultural products by region, volumes of forestry products, volumes of water resources extraction, volumes of extraction of water resources, index of industrial production. However, there are problems in providing some individual indicators	Uncertainty not included, requires additional neural network training
	0,51–1	High level of completeness of information support for determination of standardized values of the index of physical volume of gross regional product, index of agricultural products by region, volumes of forestry products, volumes of water resources extraction, volumes of extraction of water resources, index of industrial production	Included

A quantitative basis for the selection of factors of attraction of foreign investments in the sphere of land relations in regions is based on the criterion of the level of foreign investment (k_{tr32}). Characteristic of this criterion is presented in Annex E, table E.20.

Selection factors for public-private partnership, influencing the development of investment in land use in the region, is at the criterion level of provision of public private partnership (k_{tr33}). A quantitative framework for the selection of factors on the criterion level of provision public-private partnerships, that affect the formation of investment in the use of land in regions, presented in Annex E, table E.21.

Quantitative basis for selecting the factors in the level of investment activity in the sphere of land use in regions domestic investors is formed by application of the criteria:

- the level of investment activity in the sphere of land use in the region by domestic investors (k_{tr34});
- the level of investment activity in the sphere of land use in the region by domestic investors (k_{tr35}).

Characterization of specific criteria is presented in Annex E, table E.22.

The criteria that characterize the selection factors of the level of formation of special economic zones for making investments in the sphere of land use in regions like this: the level of provision of special economic zones (k_{tr36}). Its definition is given in Annex E, table E.23.

The choice of the factors in the level of provision of special regime of innovation activity of technological parks in the sphere of land use of regions is carried out according to the criterion of the level of formation and implementation of mode (k_{tr37}).

Quantitative basis for selecting factors on the criterion of the level of formation and implementation of a special regime of innovation activity of technological parks in the sphere of land use in regions identified in Annex E, table E.24.

Selection factors the implementation of investment projects in the sphere of land use regions on the principle of «single window» is at the criterion-level support for investment projects on the principle of «single window» (k_{tr38}).

Quantitative basis for selecting factors for the realization of investment projects in the sphere of land use in regions on the principle of «single window» is presented in table 4.3.

Table 4.3

Quantitative basis for the selection of factors for the implementation of investment projects in the field of land use in regions on the principle of «single window»

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of complete-ness of information support of investment factors that ensure the territorial develop	0–0,49	Low level of voluntary application of the «single window» principle, low level of ensuring equality of rights and legitimate interests of all applicants, low level of establishing a single list of documents required for the investment project depending on its specifics, low level of transparency of the issuance of documents investment project, low level of responsibility of officials of the authorized body for violation of the legislation on the issuance of documents entitling to the implementation of the investment project	Not included

Continuation of table 4.3

1	2	3	4
ment in regions	0,5	The low level of voluntary application of the «single window» principle is unsystematic ensuring equality of rights and legitimate interests of all applicants, low level of establishing a single list of documents required for the investment project depending on its specifics, low level of transparency of the procedure for issuing documents entitling to the investment project, low level of responsibility of officials for violations requirements of the legislation on the issuance of documents entitling to the implementation of the investment project	Uncertainty not included, requires additional neural network training
	0,51–1	The high level of voluntary application of the «single window» principle is high the level of ensuring the equality of rights and legitimate interests of all applicants, the high level of establishing a single list of documents required for the investment project depending on its specifics, the high level of transparency of the issuance of documents entitling to the investment project, the high level of responsibility of officials. violation of the requirements of the legislation on the issuance of documents entitling to the implementation of the investment project	Included

A quantitative framework for the selection of factors of environmental development is carried out according to the criterion of the level of its provision (k_{tr39}). Characteristics of the submitted criteria defined in Annex E, table E.25.

Selection factors the level of waste management in territorial development of land use in regions is carried out by applying the criterion of the level of the areas of treatment (k_{tr40}).

The quantitative basis for the selection of factors of the level of waste management in the system of territorial development of land use in regions according to the relevant criteria is given in Annex E, table E.26.

Selection of factors of the level of rationing and accounting of waste management is carried out according to the criteria: level of rationing of waste management (k_{tr41}); level of waste management accounting (k_{tr42});.

The quantitative basis for the selection of factors of the level of rationing and accounting of waste management is given in table 4.4.

Table 4.4

Quantitative basis for the selection of factors of the level of rationing and accounting of waste management

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of rationing of waste management	0–0,49	High level of formation and application of limiting indicators of waste generation in technological processes, high level of formation and application of indicators of waste generation, use and loss of raw materials in technological processes, low level of quality of waste management standards development	Not included
	0,5	High level of formation and application of marginal indicators of waste generation in technological processes, high level of formation and application of indicators of waste generation, use and loss of raw materials in technological processes, high the level of quality of waste management standards development	Uncertainty not included, requires additional neural network training
	0,51–1	Low level of formation and application of marginal indicators of waste generation in technological processes, low level of formation and application of indicators of waste generation, use and loss of raw materials in technological processes, high level of quality of waste management standards development	Included
The level of accounting for waste management	0–0,49	Low level of state accounting and certification of waste, low level of ensuring the completeness of the register of waste generation, treatment and disposal facilities, low level of ensuring the completeness of maintaining the register of waste disposal sites, low level of monitoring of waste generation, storage and disposal sites	Not included
	0,5	Non-systemic level of state accounting and certification of waste, non-systemic level of ensuring the completeness of the register of waste generation, treatment and disposal facilities, non-systemic level of ensuring the completeness of the register of waste disposal sites, non-systematic level of monitoring of	Uncertainty not included, requires additional neural network training

Continuation of table 4.4

1	2	3	4
		waste generation, storage and disposal sites	
	0,51–1	High level of state accounting and certification of waste, high level of ensuring the completeness of the register of waste generation, treatment and disposal facilities, high level of ensuring the completeness of maintaining the register of waste disposal sites, high level of monitoring of waste generation, storage and disposal sites	Included

The quantitative basis for the selection of functional factors for reducing or preventing waste generation is formed on the basis of the criterion of the level of ensuring the process of reducing or preventing waste generation (k_{tr43}). Characteristics of the defined criterion are given in Annex E, table E.27. The selection of factors for the level of notification of the threat or occurrence of emergencies is carried out according to the criterion of the level of provision of this process (k_{tr44}). The quantitative basis for the selection of factors according to the relevant criteria is given in Annex E, table E.28. The criterion for selecting the factors of the level of information on the occurrence and prevention of emergencies is determined by the level of completeness of information (k_{tr45}) the characteristics of which are given in table 4.5.

Table 4.5

Quantitative basis for selecting factors for the level of information on the occurrence and prevention of emergencies

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of completeness of information on the occurrence and prevention of emergencies	0–0,49	Low level of formation and use of information on forecasted or emerging emergencies, with definition of their classification, limits of distribution and consequences, as well as ways and methods of protection against them, low level of provision of effective and reliable information by civil protection bodies to the population through mass media information referred to in part one of this article, as well as on its activities on civil protection, in particular in a form accessible to persons with visual and hearing impairments, low level of completeness of information on emergencies, low level of disclosure of information on the consequences of emergency information legislation	Not included

Continuation of table 4.5

1	2	3	4
	0,5	Unsystematic level of formation and use of information on forecasted or emerging emergencies, with the definition of their classification, limits of distribution and consequences, as well as ways and methods of protection against them, unsystematic level of providing civil protection bodies to the population through the media prompt and reliable information referred to in part one of this article, as well as on its activities on civil protection, in particular in a form accessible to persons with visual and hearing impairments, low level of completeness of information on emergencies, low level of disclosure of information on the consequences of emergency information legislation	Uncertainty not included, requires additional neural network training
	0,51–1	High level of formation and use of information on forecasted or emerging emergencies, with definition of their classification, limits of distribution and consequences, as well as on ways and methods of protection against them, high level of provision of civil and operational protection to the population through the media prompt and reliable information referred to in part one of this article, as well as on its activities on civil protection, in particular in a form accessible to the visually and hearing impaired, a high level of completeness of information on emergencies, a high level of disclosure of information on the consequences of emergency information legislation	Included

The quantitative basis for the selection of factors for the level of shelter of the population in protective structures of civil defense is determined by the criterion of the level of compliance and control (k_{tr46}). Characteristics of this criterion are given in Annex E, table E.29.

The quantitative basis for the selection of factors of the level of implementation of evacuation measures is formed by applying the criterion of the level of provision of the presented process (k_{tr47}) (table 4.6).

Table 4.6

Quantitative basis for selecting factors for the level of implementation of evacuation measures

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of ensuring the implementation of evacuation measures	0–0,49	Low level of formation and efficiency of regional, local and object evacuation bodies, low level of evacuation planning, low level of identification of safe areas suitable for accommodation of evacuated population and property, low level of organization of notification of business leaders and population about the beginning of evacuation, low the level of organization of evacuation management, the low level of livelihood of the evacuated population in their safe places, the low level of training of the population to act during the evacuation	Not included

Continuation of table 4.6

1	2	3	4
	0,5	Non-systemic formation and efficiency of regional, local and object evacuation bodies, non-systemic evacuation planning, low level of identification of safe areas suitable for accommodation of evacuated population and property, non-systemic organization of notification of business leaders and the population about the beginning of evacuation, non-systemic organization of evacuation management, low level of livelihood of evacuated population in places of their population actions during the conduct	Uncertainty not included, requires additional neural network training
	0,51–1	High level of formation and efficiency of regional, local and object evacuation bodies, high level of evacuation planning, high level of identification of safe areas suitable for accommodation of evacuated population and property, high level of organization of notification of heads of business entities and population about the beginning of evacuation, high the level of organization of evacuation management, the high level of livelihood of the evacuated population in places of their safe accommodation, the low level of training of the population to act during	Included

For the selection of factors the level of engineering protection of territories used a criterion level of its provision (k_{tr48}) whose characteristics are presented in Annex E, table E.30. Selection factors the level of radiation and chemical protection of population and territories is carried out according to the criterion of the level of formation and implementation of this protection (k_{tr49}).

A quantitative framework for the selection of certain factors presented in Annex E, table E.31. Selection factors the level of health protection, provision of sanitary and epidemic wellbeing of the population is carried out according to the criterion of their level of organization and support (k_{tr50}).

Characterization of specific criteria is presented in Annex E, table E.32.

Selection factors the level of biological protection of the population, animals and plants is carried out according to the criterion of the level of timeliness of detection of biological contamination and the possibility of impeding him (k_{tr51}), the definition of which is given in Annex E, table E.33.

A quantitative framework for the selection factors of the level of psychological protection of the population in territorial development of land use in the region is formed by applying the criterion of the assurance level of this protection (k_{tr52}) Annex E, table. E.34.

Selection factors the level of technological security is the criterion of a level of its determination and provide (k_{tr53}). A quantitative framework for the selection of these factors is presented in Annex E, table E.35.

A quantitative framework for the selection factors of the level of fire safety in territorial development of land use in the region is formed by application of the criteria: level of fire safety in territorial development of land use in the region (k_{tr54}); level of implementation of fire safety measures in the system of territorial development of land use in the region (k_{tr55}). Characterization of specific criteria is presented in Annex E, table E.36.

The defined criteria allow to select the factors influencing the formation and implementation of territorial development of land use and to form an information-analytical basis for the development of a methodological approach to integrated assessment. The compliance of the criteria for the selection of factors of territorial development of land use of the regions is given in Annex E, table E.37.

As a result of the study, the criteria on the basis of which the selection of factors of territorial development of land use is carried out are determined (see Annex E, Table E.37):

1. Spatial factors:

1.1. Territorial ($f^3_{111}, f^3_{112}, f^3_{113}, f^3_{114}, f^3_{115}, f^3_{116}, f^3_{117}$ - k_{tr1}; $f^3_{118}, f^3_{119}, f^3_{1110}, f^3_{1111}$ - k_{tr2}; $f^3_{1112}, f^3_{1113}, f^3_{1114}, f^3_{1115}, f^3_{1116}, f^3_{1117}$ - k_{tr3}).

1.2. Functional ($f^3_{121}, f^3_{122}, f^3_{123}, f^3_{124}, f^3_{125}, f^3_{126}, f^3_{127}, f^3_{128}, f^3_{129}, f^3_{1245}$ - k_{tr4}; $f^3_{1210}, f^3_{1211}, f^3_{1212}, f^3_{1213}, f^3_{1214}, f^3_{1215}, f^3_{1216}, f^3_{1217}, f^3_{1218}, f^3_{1219}, f^3_{1220}, f^3_{1221}$, $f^3_{1222}, f^3_{1223}, f^3_{1224}, f^3_{1225}, f^3_{1226}, f^3_{1227}, f^3_{1228}, f^3_{1229}, f^3_{1230}, f^3_{1231}, f^3_{1232}, f^3_{1233}$, $f^3_{1234}, f^3_{1235}, f^3_{1236}, f^3_{1237}, f^3_{1238}, f^3_{1239}, f^3_{1240}, f^3_{1241}, f^3_{1242}, f^3_{1243}, f^3_{1244}$ - k_{tr5}).

1.3. Social ($f^3_{131}, f^3_{132}, f^3_{133}, f^3_{134}, f^3_{135}, f^3_{136}, f^3_{137}, f^3_{138}$ - k_{tr6}).

1.4. Political ($f^3_{141}, f^3_{142}, f^3_{143}, f^3_{144}, f^3_{145}, f^3_{146}, f^3_{147}, f^3_{148}, f^3_{149}$ - k_{tr7}; f^3_{1410}, f^3_{1411}, $f^3_{1412}, f^3_{1413}, f^3_{1414}, f^3_{1415}, f^3_{1416}, f^3_{1417}, f^3_{1418}, f^3_{1419}, f^3_{1420}, f^3_{1421}, f^3_{1422}$ - k_{tr8}).

1.5. Level of cartographic and geodetic support of land use of regions (f^3_{151}, f^3_{155}, $f^3_{156}, f^3_{157}, f^3_{158}, f^3_{1510}, f^3_{1511}, f^3_{1513}, f^3_{1514}, f^3_{1515}, f^3_{1517}, f^3_{1519}, f^3_{1521}, f^3_{1526}$ - k_{tr9}; $f^3_{152}, f^3_{153}, f^3_{154}, f^3_{159}, f^3_{1512}, f^3_{1516}, f^3_{1518}, f^3_{1520}$ - k_{tr10}; $f^3_{1522}, f^3_{1523}, f^3_{1524}, f^3_{1525}$,

$f^3_{1527}, f^3_{1528}, f^3_{1529}$ - k_{tr11}).

2. Urban factors:

2.1. Zonal (f^3_{211}, $f^3_{212}, f^3_{213}, f^3_{214}, f^3_{215}, f^3_{216}$, f^3_{217}, f^3_{218}, f^3_{219} - k_{tr12}).

2.2. Functional and planning ($f^3_{221}, f^3_{222}, f^3_{223}, f^3_{224}, f^3_{225}, f^3_{226}$, f^3_{227}, f^3_{228}, f^3_{229}, f^3_{2210}, f^3_{2211} - k_{tr13}; f^3_{2212}, f^3_{2213}, f^3_{2214}, f^3_{2215}, f^3_{2216}, f^3_{2217}, f^3_{2218}, f^3_{2219}, f^3_{2220}, f^3_{2221}, $f^3_{2222} - k_{tr14}$).

2.3. Structural and planning ($f^3_{231}, f^3_{232}, f^3_{233}, f^3_{234}, f^3_{235}, f^3_{236}, f^3_{237}, f^3_{238}, f^3_{239}$ - k_{tr15}).

2.4. Planning and restrictive (f^3_{241}, f^3_{242}, $f^3_{243}, f^3_{244}, f^3_{245}, f^3_{246}, f^3_{247}$, f^3_{248}, f^3_{249}, f^3_{2410}, f^3_{2411} - k_{tr16}).

2.5. Engineering training and equipment of territories (f^3_{251}, $f^3_{2511}, f^3_{2512}, f^3_{2513}$ - k_{tr17}; f^3_{252}, f^3_{253}, f^3_{254}, f^3_{255}, f^3_{256}, f^3_{257}, f^3_{258}, f^3_{259}, f^3_{2510} - k_{tr18}).

2.6. Transportation ($f^3_{261}, f^3_{262}, f^3_{263}, f^3_{264}$ - k_{tr19}; $f^3_{265}, f^3_{266}, f^3_{267}$ - k_{tr20}).

2.7. Historical and architectural (f^3_{271}, f^3_{272}, $f^3_{273}, f^3_{274}, f^3_{275}, f^3_{276}, f^3_{277}, f^3_{278}$, $f^3_{279}, f^3_{2710}, f^3_{2711}, f^3_{2712}, f^3_{2719}$ - k_{tr21}; $f^3_{2713}, f^3_{2714}, f^3_{2715}$, f^3_{2716}, f^3_{2717}, f^3_{2718} - k_{tr22}).

2.8. Functioning of the construction industry in the regions ($f^3_{281}, f^3_{282}, f^3_{283}$, f^3_{284}, f^3_{285} - k_{tr23}).

2.9. Level of development of territories.

2.10. Density of development of territories.

2.11. The level of application of spatial information in urban planning (f^3_{2111}, f^3_{2112}, $f^3_{2113}, f^3_{2114}, f^3_{2115}, f^3_{2116}$ - k_{tr24}).

2.12. The level of formation of cadastral information in the field of land use of regions for urban planning (f^3_{2121}, f^3_{2122}, f^3_{2123}, f^3_{2124}, f^3_{2125}, f^3_{2126}, f^3_{2127}, f^3_{2128}, f^3_{2129}, f^3_{21210}, f^3_{21211}, $f^3_{21212}, f^3_{21213}, f^3_{21214}, f^3_{21215}, f^3_{21216}$, f^3_{21217}, f^3_{21218}, f^3_{21219}, f^3_{21220}, f^3_{21221}, f^3_{21222}, f^3_{21223}, f^3_{21224}, f^3_{21225}, f^3_{21226}, f^3_{21227}, f^3_{21228}, f^3_{21229}, f^3_{21230}, f^3_{21231}, $f^3_{21232}, f^3_{21233}, f^3_{21234}$, f^3_{21235}, f^3_{21236}, f^3_{21237}, f^3_{21238}, f^3_{21239} - k_{tr25}).

3. Investment factors:

3.1. Evaluate (f^3_{311}, f^3_{312}, f^3_{313}, $f^3_{314}, f^3_{315}, f^3_{316}$ - k_{tr26}).

3.2. The level of use of funds, property and property rights (f^3_{321}, f^3_{322},

f^3_{323}, f^3_{324} - k_{tr27}).

3.3. Intelligent ($f^3_{331}, f^3_{332}, f^3_{333}, f^3_{334}$ - k_{tr28}).

3.4. Stakeholders ($f^3_{341}, f^3_{342}, f^3_{343}, f^3_{344}, f^3_{345}, f^3_{346}, f^3_{347}, f^3_{348}, f^3_{349}, f^3_{3410}, f^3_{3411}, f^3_{3412}, f^3_{3413}, f^3_{3414}, f^3_{3415}, f^3_{3416}, f^3_{3417}, f^3_{3418}, f^3_{3419}, f^3_{3420}, f^3_{3421}, f^3_{3422}, f^3_{3423}, f^3_{3424}, f^3_{3425}, f^3_{3426}, f^3_{3427}, f^3_{3428}, f^3_{3429}, f^3_{3430}, f^3_{3431}$ - k_{tr29}).

3.5. Innovative ($f^3_{351}, f^3_{352}, f^3_{353}, f^3_{354}, f^3_{355}, f^3_{356}, f^3_{357}, f^3_{358}, f^3_{359}, f^3_{3510}, f^3_{3511}$ - k_{tr30}).

3.6. Territorial development in regions ($f^3_{361}, f^3_{362}, f^3_{363}, f^3_{364}, f^3_{365}, f^3_{366}$ - k_{tr31}).

3.7. Attracting foreign investment in the field of land relations in regions ($f^3_{371}, f^3_{372}, f^3_{373}, f^3_{374}, f^3_{375}, f^3_{376}, f^3_{377}, f^3_{378}, f^3_{379}, f^3_{3710}, f^3_{3711}, f^3_{3712}, f^3_{3713}, f^3_{3714}, f^3_{3715}$ - k_{tr32}).

3.8. Public-private partnership ($f^3_{381}, f^3_{382}, f^3_{383}, f^3_{384}, f^3_{385}, f^3_{386}, f^3_{387}, f^3_{388}, f^3_{389}, f^3_{3810}, f^3_{3811}, f^3_{3812}, f^3_{3813}, f^3_{3814}, f^3_{3815}, f^3_{3816}, f^3_{3817}, f^3_{3818}, f^3_{3819}$ - k_{tr33}).

3.9. The level of investment activity in the field of land use in regions by domestic investors ($f^3_{391}, f^3_{392}, f^3_{393}, f^3_{394}, f^3_{395}, f^3_{396}, f^3_{397}, f^3_{398}$ - k_{tr34}; f^3_{399} - k_{tr35}).

3.10. The level of formation of special economic zones to ensure investment in the use in regional lands ($f^3_{3101}, f^3_{3102}, f^3_{3103}, f^3_{3104}, f^3_{3105}, f^3_{3106}$ - k_{tr36}).

3.11. The level of providing a special regime of innovation activities of technology parks in the field of land use of the regions ($f^3_{3111}, f^3_{3112}, f^3_{3113}, f^3_{3114}, f^3_{3115}, f^3_{3116}, f^3_{3117}, f^3_{3118}, f^3_{3119}, f^3_{31110}$ - k_{tr37}).

3.12. Implementation of investment projects in the field of land use of the regions on the principle of "single window" ($f^3_{3121}, f^3_{3122}, f^3_{3123}, f^3_{3124}, f^3_{3125}$ - k_{tr38}).

4. Environmental factors:

4.1. Environmental development ($f^3_{411}, f^3_{412}, f^3_{413}, f^3_{414}, f^3_{415}, f^3_{416}, f^3_{417}, f^3_{418}, f^3_{419}$ - k_{tr39}).

4.2. Level of waste management ($f^3_{421}, f^3_{422}, f^3_{423}, f^3_{424}, f^3_{425}, f^3_{426}, f^3_{427}, f^3_{428}, f^3_{429}, f^3_{4210}, f^3_{4211}, f^3_{4212}, f^3_{4213}, f^3_{4214}, f^3_{4215}, f^3_{4216}$ - k_{tr40}).

4.3. The level of rationing and accounting of waste management ($f^3_{431}, f^3_{432}, f^3_{433}$ - k_{tr41}; $f^3_{434}, f^3_{435}, f^3_{436}, f^3_{437}$ - k_{tr42}).

4.4. Functional factors to reduce or prevent waste generation ($f^3_{441}, f^3_{442}, f^3_{443}, f^3_{444}$,

$f^3_{445}, f^3_{446}, f^3_{447}, f^3_{448}, f^3_{449}, f^3_{4410}, f^3_{4411}, f^3_{4412}, f^3_{4413}, f^3_{4414}, f^3_{4415}, f^3_{4416}, f^3_{4417}, f^3_{4418}, f^3_{4419}, f^3_{4420}, f^3_{4421}, f^3_{4422}, f^3_{4423}, f^3_{4424}, f^3_{4425}, f^3_{4426}, f^3_{4427}, f^3_{4428}, f^3_{4429}, f^3_{4430}, f^3_{4431}, f^3_{4432}, f^3_{4433}, f^3_{4434}, f^3_{4435}, f^3_{4436}, f^3_{4437}, f^3_{4438}, f^3_{4439}, f^3_{4440} - k_{tr43}$).

4.5. The level of notification of the threat or occurrence of emergencies ($f^3_{451}, f^3_{452}, f^3_{453}, f^3_{454}, f^3_{455} - k_{tr44}$).

4.6. Level of information on the occurrence and prevention of emergencies ($f^3_{461}, f^3_{462}, f^3_{463}, f^3_{464} - k_{tr45}$).

4.7. The level of shelter of the population in protective structures of civil defense ($f^3_{471}, f^3_{472}, f^3_{473}, f^3_{474}, f^3_{475} - k_{tr46}$).

4.8. Level of implementation of evacuation measures ($f^3_{481}, f^3_{482}, f^3_{483}, f^3_{484}, f^3_{485}, f^3_{486}, f^3_{487} - k_{tr47}$).

4.9. Level of engineering protection of territories ($f^3_{491}, f^3_{492}, f^3_{493}, f^3_{494}, f^3_{495}, f^3_{496}, f^3_{497}, f^3_{498}, f^3_{499} - k_{tr48}$).

4.10. The level of radiation and chemical protection of the population and territories ($f^3_{4101}, f^3_{4102}, f^3_{4103}, f^3_{4104}, f^3_{4105}, f^3_{4106}, f^3_{4107}, f^3_{4108}, f^3_{4109}, f^3_{41010} - k_{tr49}$).

4.11. The level of medical protection, ensuring the sanitary and epidemic well-being of the population ($f^3_{4111}, f^3_{4112}, f^3_{4113}, f^3_{4114}, f^3_{4115}, f^3_{4116}, f^3_{4117}, f^3_{4118}, f^3_{4119}, f^3_{41110}, f^3_{41111}, f^3_{41112} - k_{tr50}$).

4.12. Level of biological protection of the population, animals and plants ($f^3_{4121}, f^3_{4122}, f^3_{4123}, f^3_{4124}, f^3_{4125}, f^3_{4126}, f^3_{4127}, f^3_{4128}, f^3_{4129} - k_{tr51}$).

4.13. The level of psychological protection of the population ($f^3_{4131}, f^3_{4132}, f^3_{4133}, f^3_{4134} - k_{tr52}$).

4.14. Level of technological security ($f^3_{4141}, f^3_{4142}, f^3_{4143}, f^3_{4144}, f^3_{4145}, f^3_{4146}, f^3_{4147}, f^3_{4148}, f^3_{4149}, f^3_{41410}, f^3_{41411} - k_{tr53}$).

4.15. Level of fire safety ($f^3_{4151}, f^3_{4152} - k_{tr54}, f^3_{4153}, f^3_{4154}, f^3_{4155} - k_{tr55}$).

To determine the criteria for selecting factors for the territorial development of land use in regions, the appropriate levels are used, the characteristics of which are given in Annex E, table E.38. It should be noted that the selection of factors is carried out by the author. The presented characteristics of the low level for the criteria of selection of factors that shape the territorial development of land use in

regions, allow to exclude some of them, which significantly, at the present stage, do not affect the level of land use.

The characteristic of the level of uncertainty, which is given in Annex E, table E.39, for the selection of factors of territorial development of land use in the region allows to establish the need for additional research to make decisions. Selection of factors of territorial development of land use is carried out either in the direction of their exclusion or inclusion for further research.

Characteristics of the level of inclusion of factors of territorial development of land use in regions are given in Annex E, Table E.40.

Identified factors of territorial development of land use in regions form its assessment basis and basis for the construction of relevant indicators.

4.3 Indicators of integrated assessment of territorial development of land use in regions

Determination of indicators of integrated assessment of territorial development of land use in regions is based on factors that are characterized in a multilevel system. Taking into account the presented factors, the following indicators are formed at the first and second levels:

Spatial factors ($F1$) are determined by spatial indicators ($T1$). They are formed from factors:

f^2_{11} t_{11} – territorial indicators;

f^2_{12} t_{12} – functional;

f^2_{13} t_{13} – social;

f^2_{14} t_{14} – political;

f^2_{15} t_{15} – level of cartographic and geodetic support of land use of regions.

Urban factors (F_2) are determined by urban indicators (T_2). Urban indicators are formed from factors:

f^2_{21} t_{21} – zonal;

f^2_{22} t_{22} – functional and planning;

f^2_{23} t_{23} – structural planning;

f^2_{24} t_{24} – planning and restrictive;

f^2_{25} t_{25} – engineering training and equipment of territories;

f^2_{26} t_{26} – transport support;

f^2_{27} t_{27} – historical and architectural;

f^2_{28} t_{28} – functioning of the construction industry in regions;

f^2_{29} t_{29} – level of development of territories;

f^2_{210} t_{210} – building density;

f^2_{211} t_{211} – level of application of spatial information in urban planning;

f^2_{212} t_{212} – level of formation of cadastral information in the field of land use of regions for urban planning.

Investment factors (F_3) are determined by indicators (T_3). Investment indicators are characterized by factors:

f^2_{31} t_{31} – evaluative;

f^2_{32} t_{32} – level of use of funds, property and property rights;

f^2_{33} t_{33} – intelligent;

f^2_{34} t_{34} – stakeholders;

f^2_{35} t_{35} – innovative;

f^2_{36} t_{36} – territorial development in regions;

f^2_{37} t_{37} – attracting foreign investment in the field of land relations in regions;

f^2_{38} t_{38} – public-private partnership;

f^2_{39} t_{39} – the level of investment activity in the field of land use in regions by domestic investors;

f^2_{310} t_{310} – the level of formation of special economic zones to ensure investment in the use of land in regions;

f^2_{311} t_{311} – the level of providing a special regime of innovation of technology parks in the field of land use in regions;

f^2_{312} t_{312} – implementation of investment projects in the field of land use of

the regions on the principle of «sin gle window».

Environmental factors (F_4) are determined by environmental indicators (T_4), which are formed from:

f^2_{41} t_{41} – environmental development;

f^2_{42} t_{42} – level of waste management;

f^2_{43} t_{43} – level of rationing and accounting of waste management;

f^2_{44} t_{44} – functional indicators to reduce or prevent waste generation;

f^2_{45} t_{45} – the level of notification of the threat or occurrence of emergencies;

f^2_{46} t_{46} – the level of information on the occurrence and prevention of emergencies;

f^2_{47} t_{47} – the level of shelter of the population in protective structures of civil defense;

f^2_{48} t_{48} – level of implementation of evacuation measures;

f^2_{49} t_{49} – level of engineering protection of territories;

f^2_{410} t_{410} – level of radiation and chemical protection of the population and territories;

f^2_{411} t_{411} – level of medical protection, ensuring sanitary and epidemic well-being of the population;

f^2_{412} t_{412} – level of biological protection of the population, animals and plants;

f^2_{413} t_{413} – level of psychological protection of the population;

f^2_{414} t_{414} – level of technological security;

f^2_{415} t_{415} – level of fire safety.

The proposed model that defines a multilevel system of indicators used for integrated assessment of territorial development of land use in regions (4.1):

$$M = \langle \mathrm{T}_1, \mathrm{T}_2, \mathrm{T}_3, \mathrm{T}_4\, \Omega \rangle, \quad (4.1)$$

T_1 – integrated spatial indicator;

T_2 – integrated urban planning indicator;

T_3 – integrated investment indicator;

T_4 – integrated environmental indicator;

Ω – many relationships that characterize the relationship between integrated spatial, urban investment and environmental indicators,

$$\Omega = \{\varpi_p\};\ p = \overline{1, \psi}. \quad (4.2)$$

The developed integrated model for the assessment of the generalized spatial indicator (4.3) is determined on the basis of territorial, functional, social, political indicators and indicators of the level of cartographic and geodetic support of the land use in regions.

$$T_1 = \langle t_{11}, t_{12}, t_{13}, t_{14,} t_{15} \rangle, \quad (4.3)$$

$t_{11}, t_{12}, t_{13}, t_{14,} t_{15}$ - indicators that determine the territorial, functional, social, political directions and features of land use in regions, the level of their cartographic and geodetic support.

The integrated model for estimation of the general town-planning indicator (4.4) is offered, which is constructed by application of zonal, functional-planning, structural-planning, planning-limiting factors and indicators of engineering preparation and equipment of territories, transport, historical-architectural, functioning of building sphere in regions. , the level of development of territories, the density of development of territories, the level of application of spatial information in urban planning, the level of formation of cadastral information in the field of land use of regions for urban planning.

$$T_2 = \langle t_{21}, t_{22}, t_{23}, t_{24,} t_{25}, t_{26}, t_{27}, t_{28}, t_{29}, t_{210}, t_{211}, t_{212} \rangle, \quad (4.4)$$

$t_{21}, t_{22}, t_{23}, t_{24,} t_{25}, t_{26}, t_{27}, t_{28}, t_{29}, t_{210}, t_{211}, t_{212}$ – the parameters that determine the zonal functional planning, structural planning, planning restrictive, engineering training and equipment of the territories, transportation, historical and architectural direction, features of functioning of the construction sector in the regions, levels of development areas, the density of territories, the use of spatial information in urban planning, cadastral information in the field of land use areas for urban planning.

Built an integrated model for the evaluation of the generalized investment benchmark (4.5) by applying the performance indicators, the level of utilization of

funds, assets and property rights, intellectual, stakeholdersa, innovation indicators, territorial development of regions, attraction of foreign investments into the sphere of the land relations of the region, public-private partnership, the level of investment activity in the sphere of land use in the region by domestic investors, the level of formation of special economic zones for making investments in the sphere of land use regions, the level of provision of special regime of innovation activity of technological parks in the sphere of land use in regions the implementation of investment projects in the sphere of land use regions on the principle of «single window».

$$T_3 = \langle t_{31}, t_{32}, t_{33}, t_{34,} t_{35}, t_{36}, t_{37}, t_{38}, t_{39}, t_{310}, t_{311}, t_{312} \rangle, \quad (4.5)$$

$t_{31}, t_{32}, t_{33}, t_{34,} t_{35}, t_{36}, t_{37}, t_{38}, t_{39}, t_{310}, t_{311}, t_{312}$ – the parameters that determine the estimated directions, levels, use of funds, assets and property rights, intellectual, stakholder, innovative features, directions of territorial development of regions, attraction of foreign investments into the sphere of the land relations of the region, public-private partnerships, the levels of implementation of investment activity in the sphere of land use in the region by domestic investors, formation of special economic zones for making investments in the sphere of land use regions, ensuring special regime of innovation activity of technological parks in the sphere of land use regions, the features of implementation of investment projects in the sphere of land use in regions on the principle of «single window».

The developed integrated model to assess the environmental summarizing indicator (4.6) based on the use of indicators of environmental development, the level of waste, level of valuation and accounting of waste management, functional performance reduction or waste prevention, levels of threat alert or emergency situations, information on the occurrence and prevention of emergency shelter population in protective structures of civil protection, the implementation of measures on evacuation, engineering protection of territories, radiation and chemical protection of population and territories, health protection, provision of sanitary and epidemic wellbeing of the population, the biological protection of the population, animals and plants psychological protection, process safety, fire safety.

$$\mathrm{T}_4 = \langle t_{41}, t_{42}, t_{43}, t_{44,} t_{45}, t_{46}, t_{47}, t_{48}, t_{49}, t_{410}, t_{411}, t_{412}, t_{413}, t_{414}, t_{415} \rangle \quad (4.6)$$

$t_{41}, t_{42}, t_{43}, t_{44,} t_{45}, t_{46}, t_{47}, t_{48}, t_{49}, t_{410}, t_{411}, t_{412}, t_{413}, t_{414}, t_{415}$ – indicators that determine environmental development, level of waste management, regulation and accounting of waste management, functional areas of waste reduction or prevention, areas and features of notification of the threat or occurrence of emergencies, informing about the occurrence and prevention of emergencies, sheltering civil defense facilities, implementation of evacuation measures, engineering protection of territories, radiation and chemical protection of the population and territories, medical protection, sanitary and epidemiological welfare of the population, biological protection of the population, animals and plants, psychological protection of the population, technological safety, fire safety.

To assess the generalized integrated indicator of territorial development of land use in regions (*T*), the proposed model (4.7):

$$T = \sqrt[4]{T_1 * T_2 * T_3 * T_4} \ . \quad (4.7)$$

Determination of integrated spatial, urban, investment and environmental indicators of territorial development of land use in regions (T_1, T_2, T_3, T_4) is carried out according to the models:

$$T_1 = t_{1i} * k_{vt1i} \ , \quad (4.8)$$

$$T_2 = t_{2i} * k_{vt2i} \ , \quad (4.9)$$

$$T_3 = t_{3i} * k_{vt3i} \ , \quad (4.10)$$

$$T_4 = t_{4i} * k_{vt4i} \ , \quad (4.11)$$

t_{1i}, t_{2i}, t_{3i}, t_{4i} – spatial, urban, investment, environmental indicators that characterize the local impact on the relevant generalizing indicators of territorial development of land use in regions;

$k_{vt1i}, k_{vt2i}, k_{vt3i}, k_{vt4i}$– weighting factors that determine the impact of spatial, urban, investment, environmental factors on the relevant generalized indicators of territorial development of land use in regions.

Weights are estimated based on the application of the method of analysis of hierarchies, the directions of use of which are given in [3].

Spatial, urban, investment, environmental indicators that characterize the local impact on the relevant generalized indicators of territorial development of land use in regions are determined by the general models presented in tables 4.7–4.10.

In particular, for spatial indicators, local models are presented in table 4.7.

Table 4.7

General local models for the assessment of spatial indicators of the second level, which do not take into account the results of the selection of factors of the third level

Name of spatial indicators	Model
Territorial	$t_{11} = \sqrt[17]{(t_{111} * t_{112} * t_{113} * t_{114} * t_{115} * t_{116} * t_{117} * t_{118} * t_{119} * t_{1110} * t_{1111} * t_{1112} * t_{1113} * t_{1114} * t_{1115} * t_{1116} * t_{1117})}$
Functional	$t_{12} = \sqrt[45]{(t_{121} * t_{122} * t_{123} * t_{124} * t_{125} * t_{126} * t_{127} * \dots * t_{1245})}$
Social	$t_{13} = \sqrt[8]{(t_{131} * t_{132} * t_{133} * t_{134} * t_{135} * t_{136} * t_{137} * t_{138})}$
Political	$t_{14} = \sqrt[22]{(t_{141} * t_{142} * t_{143} * t_{144} * t_{145} * t_{146} * t_{147} * \dots * t_{1422})}$
Level of cartographic and geodetic support of land use of regions	$t_{15} = \sqrt[29]{(t_{151} * t_{152} * t_{153} * t_{154} * t_{155} * t_{156} * t_{157} * \dots * t_{1429})}$

Generalized models for urban indicators of the second level are defined in table 4.8.

Table 4.8

General local models for assessing urban indicators of the second level, which do not take into account the results of the selection of factors of the third level

Name of urban indicators	Model
Functional and planning	$t_{22} = \sqrt[22]{(t_{221} * t_{222} * t_{223} * t_{224} * t_{225} * t_{226} * t_{227} * \dots * t_{2222})}$
Structural and planning	$t_{23} = \sqrt[9]{(t_{231} * t_{232} * t_{233} * t_{234} * t_{235} * t_{236} * t_{237} * t_{238} * t_{239})}$
Planning and restrictive	$t_{24} = \sqrt[11]{(t_{241} * t_{242} * t_{243} * t_{244} * t_{245} * t_{246} * t_{247} * t_{248} * t_{249} * t_{2410} * t_{2411})}$
Engineering training and equipment of territories	$t_{25} = \sqrt[13]{(t_{251} * t_{252} * t_{253} * t_{254} * t_{255} * t_{256} * t_{257} * t_{258} * t_{259} * t_{2510} * t_{2511} * t_{2512} * t_{2513})}$
Transportation	$t_{26} = \sqrt[7]{(t_{261} * t_{262} * t_{263} * t_{264} * t_{265} * t_{266} * t_{267})}$
Historical and architectural	$t_{27} = \sqrt[19]{(t_{271} * t_{272} * t_{273} * t_{274} * t_{275} * t_{276} * t_{277} * \dots * t_{2719})}$
Functioning of the construction industry in the regions	$t_{28} = \sqrt[5]{(t_{281} * t_{282} * t_{283} * t_{284} * t_{285})}$
The level of application of spatial information in urban planning	$t_{211} = \sqrt[6]{(t_{2111} * t_{2112} * t_{2113} * t_{2114} * t_{2115} * t_{2116})}$
The level of formation of cadastral information in the field of land use of regions for urban planning	$t_{212} = \sqrt[39]{(t_{2121} * t_{2122} * t_{2123} * t_{2124} * t_{2125} * t_{2126} * t_{2127} * \dots * t_{21239})}$

The generalized models of estimation of investment indicators of the second level are presented in table 4.9.

Table 4.9

General local models for assessing second-level investment indicators that do not take into account the results of the selection of third-level indicators

Name of urban indicators	Model
1	2
Evaluate	$t_{31} = \sqrt[6]{(t_{311} * t_{312} * t_{313} * t_{314} * t_{315} * t_{316})}$
The level of use of funds, property and property rights	$t_{32} = \sqrt[4]{(t_{321} * t_{322} * t_{323} * t_{324})}$
Intelligent	$t_{33} = \sqrt[4]{(t_{331} * t_{332} * t_{333} * t_{334})}$
Stakeholders	$t_{34} = \sqrt[31]{(t_{341} * t_{342} * t_{343} * t_{344} * t_{345} * t_{346} * t_{347} * t_{348} * t_{349} * t_{3410} * \dots * t_{3431})}$
Innovative	$t_{35} = \sqrt[11]{(t_{351} * t_{352} * t_{353} * t_{354} * t_{355} * t_{356} * t_{357} * t_{358} * t_{359} * t_{3510} * t_{3511})}$
Territorial development of regions	$t_{36} = \sqrt[6]{(t_{361} * t_{362} * t_{363} * t_{364} * t_{365} * t_{366})}$
Attracting foreign investment in the field of land relations in regions	$t_{37} = \sqrt[15]{(t_{371} * t_{372} * t_{373} * t_{374} * t_{375} * t_{376} * t_{377} * \dots * t_{3715})}$
Public-private partnership	$t_{38} = \sqrt[19]{(t_{381} * t_{382} * t_{383} * t_{384} * t_{385} * t_{386} * t_{387} * \dots * t_{3819})}$
The level of investment activity in the field of land use in the region by domestic investors	$t_{39} = \sqrt[9]{(t_{391} * t_{392} * t_{393} * t_{394} * t_{395} * t_{396} * t_{397} * t_{398} * t_{399}}$
The level of formation of special economic zones to ensure investment in the use of regional lands	$t_{310} = \sqrt[6]{(t_{3101} * t_{3102} * t_{3103} * t_{3104} * t_{3105} * t_{3106})}$

Continuation of table 4.9

1	2
The level of providing a special regime of innovation activities of technology parks in the field of land use in regions	$t_{311} = \sqrt[10]{(t_{3111} * t_{3112} * t_{3113} * t_{3114} * t_{3115} * t_{3116} * t_{3117} * t_{3118} * t_{3119} * t_{31110})}$
Implementation of investment projects in the field of land use of the regions on the principle of "single window"	$t_{312} = \sqrt[5]{(t_{3121} * t_{3122} * t_{3123} * t_{3124} * t_{3125})}$

The assessment of the generalized ecological indicators of the second level is carried out according to the models presented in table 4.10.

Table 4.10

General local models for assessing environmental indicators of the third level, which do not take into account the results of the selection of factors of the third level

Name of urban indicators	Local model
1	2
Environmental development	$t_{41} = \sqrt[9]{(t_{411} * t_{412} * t_{413} * t_{414} * t_{415} * t_{416} * t_{417} * t_{418} * t_{419})}$
Level of waste management	$t_{42} = \sqrt[16]{(t_{421} * t_{422} * t_{423} * t_{424} * t_{425} * t_{426} * t_{427} * t_{428} * t_{429} * t_{4210} * \dots * t_{4216})}$
The level of rationing and accounting of waste management	$t_{43} = \sqrt[7]{(t_{431} * t_{432} * t_{433} * t_{434} * t_{435} * t_{436} * t_{437})}$
Functional factors to reduce or prevent waste generation	$t_{44} = \sqrt[40]{(t_{441} * t_{442} * t_{443} * t_{444} * t_{445} * t_{446} * t_{447} * t_{448} * t_{449} * t_{4410} * \dots * t_{4440})}$
The level of notification of the threat or occurrence of emergencies	$t_{45} = \sqrt[5]{(t_{451} * t_{452} * t_{453} * t_{454} * t_{455})}$
Level of information on the occurrence and prevention of emergencies	$t_{46} = \sqrt[4]{(t_{461} * t_{462} * t_{463} * t_{464})}$

Continuation of table 4.10

1	2
The level of shelter of the population in protective structures of civil defense	$t_{47} = \sqrt[5]{(t_{471} * t_{472} * t_{473} * t_{474} * t_{475})}$
Level of implementation of evacuation measures	$t_{48} = \sqrt[7]{(t_{481} * t_{482} * t_{483} * t_{484} * t_{485} * t_{486} * t_{487})}$
Level of engineering protection of territories	$t_{49} = \sqrt[9]{(t_{491} * t_{492} * t_{493} * t_{494} * t_{495} * t_{496} * t_{497} * t_{498} * t_{499}}$
The level of radiation and chemical protection of the population and territories	$t_{410} = \sqrt[10]{(t_{4101} * t_{4102} * t_{4103} * t_{4104} * t_{4105} * t_{4106} * t_{4107} * t_{4108} * t_{4109} * t_{41010})}$
The level of medical protection, ensuring the sanitary and epidemic well-being of the population	$t_{411} = \sqrt[12]{(t_{4111} * t_{4112} * t_{4113} * t_{4114} * t_{4115} * t_{4116} * t_{4117} * t_{4118} * t_{4119} * t_{41110} * t_{41111} * t_{41112})}$
Level of biological protection of the population, animals and plants	$t_{412} = \sqrt[9]{(t_{4121} * t_{4122} * t_{4123} * t_{4124} * t_{4125} * t_{4126} *) t_{4127} * t_{4128} * t_{4129}}$
The level of psychological protection of the population	$t_{413} = \sqrt[4]{(t_{4131} * t_{4132} * t_{4133} * t_{4134})}$
Level of technological security	$t_{414} = \sqrt[11]{(t_{4141} * t_{4142} * t_{4143} * t_{4144} * t_{4145} * t_{4146} * t_{4147} * t_{4148} * t_{4149} * t_{41410} * t_{41411})}$
Level of fire safety	$t_{415} = \sqrt[5]{(t_{4151} * t_{4152} * t_{4153} * t_{4154} * t_{4155})}$

Thus, the study identified factors and indicators that affect the territorial development of land use in regions. The presented indicators allow to develop a methodological approach to assessing the level of territorial development and to form a quantitative basis for its provision on the basis of relevant methodological recommendations.

5 Assessment of spatial, urban planning, investment and environmental indicators of territorial development of land use in regions

5.1 Definition of spatial indicators of territorial development land use in regions

To determine the indicators that form the assessment model indicators of territorial development land use in regions, apply analytical methods and expert estimates. In the system of spatial indicators territorial indicators of the level of promotion and financing the development of the region ($t_{111}, t_{112}, t_{113}, t_{114}, t_{115}, t_{116}, t_{117}$) is determined by applying the method of expert assessments of the experts identified above. Criteria for scoring are given in Annex F, table F. 1.

Evaluation of territorial indicators of the level of formation and development of the unified territorial communities ($t_{118}, t_{119}, t_{1110}, t_{1111}$)on the basis of applying the method of expert assessments on the scale proposed above. Evaluation criteria indicators:

a) 0 is not generated, and not implemented the program of development of the unified territorial communities not provided with spatial information, no information system of formation and use of spatial information, there are no directions of territorial development of the united territorial community, not developed system of the management of their land relations, are not set boundaries that are not made by examination of land-property complex of the unified territorial communities;

b) 1 – developed, but not implemented development programme United territorial communities not provided with spatial information, no information system of formation and use of spatial information, there are no directions of territorial development of the United territorial community, not developed system of the management of their land relations, the existing «legacy» spatial information relative to the territories of the united territorial community, not set their boundaries that are not made by examination of land-property complex;

c) 2 – developed and implemented the program of development of the unified territorial communities not provided with spatial information, no information system of formation and use of spatial information, there are no directions of territorial development of the united territorial community, form a management system for their land relations, the existing «legacy» spatial information relative to the territories of the united territorial community, not set their boundaries that are not made by examination of land-property complex, are implemented in separate directions for the formation of spatial information;

d) 3 – developed and implemented the program of development of the unified territorial communities not provided with spatial information, no information system of formation and use of spatial information, there are no directions of territorial development of the united territorial community, form a management system for their land relations, the existing «legacy» spatial information relative to the territories of the united territorial community, not set their boundaries that are not made by examination of land-property complex, are implemented in separate directions for the formation of spatial information, are a separate work on updating cartographic information, has not formed the land registry, there is no information regarding the property, the condition of engineering networks of the united territorial communities;

e) 4 – developed and implemented the program of development of the unified territorial communities not provided with spatial information, no information system of formation and use of spatial information, and develop and implement separate directions of territorial development of the United territorial community, form a management system for their land relations, the existing «legacy» spatial information relative to the territories of the united territorial community, the work is done on establishing their borders, to conduct a separate work on the expertise of the land-property complex, are implemented in separate directions for the formation of spatial information, are a separate work on updating cartographic information, has not formed the land registry, absent full information regarding the property, the condition of engineering networks of the united territorial communities;

f) 5 – designed and implemented a separate stream within the program of development of the unified territorial communities, partly provided with the spatial information developed by the information system of formation and use of some spatial information, and develop and implement separate directions of territorial development of the united territorial community, form a management system for their land relations, the existing «legacy» spatial information relative to the territories of the united territorial community, the work is done on establishing their borders, to conduct a separate work on the expertise of the land-property complex, are implemented in separate directions for the formation of spatial information, are a separate work on updating cartographic information implemented directions on creation of land cadastre, the information available regarding real estate, the condition of engineering networks of the united territorial communities;

g) 6 – developed and implemented a separate stream within the program of development of the unified territorial communities, partly provided with the spatial information developed by the information system of formation and use of spatial information, and develop and implement the directions of territorial development of the united territorial community, form a management system for them to land relationships, the updating of spatial information relative to the territories of the united territorial community, the work is done on establishing their borders, to conduct a separate work on the expertise of the land-property complex, are implemented in separate directions for the formation of spatial information, are a separate work on updating cartographic information and implementing areas to create the land cadastre, available information regarding the property, the condition of engineering networks of the United territorial communities;

h) 7 – developed and systematically implemented direction in the framework of the program of development of the unified territorial communities, partly provided with the spatial information developed by the information system of formation and use of spatial information, systematically developed and implemented the directions of territorial development of the united territorial community, form a management system for their land relations, system is updating spatial information

relative to the territories of the united territorial community, the work is done on establishing their borders, carried out expert appraisal of land and property complex, implemented the directions for the formation of spatial information, the works on the updating map information are implemented directions on creation of land cadastre, available information regarding the property, the condition of engineering networks of the united territorial communities;

i) 8 – comprehensively implements development programs of the united territorial community, which includes spatial information established and operational the information system of formation and use of spatial information, systematically developed and implemented the directions of territorial development of the united territorial community, an effective system for management of their land relations, system is updating spatial information relative to the territories of the united territorial community, the work is done on establishing their borders, carried out expert appraisal of land and property complex, implemented the directions for the formation of spatial information, and constantly works on updating map information are implemented directions on creation of land cadastre, available information regarding the property, the condition of engineering networks of the United territorial communities;

j) 9 – complex implementation of development programmes of the united territorial community, which includes spatial information established and operational the information system of formation and use of spatial information, systematically developed and implemented the directions of territorial development of the united territorial community, an effective system for management of their land relations, system is updating spatial information relative to the territories of the united territorial community, established their boundaries, fully realized examination of land and property complex, implemented the directions for the formation of spatial information, and constantly works on updating map information and implementing areas to create the land cadastre, the information available regarding real estate, the condition of engineering networks of the United territorial communities;

k) 10 – comprehensively implements development programs of the united territorial community, which is fully provided spatial information established and operational the information system of formation and use of spatial information, systematically developed and implemented the directions of territorial development of the united territorial community, an effective system for management of their land relations, system is updating spatial information relative to the territories of the united territorial community, established their boundaries, fully realized examination of land and property complex and constantly works on updating and implementing directions for the formation of spatial information, and constantly works on updating cartographic data, developed and applied in the land cadastre, available information regarding the property, the condition of engineering networks of the united territorial communities.

Indicators of the level of implementation of the directions of territorial development ($t_{1112}, t_{1113}, t_{1114}, t_{1115}, t_{1116}, t_{1117}$) are determined on the basis of applying the expert evaluation method, feature points which are presented in Annex F, table F.2.

Indicators of the level of land use in the region (t_{121}, t_{122}, t_{123}, t_{124}, t_{125}, t_{126}, t_{127}, t_{128}, t_{129}) in the system functional parameters are determined by applying the expert evaluation method with the application of the above criteria:

a) 0 – there are no areas of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and other purposes, is «chaotic» the formation, distribution and use of these lands;

b) 1 – a low level of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water fund, industry, transport, communications, energy, defense and other purposes, is a non-system formation, distribution and use of these lands;

c) 2 – low level of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational purposes, industry, transport, communications, energy, defense and other purposes, focuses attention on the increase of efficiency of formation, distribution and use of lands of historical-cultural purpose, forest Fund, water Fund, is a non-system formation, distribution and use of these lands;

d) 3 – low level of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational purposes, industry, transportation, communications and other purposes, focuses attention on the increase of efficiency of formation, distribution and use of lands of historical-cultural purpose, forest Fund, water Fund, energy, defense, is a non-system formation, distribution and use of these lands;

e) 4 – low level of formation, distribution and use of agricultural lands, residential and public buildings, industry, transport, communication and other purposes, creates conditions for increase of efficiency of formation, distribution and use of lands of historical-cultural purpose, forest Fund, water Fund, energy, defense, natural reserve Fund and other conservation purposes, recreational purposes, recreational purposes, is a non-system formation, distribution and use of these lands;

e) 5 – increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and other purposes, low level of implementation of information support of the territorial development of the formation, distribution and use of land in the region;

f) 6 – increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and

other purpose built system of institutional mechanisms of territorial development land use, low level of implementation of information support;

g) 7 – increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and other purpose built system of institutional mechanisms of territorial development use of land, increasing the level of application of information security;

h) 8 – increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and other purpose built system of institutional mechanisms of territorial development use of land, increasing the level of application of information security, systematically implemented use of lands in accordance with the developed regulatory-legal documents, there are no violations in the sphere of spatial security of the territories fully compliant and proportion in the use of land;

i) 9 – system increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest Fund, water Fund, industry, transport, communications, energy, defense and other purpose built system of institutional mechanisms of territorial development use of land, increasing the level of application of information security, systematically implemented use of lands in accordance with the developed regulatory-legal documents, there are no violations in the sphere of spatial security of the territories fully compliant and proportion in the use of land;

j) 10 – system increases the efficiency of formation, distribution and use of agricultural lands, residential and public construction, natural reserve Fund and other conservation purposes, recreational purposes, recreational, historic-cultural purpose, forest fund, water fund, industry, transport, communications, energy, defense and

other purpose built system of institutional mechanisms of territorial development use of land, increasing the level of application of information security, systematically implemented use of lands in accordance with the developed regulatory-legal documents, there are no violations in the sphere of spatial security of the territories fully compliant and proportion in the use of land provided by the system use of modern technology, instrumental apparatus, of information systems for the formation and implementation of the directions of territorial development of land use.

The indicator of the status and use of underground real estate (t_{1245}) is determined by the method that is proposed below.

Indicators of the level of spatial provision of use of land in the region in the system functional parameters are determined on the basis of the criteria presented in Annex F, table F.3 using the method of expert estimates.

The indicators characterizing the level of spatial provision of use of land in the region is estimated by the indexes, which are determined by an analytical method based on established standards and criteria:

t_{1235} – coefficients that determine the influence of local factors of the location of the cadastral quarter on the territorial-planning, engineering-geological, historical-cultural, natural-landscape, sanitary-hygienic and other conditions;

t_{1236} – coefficients that take into account the type of forest vegetation conditions in the conditions of Polissya for (all districts of Volyn, Zhytomyr, Rivne, Chernihiv regions) (except for those related to the Forest-Steppe); Seredino-Bud, Shostka, Yampil districts of Sumy region);

t_{1237} – coefficients taking into account the forest site conditions of forest-Steppe zone (for all districts in Vinnytsia, Poltava, Ternopil, Khmelnytskyi, Cherkasy regions; all districts of Kiev, Sumy areas (except related to Polesie); all districts of Chernivtsi region (with the exception related to the Ukrainian Carpathians); Gorokhovsky, Vladimir-Volyn, Ivanchenkova, Lobachevskogo, Lutsk district of Volyn region, Andrushovskoho, Berdichevsky, lubarsky, Popelnianski, Ruzhinskaya, of Chudnovsky district, Zhitomir region; Galitsky,

Horodenkivsky, Rohatyn, Sniatyn, Tlumach district of Ivano-Frankivsk region; Olshansky, Gayvoronsky, Golovanevsk, Dobrovelichkovsky, sign, Maloviskovsky, Archangel, Novomirgorod, Alexander, of St., Svitlovodsk, Ulyanovsk regions Kropiwnicka region; Brody, Busk, Gorodok, Zolochevsky, Kamenka-Bugskaya, zhidachivskogo, of Zhovkva, Mykolaiv, Mostyska, Peremyshlanska, Radekhiv, Sokal, Stryi, Pustomyty, jaworowski district, Lviv region; baltsky, Kodymsky, Savransky, Zaharevskaya, Podolsky, Okeanskogo districts of Odessa region; Goshchansky, Dubrovitsky, Dubno, Zdolbuniv, Koretsky, Malinovskogo, Ostrog, Radivilivskogo, Rivne district, Rivne region; Bohodukhiv, Balakleya, Borowski, Valkovsky, velikoburluksky, Volchansk, Dvurechansky, Dergachi, Zmiev, Zolochiv, Kolomak, Krasnokutsk, Pechenigy, Kharkov, Chuguev districts of Kharkiv region; Bahmatskoy, Bobrovitskiy, borznyansky it Varvinsky, Ichnya, Nizhyn, Nosivka, Prilutsky, Srebrenska, Tellescope areas Chernihiv region);

t_{1238} – coefficients that take into account the type of forest vegetation conditions in the steppe for (all districts of Dnipropetrovsk, Donetsk, Zaporizhia, Luhansk, Mykolaiv, Kherson regions; all districts of Kropyvnytskyi, Kharkiv, Odessa regions) (except for those related to the Forest-Steppe);

t_{1239} – coefficients that take into account the type of forest vegetation conditions in the Ukrainian Carpathians for (all districts of Zakarpattia region; all districts of Ivano-Frankivsk, Lviv regions (except for those related to the Forest-Steppe); Vyzhnytskyi, Putylsky, Storozhynetsky districts of Chernivtsi region);

t_{1240} – coefficients that determine the actual forest cover of the territory;

t_{1241} – coefficients that take into account the values of water bodies;

t_{1242} – coefficients that take into account the quality of water bodies;

t_{1243} – coefficients that take into account the value of health, recreational, historical and cultural lands.

The share of agricultural land in the total land fund by region (t_{1244}) is estimated as the ratio of the presented indicators according to the State Service of Ukraine for Geodesy, Cartography and Cadastre.

The indicator of the level of condition and use of underground real estate (t_{1245}) is determined on the basis of the method developed by the author, the characteristics of which are given in the next section.

Indicators of the level of provision of social infrastructure facilities ($t_{131}, t_{132}, t_{133}, t_{134}, t_{135}, t_{136}, t_{137}, t_{138}$) are determined by an expert method according to the established criteria:

a) 0 – lack of directions of development of social infrastructure facilities;

b) 1 – low level of housing, no directions of development and functioning of children's preschool institutions, secondary schools, medical institutions (hospitals, clinics, pharmacies), cultural facilities (theaters, cinemas, dance halls, clubs, libraries), trade (shops, markets, catering facilities), household services (households, dry cleaners, laundries), affordable housing for citizens, especially the poor, with disabilities, orphans and children deprived of parental care, persons from among them, youth, public sector employees, as well as large families, the formation of a powerful state order for the construction of social housing, the revival of affordable mortgage lending;

c) 2 – low level of provision of housing, low level of affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage lending, there are no directions for the development and functioning of preschool institutions, comprehensive schools, medical institutions (hospitals, clinics, pharmacies), cultural facilities (theatres, cinemas, Tanceval halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

g) 3 – low level of provision of housing, low level of affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage lending, low level of provision of

children's preschool institutions, secondary schools, medical institutions (hospitals, clinics, pharmacies), cultural (theatres, cinemas, dance halls, clubs, libraries)trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

d) 4 – implemented separate areas for housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage lending, low level of provision of kindergartens, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies), cultural (theatres, cinemas, dance halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

e) 5 – implemented separate areas for housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage lending, implemented the particular directions to provide kindergartens, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies), cultural (theatres, cinemas, dance halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

g) 6 – the rise of the level of provision of housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage lending, implemented the particular directions to provide kindergartens, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies), cultural (theatres, cinemas, dance halls, clubs, libraries)trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

s) 7 – the rise of the level of provision of housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage credit, an increase level of provision of kindergartens, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies) are implemented in separate areas of provision of cultural facilities (theatres, cinemas, dance halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

к) 8 – there is a permanent increase in the level of provision of housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage credit, an increase level of provision of kindergartens, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies) are implemented in separate areas of provision of cultural facilities (theatres, cinemas, dance halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

l) 9 – systematically implemented the program of provision of housing, affordable housing for the citizens, especially the poor, disabled, children-orphans and children deprived of parental care, persons of their number, young people, public sector employees, as well as large families, the emergence of a strong state order for the construction of social housing, the revival of accessible mortgage credit, there is the system increasing the provision of childcare facilities, zagalnoosvitnioi schools, medical institutions (hospitals, clinics, pharmacies), increasing the level of provision of cultural facilities (theatres, cinemas, dance halls, clubs, libraries), trade (shops, markets, restaurants), domestic services (domestic services, dry cleaning, laundries);

m) 10 – programs for providing the population with housing, affordable housing for citizens, primarily low-income, with disabilities, orphans and children

deprived of parental care, persons from among them, youth, public sector employees, as well as large families, the formation of strong state order for the construction of social housing, the revival of affordable mortgage lending, which leads to an increase in the quality of life, there is a systematic increase in the level of provision of children's preschools, secondary schools, medical institutions (hospitals, clinics, pharmacies), there is a systematic increase cultural facilities (theaters, cinemas, dance halls, clubs, libraries), trade (shops, markets, catering facilities), consumer services (homes, dry cleaners, laundries), which leads to increased quality of life and efficiency of use melting of the region's lands.

Political indicators influencing the formation of spatial support for the territorial development of land use in regions ($t_{141}, t_{142}, t_{143}, t_{144}, t_{145}, t_{146}, t_{147}, t_{148}, t_{149}, t_{1410}, t_{1411}, t_{1412}, t_{1413}, t_{1414}, t_{1415}, t_{1416}, t_{1417}, t_{1418}, t_{1419}, t_{1420}, t_{1421}, t_{1422}$) are determined by the criteria, the characteristics of which are given in Annex F, table F.4.

Spatial indicators of cartographic and geodetic support of land use in regions ($t_{151}, t_{152}, t_{153}, t_{154}, t_{155}, t_{156}, t_{157}, t_{158}, t_{159}, t_{1510}, t_{1511}, t_{1512}\ t_{1513}, t_{1514}, t_{1515}, t_{1516}, t_{1517}, t_{1518}, t_{1519}, t_{1520}, t_{1521}, t_{1522}, t_{1523}, t_{1524}, t_{1525}, t_{1526}, t_{1527}, t_{1528}, t_{1529}$) are determined using the method of expert analysis according to the relevant criteria:

a) 0 – no cartographic and geodesic support of land use in regions;

b) 1 – does not comply with the requirements of standards and normative-technical documentation, not implemented advanced technologies and methods of organization of surveying and mapping production, have not been developed, accepted and organized programmatic, technological and technical support for the effective use of digital maps and geoinformation systems, not the works of the methods and ways safe for life and health of people, environment and objects of historical and cultural value, not stored and ignored topographic-geodetic, cartographic, erosion and space materials no systematic analysis of the state astronomic and geodetic bases of Ukraine and of compliance of cartographic materials modern condition of the area, are not provided with the implementation of topographic, cartographic, cadastral surveying and updating maps and plans, the

filming of the continental shelf and water features in a common coordinate system and heights in the creation, development and upkeep of the geodetic networks, creation and updating of cartographic bases of the state cadastre, the creation of local coordinate systems, creation of geodetic and cartographic materials and data for planning, design, construction and reconstruction of capital construction objects, creation of engineering and transport infrastructure, and also carrying out necessary engineering surveys, not a geographical information system, not provided with the creation of thematic maps, plans and atlases of special purpose graphics, digital and other forms of publishing such maps, plans and atlases, surveying, topographic, herasimovich and other special works for other surveys and special works, the performance of research and developmental works, development and application of normative-technical documentation in the field of topographic-geodetic and cartographic activities, establish the procedure of organization of topographic, geodetic and cartographic works, technical requirements, norms and rules of their implementation, metrological support of topographic, geodesic and cartographic activity, which includes system standards, standards, technical conditions, shall be binding upon and define the terms and names in this field, the mode of use of the devices during geodetic observations, methods of quality control of geodetic measurements, and other issues related to surveying and mapping activities not carried out technical support of topographic, geodetic and cartographic activity, which is based on the use of computer and information technology, technical tools to perform topographic and geodetic and cartographic works, are not provided with the application of modern information technologies and systems for creating a geodesic, topographic and cartographic materials collection, management, control, accumulation, storage, renewal, search, conversion, processing, display, issue, and transfer of data, development of a national mapping system to provide modern high-precision multi-scale topographic and thematic maps, other cartographic materials, streamlining and borders of administrative-territorial units, navigation, territorial planning and construction, land and forest management, management of land, water, urban, other state cadastres, registers and accounting systems, segregation and

accounting of land use and land tenure, taking into account their affiliation to various forms of ownership, inventory and assessment of agricultural land and non-agricultural land, management of utilities, transport and utilities, state environmental monitoring, impact assessment of high-risk facilities on the environment, prevention of emergency situations of technogenic and natural character, recreation, tourism, and other purposes the creation with the participation of leading scientific and production centers of the national and special geographic information systems and information banks and databases of geospatial data to support management and other needs at the national, regional and local levels, ensuring access to them in accordance with the laws of the interested enterprises, institutions and organizations, scientists and other citizens, not improved system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral, including military, as well as regional and local needs are not provided for the inclusion of plans and programmes of educational institutions, which train specialists in the field of topographic-geodetic and cartographic activities, learning relevant latest technical tools, techniques and technologies, implementation of additional measures for the development of market relations in the field of topographic-geodetic and cartographic activities, strengthening the export potential of the relevant domestic instrument and cartographic production, the initiation of international negotiations with the States concerned in the acquisition of equipment, cartographic products, which are produced by specialized enterprises, institutions and organizations of Ukraine, and the performance of works and provision of services, establishment and management of regional funds (archives, databases and data banks) herasimovich, topographic, geodetic and cartographic materials and information not provided state Executive bodies and local self-government at all levels, other physical and legal persons modern erosional, surveying and mapping scientific and technical information, there is no interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media, topographic, geodetic and cartographic information, which is public property, not

ensured the implementation of regional programmes and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, facilitation of activities of the public geodetic, cartographic and other professional organizations in the regions definition of regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, providing enterprises with the necessary topographic, geodetic and cartographic materials for the formation of regional funds is not ensured delegation of appropriate authority to interact with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support;

c) 2 – low level of compliance with standards and regulatory and technical documentation, introduction of advanced technologies and methods of organization of topographic and geodetic and cartographic production, development and implementation of software, technological and technical support for efficient use of digital maps and geographic information systems, etc., low level Improving the system of state topographic surveying, improving coordination and cooperation of topographic and geodetic and cartographic activities for national and sectoral, including military, as well as regional and local needs, are not included in the plans and programs of educational institutions that train specialists in the field of topographic and geodetic and cartographic activities, the study of relevant latest technical means, methods and technologies, the implementation of additional measures for the development of market relations in the field of topographic, geodetic and cartographic activities, strengthening the export potential of resp. leading domestic instrument making and cartographic production, initiating international negotiations with states interested in purchasing equipment, cartographic products produced by specialized enterprises, institutions and organizations of Ukraine, as well as in their work and services, formation and maintenance of regional funds (archives, databases and data banks) aerial photography, topographic and geodetic, cartographic materials and information,

state executive and local self-government bodies of all levels, other individuals and legal entities are not provided with modern aerial, topographic and geodetic cartographic and scientific and technical information, low level of interaction of regional authorities with state geodetic supervision bodies in the implementation of topographic and geodetic and cartographic works, as well as the use of topographic and geodetic and cartographic information, which is state property, the implementation of regional programs and projects on geodesy and cartography, the implementation of state scientific and technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geoinformation systems, etc., assistance in the activities of public geodetic, cartographic and other professional organizations in the regions, determination of regions and responsible enterprises for topographic, geodetic and cartographic support designation of certain territories, providing enterprises with the necessary topographic and geodetic and cartographic materials for the formation of regional funds, delegation of relevant powers for cooperation with regional bodies of state executive power and local self-government on topographic, geodetic and cartographic support;

d) 3 – separate directions are realized concerning formation of standards and normative-technical documentation, introduction of advanced technologies and methods of the organization of topographic-geodetic and cartographic production, development and introduction of software, technological and technical maintenance of effective use of digital maps and geoinformation systems, etc., improvement system of state topographic surveying, improving coordination and cooperation of topographic and geodetic and cartographic activities for national and sectoral programs, inclusion in the plans and programs of educational institutions that train specialists in the field of topographic and geodetic and cartographic activities, strengthening the export potential of the country. Production, initiating international negotiations with states interested in purchasing equipment, cartographic products produced by specialized enterprises, institutions and bodies organizations of Ukraine, as well as in their performance of works and provision of services, formation and maintenance of regional funds (archives, databases and data banks)

of aerial, topographic and geodetic, cartographic materials and information, are not provided by state executive and local governments of all levels, other individuals and legal entities with modern aerial photography, topographic-geodetic cartographic and scientific-technical information, interaction of regional authorities with bodies of state geodetic supervision in the implementation of topographic-geodetic and cartographic works, as well as the use of topographic-geodetic and cartographic information, which is state property, implementation of regional programs and projects on geodesy and cartography, implementation of state scientific and technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geoinformation systems, etc., promotion of public geodetic, cartographic and other professional organizations in the regions, definition of regions and responsible enterprises for topographic and geodetic and cartographic support of certain territories, provision of enterprises with the necessary topographic, geodetic and cartographic materials for the formation of regional funds, the delegation of appropriate powers for interaction with regions is not provided local bodies of state executive power and local self-government on issues of topographic, geodetic and cartographic support;

e) 4 – implemented a set of directions for the establishment of standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists in the field of topographic-geodetic and cartographic activities, strengthening the export potential of the relevant domestic instrument and cartographic production the initiation of international negotiations with the States concerned in the acquisition of equipment, cartographic products, which are produced by specialized enterprises, institutions and organizations of Ukraine, as well as in the execution of works and provision of

services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic, geodetic and cartographic materials and information not provided state Executive bodies and local self-government at all levels, other physical and legal persons modern erosional, surveying and mapping scientific and technical information, interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works, as well as the use of carriers of topographic and geodetic and cartographic information, which is state property, implementation of regional programs and projects on geodesy and cartography, implementation of state scientific and technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, etc. public geodetic, cartographic and other professional organizations in the regions, determination of regions and responsible enterprises for topographic-geodetic and cartographic support of certain territories, provision of enterprises with necessary topographic-geodetic and cartographic materials for formation of regional funds, delegation of relevant powers for interaction with regional bodies state executive power and local self-government on issues of topographic, geodetic and cartographic support;

f) 5 – system implements the direction for building standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists in the field of topographic-geodetic and cartographic activities, strengthening the export potential of the relevant domestic instrument and cartographic production the initiation of international negotiations with the States concerned in the acquisition of equipment, cartographic products, which are produced by specialized enterprises, institutions

and organizations of Ukraine, as well as in the execution of works and provision of services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic, geodetic and cartographic materials and information not provided state Executive bodies and local self-government at all levels, other physical and legal persons modern erosional, surveying and mapping scientific and technical information, interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property, execution of regional programs and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, facilitation of activities of the public geodetic, cartographic and other professional organizations in the regions definition of regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, provide companies with the necessary topographic, geodetic and cartographic materials for the formation of regional funds is not ensured delegation of appropriate authority to interact with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support;

g) 6 – systematically implemented the directions for the formation of standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists in the field of topographic-geodetic and cartographic activities, strengthening the export potential of the relevant domestic instrument and cartographic production the initiation of international negotiations with the States concerned in the acquisition of equipment, cartographic products, which are produced by specialized enterprises, institutions

and organizations of Ukraine, as well as in the execution of works and provision of services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic, geodetic and cartographic materials and information not provided state Executive bodies and local self-government at all levels, other physical and legal persons modern erosional, surveying and mapping scientific and technical information, interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property, execution of regional programs and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, facilitation of activities of the public geodetic, cartographic and other professional organizations in the regions definition of regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, provide companies with the necessary topographic, geodetic and cartographic materials for the formation of regional funds is not ensured delegation of appropriate authority to interact with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support;

h) 7 – systematically implementing a complex of directions on building standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists in the field of topographic-geodetic and cartographic activities, strengthening the export potential of the relevant domestic instrument and cartographic production the initiation of international negotiations with the States concerned in the acquisition of equipment, cartographic products, which are produced by specialized enterprises,

institutions and organizations of Ukraine, as well as in the execution of works and provision of services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic-geodesic and cartographic materials and information provided to bodies of state Executive power and local self-government at all levels, other physical and legal persons separate modern erosional, surveying and mapping scientific and technical information, interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property, execution of regional programs and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, facilitation of activities of the public geodetic, cartographic and other professional organizations in the regions definition of regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, provide companies with the necessary topographic, geodetic and cartographic materials for the formation of regional funds provided for delegation of certain authority to interact with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support;

i) 8 – systematically implemented a set of tactical areas for the formation of standards and regulatory and technical documentation, implementation of advanced technologies and methods of topographic and geodetic and cartographic production, development and implementation of software, technological and technical support for effective use of digital maps and geographic information systems, etc., improving the system of state topographic surveying, improving coordination and cooperation of topographic and geodetic and cartographic activities for national and sectoral programs, inclusion in the plans and programs of educational institutions that train specialists in the field of topographic and geodetic and cartographic activities, strengthening the export potential of the relevant and cartographic production, initiating international negotiations with states interested in purchasing

equipment, cartographic products produced by specialized enterprises, institutions and organizations of Ukraine, as well as in the performance of their work and provision of services, formation and maintenance of regional funds (archives, databases and data banks) of aerial surveying, topographic and geodetic, cartographic materials and information, provided state executive authorities and local governments at all levels, other individuals and legal entities with a complex of modern aerial photography, topographic and geodetic, cartographic and scientific and technical information, there is a constant interaction of regional authorities with the state geodetic supervision in the implementation of topographic and geodetic and cartographic works, as well as the use of topographic and geodetic and cartographic information, which is state property, constant implementation of regional programs and projects on geodesy and cartography, implementation of state scientific and technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geoinformation systems, etc., constant assistance to public geodetic, cartographic and other professional organizations in the regions, definition of regions and responsible enterprises for topographic and geodetic and cartographic support of certain territories, constant provision of enterprises with the necessary topographic, geodetic and cartographic materials for the formation of regional funds, permanent delegation of relevant my powers to interact with regional bodies of state executive power and local self-government on issues of topographic, geodetic and cartographic support;

j) 9 – systematically implemented a set of strategic directions for the development of standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists in the field of topographic-geodetic and cartographic activities, strengthening export

potential of the relevant domestic instrument and cartographic production, the initiation of international negotiations with the States concerned in the acquisition of equipment and mapping products that are produced by specialized enterprises, institutions and organizations of Ukraine, as well as in the execution of works and provision of services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic-geodesic and cartographic materials and information provided to bodies of state Executive power and local self-government at all levels, other physical and legal persons complex modern erosivno, topographic and geodetic, cartographic and scientific and technical information, is the system of interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property, systemic implementation of regional programmes and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, GIS system supporting the activities of the public geodetic, cartographic and other professional organizations in the regions definition in regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, system providing businesses the necessary topographic, geodetic and cartographic materials for the formation of regional funds systematically provided for delegation of certain powers to interact with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support;

k) 10 – system implements a range of strategic and tactical directions for the formation of standards and normative-technical documentation, introduction of progressive technologies and methods of organization of topographic-geodetic and cartographic production, software development and implementation, technological and technical support effective use of digital maps and geoinformation systems, etc. improving the system of the state topographic survey, improving coordination and cooperation surveying and mapping activities for national and sectoral programs, the inclusion of plans and programmes of educational institutions that train specialists

in the field of topographic-geodetic and cartographic activities, strengthening export potential of the relevant domestic instrument and cartographic production, the initiation of international negotiations with the States concerned in the acquisition of equipment and mapping products, which are produced by specialized enterprises, institutions and organizations of Ukraine, as well as in the execution of works and provision of services, establishment and management of the regional funds (archives, databases and data banks) herasimovich, topographic-geodesic and cartographic materials and information systematically provided with bodies of state Executive power and local self-government at all levels, other physical and legal persons complex modern erosivno, topographic and geodetic, cartographic and scientific and technical information, is a system interaction for implementation of strategic and tactical directions of the regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property, systemic implementation of strategic regional programmes and projects on geodesy and cartography, implementation of the state scientific-technical policy in the field of topographic and geodetic and cartographic activities, creation of cadastral, geographic information systems, system promoting strategic activities of the public geodetic, cartographic and other professional organizations in the regions the definition of regions and enterprises responsible for topographic, geodetic and cartographic support of certain territories, system providing businesses the necessary topographic, geodetic and cartographic materials for the formation and strategic development of regional funds systematically provided with the appropriate delegation of authority for strategic engagement with regional bodies of state power and local self-government in matters of topographic-geodetic and cartographic support.

Thus, the criteria of estimation of local spatial indicators that formed the basis for developing methodological approach determining the level of territorial development land use in the region. The criteria allow us to estimate spatial indicators and their value for modeling territorial development.

5.2 Local urban indicators of territorial development of land use in regions: evaluation criteria

Local urban indicators of territorial development of land use in regions are determined by an appropriate system of factors. In particular, urban zonal indicators that affect the territorial development of land use in regions (t_{211}, t_{212}, t_{213}, t_{214}, t_{215}, t_{216}, t_{217}, t_{218}) are characterized by the following criteria:

a) 0 – there are no directions for forming decisions about the planning and building of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, not updated setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically violated the border areas with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies not established an information system not formed an information system the definition of the social areas in regions, residential area region recreation area region;

b) 1 – they form separate areas where decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, updated separate directions setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically violated the border areas with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies not established an information system not formed

an information system the definition of the social areas of the region, residential area region recreation area in regions;

c) 2 – there have been isolated areas where decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, updated separate directions setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically violated the border areas with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies not established an information system not formed an information system the definition of the social areas in regions, residential area region recreation area in regions;

d) 3 – systematically implemented directions create decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically violated the border areas with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies not established an information system not formed an information system the definition of the social areas of the region, residential area region recreation area in regions;

e) 4 – comprehensively implements directions of making decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local

conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development of non-system defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies not established an information system not formed an information system the definition of the social areas in regions, residential area region recreation area in regions;

f) 5 – comprehensively implements directions of making decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development of non-system defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach zones of water objects are implemented separate areas to create the information system implements separate areas to create the information system the definition of the public area of the region, residential area in regions, recreation area in regions;

g) 6 – comprehensively implements directions of making decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development of non-system defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the

boundaries of coastal protective strips and beach areas of water bodies, comprehensively implements the direction for building the information system, comprehensively implements the direction for building the information system the definition of the public area of the region, residential area in regions, recreation area in regions;

h) 7 – comprehensively implements directions of making decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development of non-system defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach zones of water objects, are implemented systematically areas for the development of an information system is systematically implemented direction on creating an information system the definition of the public area in regions, residential area in regions, recreation area regions;

i) 8 – comprehensively implements directions of creation of decisions concerning planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, non-system is updated on direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies, has developed and effectively operates the corresponding information system,

developed and effectively functioning information system is the definition of the social areas in regions, residential area in regions, recreation area in regions;

j) 9 – system implemented directions create decisions regarding planning and development of the territory, is not carried out work on mapping the existing built up areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining the functional areas, system brushes direction setting for each zone permissible types of land use for urban needs, conditions and constraints regarding their development, systematically defines the boundaries of the zones with the boundaries of natural territorial complexes, strips of sanitary protection, sanitary, security and other restricted areas of land use, red lines the boundaries of coastal protective strips and beach areas of water bodies, which leads to the formation of zones of effective use of land in the region, has developed and effectively operates the corresponding information system, developed and effectively functioning information system is the definition of the social areas in regions, residential area in regions, recreation area in regions;

k) 10 – the directions of creation of decisions concerning planning and building of the territory are systematically realized, work on reflection of the existing building of territories, engineering and transport infrastructure, and also the basic elements of planning structure of territories is not carried out; taking into account local conditions when defining functional zones, systematically updating the directions of establishing for each zone of permitted and permissible uses of territories for urban needs, conditions and restrictions on their development, systematically determining the boundaries of zones with natural complexes, strips of sanitary protection, sanitary, protected and other areas of limited land use, red lines, boundaries of coastal protection strips and beach areas of water bodies, which leads to the formation of areas of efficient use of land in the region, developed and operates an appropriate information system, developed and operates an information system in regions, residential zone in regions, recreational zone in regions, zoning of territories has been developed and implemented.

Coefficients that characterize the urban value of the territory within the settlements (f^{3}_{219}) are determined analytically using the data of established standards.

Urban planning and planning indicators that affect the territorial development of land use in regions ($t_{221}, t_{222}, t_{223}, t_{224}, t_{225}, t_{226}, t_{227}, t_{228}, t_{229}, t_{2210}, t_{2211}, t_{2212}, t_{2213}, t_{2214}, t_{2215}, t_{2216}, t_{2217}, t_{2218}, t_{2219}, t_{2220}, t_{2221}, t_{2222}$), are determined by the following criteria:

a) 0 - not established and not provided functional and planning characteristics in the system of urban relations for the territorial development of land use in regions;

b) 1 – low level of establishment and provision of functional and planning characteristics in the system of town-planning relations for territorial development of land use in regions;

c) 2 – established and provided separate functional and planning characteristics in the system of urban relations for the territorial development of land use in regions;

d) 3 – established and provided functional and planning characteristics in the system of urban relations for the territorial development of land use in regions in the short term;

e) 4 – established and provided functional and planning characteristics in the system of urban relations for the territorial development of land use in regions in the long run;

f) 5 – non-system installed and provided functional design specifications in the system of urban relations for territorial development land use in regions;

g) 6 – system installed and provided functional design specifications in the system of urban relations for territorial development land use in regions in the short term;

h) 7 – system installed and provided functional design specifications in the system of urban relations for territorial development land use in regions in the long term;

j) 8 – system installed and provided functional design specifications the implementation of the strategic directions in the system of urban relations for territorial development land use in regions;

i) 9 – system installed and provided functional design specifications the implementation of the strategic directions in the system of urban relations and regional development, leading to increased efficiency of land use in regions;

k) 10 – system is installed and provided functional design specifications in the system of urban relations and regional development, which causes permanent increase of effectiveness of land use in regions.

Structural and planning indicators $(t_{231}, t_{232}, t_{233}, t_{234}, t_{235}, t_{236}, t_{237}, t_{238}, t_{239})$, influencing the formation of urban areas of territorial development of land use, are determined on the basis of qualitative factors according to the following criteria:

a) 0 – there is no information support on the share of residential area (manor, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing): community centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main and residential streets and squares; specific weight of green areas of general use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower and greenhouse farms), specific weight of industrial, communal and warehouse territories, resort territories, landscape areas, landscape areas societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories of historical monuments and cultures of national and local significance;

b) 1 – low level of information support to determine the share of residential area (manor, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing): community centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main and residential streets and squares; specific weight of green areas of general

use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower and greenhouse farms), specific weight of industrial, communal and warehouse territories, resort territories, landscape areas, landscape areas societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories of historical monuments and cultures of national and local significance;

c) 2 – low level of information support to determine the share of residential area (homestead, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing): community centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main and residential streets and squares; specific weight of green areas of general use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower and greenhouse farms), specific weight of industrial, communal and warehouse territories, resort territories, landscape areas, landscape areas societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories of historical monuments and cultures of national and local significance; certain measures are being taken to improve the information provided;

d) 3 – low level of information provision on the determination of the proportion of residential areas (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories,

territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance; systematic measures are being taken to improve the information security;

f) 4 – implements certain measures for ensuring growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance;

g) 5 – systematically implemented activities to ensure growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands,

territories for engineering infrastructure of territories of monuments of history and culture of national and local importance;

h) 6 – comprehensively implements measures to ensure growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance;

j) 7 – systematically implemented activities to ensure growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance;

i) 8 – systematically implemented activities to ensure growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings,

multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance, formed an information system;

k) 9 – systematically implemented activities to ensure growth in the share of residential development (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and flower-hothouse economy), the specific weight of industrial, utility and warehouse areas, resort areas, recreation territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance, are formed and effectively functioning information system;

l) 10 – system implemented on the effective use of residential areas (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings, identified on the basis of mapping, major and residential streets and squares; specific gravity of green areas green areas special

purpose (green sanitary protection zone, coastal protective strip, nurseries and floral and greenhouse agriculture), industrial, municipal and warehouse territories resort areas, landscape and recreational territories, territories of gardening societies, country development, institutions of rest and leisure, resort hotels, forests, parks, Logopark, Botanical parks, landscape parks, water bodies, watercourses, objects of natural reserve Fund, agricultural lands, territories for engineering infrastructure of territories of monuments of history and culture of national and local importance, given the appropriate ratio, are formed and effectively functioning information system.

Planning and limiting indicators ($t_{241}, t_{242}, t_{243}, t_{244}, t_{245}, t_{246}, t_{247}, t_{248}, t_{249}, t_{2410}, t_{2411}$), which form the town-planning directions of territorial development of land use in regions, are determined according to the criteria given in Annex F, table F.5.

Indicators of engineering training and equipment of territories in the urban aspect of the development of the ($t_{251}, t_{252}, t_{253}, t_{254}, t_{255}, t_{256}, t_{257}, t_{258}, t_{259}, t_{2510}, t_{2511}, t_{2512}, t_{2513}$) are determined by the following in regions:

a) 0 – no zoning of industrial and communal areas according to the sanitary classification of industries, implementation of measures that require a significant amount of backfilling or cutting of soils, drainage, peat, implementation of measures for the formation and reconstruction of urban hydraulic structures, implementation of measures for riverbeds and other reservoirs, which are subject to regulation, cleaning, dredging, locking in pipes, implementation of measures for the formation of water protection zones and coastal protection strips of reservoirs, reclamation of disturbed areas, formation and reconstruction of engineering structures and springs, construction of new and reconstruction of existing water mains, electricity, gas supply, storm sewerage and sewage treatment plants, implementation of measures for the construction and reconstruction of places of discharge of treated wastewater, provision of high-voltage power lines, provision of main communication facilities, electronic and low-current devices troy;

b) 1 – low zoning industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources, construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage Linyi transmission, the provision of basic communication facilities, electronic and low-voltage devices;

c) 2 – implemented a separate direction with respect to the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage Linyi transmission, the provision of basic communication facilities, electronic and low-voltage devices;

d) 3 – implemented guidelines for the zoning of industrial and communal territories according to the sanitary classification of production activities that require

a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage Linyi transmission, the provision of basic communication facilities, electronic and low-voltage devices;

e) 4 – system implemented direction with respect to the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage Linyi transmission, the provision of basic communication facilities, electronic and low-voltage devices;

f) 5 – comprehensively implements direction with respect to the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of

urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, the circuit in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices;

g) 6 – comprehensively implements tactical direction regarding the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices;

h) 7 – comprehensively implements the strategic direction regarding the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang

in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices;

i) 8 – systematically implemented strategic direction regarding the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices;

j) 9 – systematically implemented strategic direction regarding the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed

territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices, leading to improve the efficiency of land use in regions;

k) 10 – systematically implemented strategic direction regarding the zoning of industrial and communal territories according to the sanitary classification of production activities that require a significant amount of filling or cutting soil, drainage, vitorialanda, realization of measures on formation and reconstruction of urban hydraulic structures, the implementation of sections of river channels and other water bodies subject to regulation, the purification, dnouglubleniju, Tamkang in the pipe, the implementation of activities on the formation of water protection zones and coastal protective strips of water bodies, for recultivation of disturbed territories, on the formation and reconstruction of engineering structures and sources the construction of new and reconstruction of existing backbone networks of water, heat, electricity, gas supply, stormwater and wastewater treatment facilities, implementation of measures on construction and reconstruction of places of discharge of purified waste waters, provide high-voltage power lines, the provision of basic communication facilities, electronic and low-voltage devices, leading to increased efficiency of land use in regions.

Urban indicators of transport provision, which affect the territorial development of land use in regions ($t_{261}, t_{262}, t_{263}, t_{264}, t_{265}, t_{266}, t_{267}$), are determined by the criteria presented in Annex F, table F.6.

Characteristics of criteria for assessing urban historical and cultural indicators of territorial development of land use in regions (t_{271}, t_{272}, $t_{273}, t_{274}, t_{275}$, t_{276}, t_{277}, t_{278}, t_{279}, t_{2710}, $t_{2711}, t_{2712}, t_{2713}$, $t_{2714}, t_{2715}, t_{2716}, t_{2717}, t_{2718}, t_{2719}$):

a) 0 – lack of directions of formation and use of monuments of national and local significance of all types and species according to the classification of cultural

heritage sites, cultural heritage sites of all types and species according to the classification of cultural heritage sites, low level of historical buildings (significant and ordinary historical buildings: public, including religious, lack of directions of formation and use of residential and commercial, industrial and fortification structures) of territories that have the status of historical and cultural lands, places of lost houses, buildings, fortifications that had important historical or urban significance, high level of disharmonious buildings and structures, low level of natural monuments, nature reserves, valuable natural landscapes, the formation of the boundaries of historical habitat populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical paths, streets, squares, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries etc., the low level formed the boundaries of the historic city center (subject to availability of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, formed zones of monuments of architecture, an architectural dominants and accents formed observation points, the axes of the fronts, formed of zones of the display types, the definition of the Grand slopes, formed natural dominants, water surfaces, green spaces, lack of outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

b) 1 – determined by separate directions of formation and use of monuments of national and local importance of all types in accordance with the classification of

cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage is historical construction (significant and ordinary historic buildings: the public, including the cult, determined by separate directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, having important historical or urban significance, high level disharmonious buildings and structures, identifies parts of the formation of the natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historic road, street, square, historical buildings, structures and complexes, the trace is preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc, are defined separate areas formed by the boundaries of the historic city center (subject to availability of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, the generated inspection zones of monuments that are architectural landmarks and accents, formed by the observation points, the axes of the fronts, formed of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green spaces, lack of outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

c) 2 – defined and implemented parts of the formation and use of monuments of national and local importance of all types in accordance with the classification of

cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, are implemented by separate directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, high level disharmonious buildings and structures are implemented in separate areas of the formation of the natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historic road, street, square, historical buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc, are implemented separate areas formed by the boundaries of the historic city center (subject to availability of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, formed zones of monuments of architecture, an architectural dominants and accents formed observation points, the axes of the fronts, formed of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green spaces, low level of definition located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

d) 3 – defined and implemented the directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, having important historical or urban significance, high level disharmonious buildings and facilities, implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historic road, street, square, historical buildings, structures and complexes, the trace is preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc, are implemented separate areas formed by the boundaries of the historic city center (subject to availability of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, the generated inspection zones of monuments that are architectural landmarks and accents, formed by the observation points, the axes of the fronts, formed of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green spaces, formed parts of the definition located outside of the village

and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

e) 4 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically reduced the level disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historic road, street, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand

slopes formed natural dominants, water surfaces, green spaces, irregularly formed areas of definition located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

f) 5 – complex is defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, comprehensively implements the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, comprehensively implements the direction to reduce the level of disharmonious buildings and structures, comprehensively implements the direction of the formation of the natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc, comprehensively implements the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), the Grand slopes, water surfaces, the

formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green spaces, the complex is formed the direction of determine located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

g) 6 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically implemented the direction to reduce the level of disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning

dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), the Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green space, system generated direction determination located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes;

h) 7 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically implemented the direction to reduce the level of disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic

center of the city (in the presence of defensive walls or along the walls of these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green space, system generated direction determination located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes, which leads to increased efficiency of land use in regions;

i) 8 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, and reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically implemented the direction to reduce the level of disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings,

structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), the Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green space, system generated direction determination located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes, leading to increased efficiency of land use in regions;

j) 9 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, systematically reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically implemented the direction to reduce the level of disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times

protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), the Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green space, system generated direction determination located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes, which lead to growth of efficiency of land use in regions and the quality of urban settings;

k) 10 – system defined and realized directions of formation and use of monuments of national and local importance of all types in accordance with the classification of cultural heritage objects cultural heritage objects of all types in accordance with the classification of cultural heritage objects, systematically reconstructing historic buildings (significant and ordinary historic buildings: the public, including religious, systematically implemented the directions of formation and use of residential and commercial, industrial and fortifications) territories which have the status of lands of historical and cultural significance, places, lost buildings, structures, fortifications, that had important historical or urban significance, systematically implemented the direction to reduce the level of disharmonious buildings and structures, systematically implemented the directions of formation of natural monuments, nature reserves, valuable natural landscapes, forming the

boundaries of the historic areas of the populated area, the formation of borders of zones of protection of monuments of cultural heritage which are in force at the time of writing, the historical-architectural basic plan (when approved in earlier times protection zones), formed lists reflected the historical-architectural basic plan of cultural heritage, formation of borders of the settlement at each stage of development, the most important historical ways, streets, square, historic buildings, structures and complexes, trace preserved and lost lines of fortifications, monuments of landscape art, nature monuments, natural reserves and sanctuaries, etc., systematically implemented the directions of formation of borders of the historic center of the city (in the presence of defensive ramparts or walls along these fortifications), suburbs and the like, historical and modern town-planning dominants, architectural accents, architectural ensembles and complexes, the main and subordinate planning-donkey and composite nodes, characteristic types of urban spaces (closed, open, and disharmonious), the Grand slopes, water surfaces, the formation of zones of monuments of architecture, an architectural dominants and accents formed observation points, axes, fronts, formation of zones of the display types, the definition of the Grand slopes formed natural dominants, water surfaces, green space, system generated direction determination located outside of the village and historically associated objects of cultural heritage, the main directions of inspection of the historical centre, with entrances to it, valuable landscapes, which leads to a permanent increase of the efficiency of land use in regions and the quality of urban settings.

Indicators of the functioning of the construction sector in the regions determined by calculation on the basis of the data of the State statistics service of Ukraine, namely:

- standardized value of the index of construction output (t_{281});

- standardized value of the volume index of construction works (t_{282});

- standardized value of the indicator for the commissioning of housing (t_{283});

- standardized value of the indicator for the commissioning of flats in residential buildings at the construction site (t_{284});

- standardized value of the total area taken in buildings (t_{285}).

Standardization is carried out to bring all indicators to a common measurement unit, in particular relative units. This process is characterized by determining the values of indicators for the reporting and base periods. Standardized value of indicators is estimated as the ratio of the values of the indicators for the reporting period to the corresponding values in the base period.

Indicators of the level of use of spatial information in urban planning the development of land use in regions ($t_{2111}, t_{2112}, t_{2113}, t_{2114}, t_{2115}, t_{2116}$) following criteria (Annex F, table F.7):

Indicators of the level of formation of cadastral information in the field of land use areas for urban development are defined similarly as the previous group of factors (Annex F, table F.8):

Thus, the study defined criteria for evaluating local urban indicators, territorial development land use in regions, which will help form the appropriate quantitative basis for informed decision-making in the sphere of land relations.

5.3 Evaluation of local investment indicators, territorial development land use in regions

Investment indicators territorial development land use region are formed on the basis of a system of indicators that cover the evaluative factors affecting the formation of investment attractiveness in the system of territorial development of land use in regions. They are defined using the method of expert evaluations ($t_{311}, t_{312}, t_{314}$). Indicators ($t_{313}, t_{315}, t_{316}$) are evaluated using analytical data are presented according to the State service for geodesy, cartography and land management standards.

Evaluation factors affecting the formation of investment attractiveness in the system of territorial development of the land use in regions: the level of soil evaluation, economic valuation of land, level of use of expert assessment in the

system of monetary valuation of land is determined according to the criteria presented in Annex F, table F. 9.

Indicators of the level of use of funds, assets and property rights that influence the formation of investment attractiveness in the system of territorial development of land use in regions ($t_{321}, t_{322}, t_{323}, t_{324}$) are determined using the method of expert assessments and analytical method according to the State statistics service of Ukraine.

Indicators of the level of use of funds, target Bank deposits, shares, shares and other securities (except promissory notes) used in the sphere of land relations and the level of use of movable and immovable property (buildings, constructions, equipment and other tangible assets) that is at the disposal of regional authorities are determined on the basis of the criteria presented in Annex F, table F.10.

Index of capital investment by region is determined according to the State statistics service of Ukraine.

Intellectual factors influencing investment attractiveness in the system of territorial development of land use in regions ($t_{331}, t_{332}, t_{333}, t_{334}$) are determined according to the following criteria:

a) 0 – not developed areas for the use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («know-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values;

b) 1 is not formed, however the directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («know-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values;

c) 2 – are not implemented, however, the formed directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («APA-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values;

d) 3 – are implemented by separate directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («and -how»), use of land use rights, buildings, structures, equipment, and other property rights and other values;

d) 4 – implemented separate directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («nshi-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the increase of investment attractiveness of land in regions;

e) 5 – system implements the directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («Dr-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the increase of investment attractiveness of land in regions;

f) 6 – implemented the integrated areas for the use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of

a particular type of production, but not patented («Dr-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the increase of investment attractiveness of land in regions;

g) 7 – systematically implemented the directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («Dr-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the increase of investment attractiveness of land in regions;

h) 8 – systematically implemented the directions of use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («no-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the growth of investment attractiveness of land in regions;

i) 9 – systematically implemented strategic direction for the use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («Dr-how»), use of land use rights, buildings, structures, equipment, and other property rights and other values, which leads to the growth of investment attractiveness of land in regions;

j) 10 – systematically implemented strategic direction for the use of intellectual property rights, used in the sphere of land relations, the use of a range of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented («nshi-how»), use of land use rights,

buildings, structures, equipment, and other property rights and other values, which leads to the growth of investment attractiveness of land and development in regions.

Criteria stakeholdersa factors affecting the investment attractiveness in the system of territorial development land use area are presented in Annex F, table F. 11.

Innovation indicators forming the investment attractiveness in the system of territorial development of land use in the region are determined according to the following criteria:

a) 0 – no innovative ways of attracting investment in the system of territorial development of land use in regions;

b) 1 – formed innovative ways of attracting investment in the system of territorial development of the use of land in the region, but they are not implemented;

c) 2 – implemented some innovative ways of providing investment attractiveness in the system of territorial development of land use in regions;

d) 3 – systematically implemented innovative ways of attracting investment in the system of territorial development of land use in regions;

e) 4 – comprehensively implements innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions;

f) 5 – comprehensively implements innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders;

g) 6 – comprehensively implements innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders and the development of an appropriate information system;

h) 7 – systematically implement innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders and the development of an appropriate information system;

i) 8 – systematically implement innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders and the development of an appropriate information system, developed innovative technologies in the system of land use;

j) 9 – systematically implement innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders and the development of an appropriate information system, implementation of innovative technologies in the system of land use;

k) 10 – systematically implement innovative tools and programs to ensure the investment attractiveness in the system of territorial development of land use in regions, which provided a high level of interaction between stakeholders and the development of an appropriate information system, implementation of innovative technologies in the system of land use that leads to the growth of investment attractiveness of land in regions.

Investment performance, ensure the territorial development in regions ($t_{361}, t_{362}, t_{363}, t_{364}, t_{365}, t_{366}$), determined with the application of an analytical method according to the State statistics service of Ukraine.

The indicators of attracting foreign investments in the sphere of land relations in regions are estimated using the method of expert analysis on the criteria defined in Annex F, table F.12.

Indicators of public-private partnerships that influence the formation of investment in the use of land in regions, are determined according to the following criteria:

a) 0 – there are no directions for the formation and implementation of public-private partnerships, influencing the development of investment in land use in regions;

b) 1 – by the direction of the formation of public-private partnerships, influencing the development of investments in land use, but not implemented at regional level;

c) 2 – developed and implemented separate ways in the formation of public-private partnerships, influencing the development of investment in land use in regions;

d) 3 – developed and implemented separate ways in the formation of public-private partnerships that influence the formation of investment in the use of land in regions, which ensures the involvement of partners;

e) 4 – system is implemented in separate areas of the formation of public-private partnerships, influencing the development of investment in land use in regions;

f) 5 – system is implemented in separate areas of the formation of public-private partnerships that influence the formation of investment in the use of land in regions, creating an information system of public-private partnerships;

g) 6 – system is implemented in separate areas of the formation of public-private partnerships that influence the formation of investment in the use of land in regions, thereby creating an information system of public-private partnership and institutional system for the development of this partnership;

h) 7 – comprehensively implements the direction of the formation of public-private partnerships that influence the formation of investment in the use of land in regions that enhances the efficiency of interaction between stakeholders that operate in the public-private partnership;

i) 8 – system implements the direction of the formation of public-private partnerships that influence the formation of investment in the use of land in the region that provides growth of efficiency of interaction between stakeholders that operate in the public-private partnership;

j) 9 – system implements the direction of the formation of public-private partnerships that influence the formation of investment in the use of land in regions that attracts significant financial resources to implement projects;

k) 10 – system implements the direction of the formation of public-private partnerships that influence the formation of investment in the use of land in regions that provides a high level of equality before the law public and private partners, the implementation of the prohibition of any discrimination of rights of public or private partners, coordination of interests of public and private partners with the aim of obtaining mutual benefits, ensure high working efficiency than in the case of such activity by a public partner without involvement of the private partner, to ensure the sustainability during the whole term of the contract, concluded within state-private partnership, the purpose and ownership of objects being in state or municipal ownership or owned by the Autonomous Republic of Crimea, transferred to the private partner, the recognition of public and private partners the rights and duties stipulated by the legislation of Ukraine and defined by terms of the contract concluded in the framework of public-private partnerships, a high level of equitable sharing between the public and private partners of the risks associated with the implementation of the agreements concluded in the framework of public-private partnership, the definition of the private partner on a competitive basis, the use of land in the region for the implementation of public-private partnerships, which are the objects of state-private partnership with the object of public-private partnership for a period specified by the agreement concluded under the public-private partnership, provides not later than the date of entry into force of the agreement concluded in the framework of public-private partnership, receipt of a private partner the right to use the land granted in the prescribed manner for the construction of a public-private partnership, development on order of the government of the partner projects of land management concerning allocation of land plots, other documentation for land, which is in accordance with the legislation required to provide land for use, and documentation in relation to land, necessary to the private partner for the implementation of such partnerships, financing of works on development (manufacture) of land management documents and their expertise that is at the expense of the respective budget or at the expense of the person who submitted the proposal for implementation of public-private partnerships, payment

for work on development (manufacture) land documents and their examination by the person who submitted the proposal for implementation of public-private partnership that does not create for such person the benefits of competition to determine the private partner compared with other participants, the implementation of the procedure and conditions for obtaining a private partner the right to use the land specified in the conditions of the competition to determine the private partner for the contract through a public-private partnership the provision of state guarantees, guarantees of the Autonomous Republic of Crimea and local self-government financing at the expense of the state or local budgets and other sources according to national and local programs, payments to the private partner other payments provided by the agreement concluded in the framework of public-private partnerships, in particular payment for availability (accessibility) of the object of public-private partnerships for operation (use) and the like, the acquisition of the state partner a certain volume of goods (works, services) produced (performed, provided) by the private partner under the contract, concluded in the framework of public-private partnership based on the land use in regions, the private partner supplies of goods (works, services) necessary for the implementation of public-private partnerships in the framework of implementation of agreements on land use regions and monitoring the implementation of contracts concluded within the framework of public-private partnerships, carried out by the Central Executive authority, providing formation and implements state policy in the sphere of public-private partnerships, other state bodies and bodies of local self-government, their officials in accordance with their authority in the manner prescribed by law.

Indicators of the level of investment activity in the sphere of land use of the region's domestic investors are determined by the following criteria:

a) 0 – not defined directions of investment activity in the sphere of land use in regions are domestic investors;

b) 1 – formed, but not implemented directions of investment activity in the sphere of land use in regions are domestic investors;

c) 2 – low level of implementation of directions of investment activity in the sphere of land use in regions are domestic investors;

d) 3 – certain areas of investment activity in the field of land use in regions by domestic investors are being implemented;

e) 4 – non-systematically implemented areas of investment activities in the field of land use in regions by domestic investors;

f) 5 – systematically implemented areas of investment activities in the field of land use in regions by domestic investors, which leads to increased efficiency of interaction of other stakeholders;

g) 6 – systematically implemented areas of investment activities in the field of land use in regions by domestic investors, which leads to increased efficiency of interaction of other stakeholders;

i) 7 – systematically implemented areas of investment activities in the field of land use in regions by domestic investors, which leads to increased investment attractiveness of land;

j) 8 – systematically implemented areas of investment activities in the field of land use in regions by domestic investors, which leads to an increase in investment attractiveness of land;

k) 9 – systematically implemented areas of investment activity in the field of land use in regions by domestic investors, which leads to increased efficiency of regional institutions;

l) 10 – system implements the directions of investment activities in the sphere of land use in regions by domestic investors, which leads to high level of investments carried out by nationals of non-state enterprises, economic associations, unions and societies, and civic and religious organizations, other legal entities based on collective ownership, public investment carried out by public authorities at the expense of state budget funds, borrowed funds, and public enterprises and institutions at the expense of own and borrowed funds, local investments implemented by local governments at the expense of local budget funds, borrowed funds, as well as municipal enterprises and institutions at the expense of own and

borrowed funds of state support for realization of local investment projects financing of investment projects using funds of financing construction, financing of investment projects using funds of operations with real estate, financing of investment projects through the institutions of joint financing, financing investment projects by issuing bonds of enterprises, execution of obligations on which is performed by transfer of object (part of object) housing construction, and implementation of organizational, technical, and legal measures aimed at creating conditions conducive to maintaining investments, achieving the goal of making investments, the effective operation of objects of investment and reinvestment, protect the legitimate rights and interests of investors, including rights to receive profit (income) from investments.

Indicators of level of formation of special economic zones for making investments in the sphere of land use regions are determined according to the criteria presented in Annex F, table F.13.

Indicators of level of provision of special regime of innovation activity of technological parks in the sphere of land use in regions are determined by the criteria:

a) 0 – the lack of areas to ensure a special regime of innovation activities of technology parks in the field of land use in regions;

b) 1 – formed, but not implemented areas of special regime of innovation activities of technology parks in the field of land use in regions;

c) 2 – separate directions of providing a special regime of innovative activity of technology parks in the field of land use in regions are implemented;

d) 3 – non-systematically implemented areas of special regime of innovation activities of technology parks in the field of land use in regions;

e) 4 – non-systematically implemented areas of special regime of innovation activities of technology parks in the field of land use in regions, which leads to increased interaction between stakeholders;

f) 5 – non-systematically implemented areas of special regime of innovation activities of technology parks in the field of land use in regions, which leads to increased interaction between stakeholders;

g) 6 – comprehensively implemented areas of providing a special regime of innovation activities of technology parks in the field of land use in regions, which leads to increased interaction between stakeholders;

h) 7 – comprehensively implemented areas to ensure a special regime of innovation activities of technology parks in the field of land use in regions, which leads to the identification of trends in regional development;

i) 8 – systematically implemented areas to ensure a special regime of innovation activities of technology parks in the field of land use of the regions, which leads to increased investment attractiveness of the lands in regions;

j) 9 – systematically implemented areas of special regime of innovation activities of technology parks in the field of land use of the regions, which leads to an increase in investment attractiveness of the lands in regions;

k) 10 – systematically implemented areas to ensure a special regime of innovation of technology parks in the field of land use in regions, which leads to an increase in financial support for technology park projects, for which a budget program to support technology parks, efficiency of formation and use of import duties. accrued in accordance with the customs legislation of Ukraine, during the import to Ukraine for the implementation of technology parks of new equipment, facilities and components, as well as materials that are not produced in Ukraine in the field of land use of the regions, formation and use of special accounts of participants of technology parks and joint ventures that are implementing technological parks projects and is credited 50 percent of the amounts of import duties, and the remaining 50 percent of the amounts of import customs duties shall be credited to the special account of the governing body of the appropriate technology Park for scientific, research and developmental works on priority directions of activity of technological parks in the sphere of land use regions in the creation, development, modernization and reconstruction of scientific and

technological, experimental and experimental-industrial sites, in particular on the tools and equipment used for innovation in the field of land use regions, preparation of design and technological documentation, technical conditions, technical projects and costs of training production of innovative products in the field of land use regions, patenting activities, the acquisition of rights to objects of intellectual property rights (patents, licenses to use inventions, useful models, industrial samples, know-how and the like) in the field of land use in regions, the implementation overhead and recurrent costs (materials, technical support, etc.) that arise in the course of innovation activity; the acquisition of equipment equipment and other capital goods related to innovation in the field of land use in regions, the implementation of scientific and organizational activities of the governing body of the Technopark, conduct and participate in scientific, scientific-technical conferences, seminars and exhibitions, publication of results of scientific researches on priority directions of activity of technological parks in the sphere of land use in regions, control and monitoring of implementation technological parks projects, carried out by the Central Executive authority that implements the state policy in the sphere of scientific-technical and innovation activities established by the Cabinet of Ministers of Ukraine.

Indicators of implementation of investment projects in the sphere of land use in regions on the principle of «single window» are evaluated according to certain criteria:

a) 0 – no directions of implementation of investment projects in the sphere of land use in regions on the principle of «healthc window»;

b) 1 – formed, but not carried out the directions of implementation of investment projects in the sphere of land use in regions according to the principle – «sform Windows»;

c) 2 – are separate areas of implementation of investment projects in the sphere of land use in regions on the principle of «the wasp window»;

d) 3 – are separate areas of implementation of investment projects in the sphere of land use in regions on the principle of «the wasp window» that provides interaction between stakeholders;

e) 4 – are carried out systematically areas of implementation of investment projects in the sphere of land use in regions according to the principle «Nesis window» that improves the efficiency of interaction between stakeholders;

f) 5 – system are the directions of realization of investment projects in the sphere of land use in regions on a «system window" that leads to an increase of efficiency of interaction between stakeholders;

g) 6 – system are the directions of realization of investment projects in the sphere of land use in regions on the principle of the «system window», which increases the efficiency of functioning of institutions for the implementation of submitted projects;

h) 7 – system are the directions of realization of investment projects in the sphere of land use in regions on the principle of «the system window» that leads to an increase of efficiency of functioning institutions which ensure the implementation of submitted projects;

i) 8 – system are the directions of realization of investment projects in the sphere of land use in regions on the principle of « system window» that increases the investment attractiveness of the land;

j) 9 – system are the directions of realization of investment projects in the sphere of land use in regions on the principle of «system window» that leads to the growth of investment attractiveness of the land;

k) 10 – system are the directions of realization of investment projects in the sphere of land use in regions on the principle of «single window» that leads to higher levels of voluntary application of the principle of «single window», the equality of the rights and legitimate interests of all claimants, the establishment of a unified list of documents required for implementation of the investment project, depending on its specificity and the transparency of procedures for the issuance of documents granting the right on realization of the investment project, responsibility of officials

of the authorized body for violation of legislation on the issuance of documents granting the right on realization of the investment project.

Thus, the proposed criteria for the evaluation of local investment indicators provide a quantitative Foundation for the system of territorial development of land use in regions.

5.4 Local environmental indicators, territorial development land use in regions: assessment criteria

The territorial development of land use in regions are influenced by a group of environmental indicators. In the presented group indicators of ecological development which are characterized by the criteria presented in Annex F, table F.14 are defined.

Standardized values of coefficients that take into account the ecological value of water bodies (t_{419}), are determined according to the analytical data of the State Statistics Service of Ukraine.

Indicators of the level of waste management in the system of territorial development of land use in regions are determined by the criteria:

a) 0 – the lack of areas to ensure complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules in their management; minimizing the generation of waste and reducing its danger, ensuring the integrated use of material resources, promoting the maximum possible disposal of waste through direct reuse or alternative use of valuable waste, ensuring safe disposal of non-recyclable waste by developing appropriate technologies, environmentally friendly safe methods and means of waste management, control of waste disposal sites or facilities to prevent their harmful effects on the environment and human health, the implementation of a set of scientific, technical and marketing research to identify and determine the resource value of waste for their effective use, promoting the creation of waste management facilities, ensuring social protection of workers engaged in waste management, providing obligations accounting of waste

on the basis of their classification and certification, creating conditions for the implementation of separate collection of household waste by introducing socio-economic mechanisms aimed at encouraging the producers of this waste to separate collection, promoting non-state investment and other extrabudgetary sources of funding in the field of waste management waste;

b) 1 – a low level ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management;

c) 2 – realization of the individual areas ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and

human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management;

d) 3 – non-systemic implementation of the directions ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management;

e) 4 – comprehensive implementation of the directions ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring

complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management;

f) 5 – system implementation areas ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these

wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management;

g) 6 – system implementation areas ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management, which increase the effectiveness of environmental parameters of the region development;

h) 7 – system implementation of the directions is to ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of

waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management that leads to increasing effectiveness of environmental parameters of the region development;

i) 8 – consistent implementation of the directions ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management that leads to increased efficiency of land use in regions;

j) 9 – system implementation of the directions is to ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring

complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management, leading to increased efficiency of land use in regions;

k) 10 – system implementation of the directions is to ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; to minimize waste and risk reduction, ensuring complex use of raw material resources, promote the maximum possible waste utilization by direct repeated or alternative usage of resource valuable waste, ensuring the safe disposal of wastes not subject to recycling, through the development of relevant technologies, ecologically safe methods and means of waste management, monitoring places or objects of waste disposal to prevent their harmful impact on the environment and human health, implementation of complex of scientific-technical and marketing research to identify and define resource value of waste with the purpose of their efficient use, promote the creation of facilities of waste management, social protection of workers employed in the field of waste management, compulsory accounting of waste on the basis of their classification and certification, creation of conditions for realization of separate collection of household waste through the implementation of socio-economic mechanisms to

encourage the creators of these wastes for separate collection, assistance in attracting private investment and other extrabudgetary funding sources in the field of waste management, which leads to the development in regions.

The indicators of specific weight of the waste regions to a total number (t_{4212}), standardized ratio of the excess of generated waste compared to the volumes of waste recycled, incineration, and removal to designated areas or facilities and the average population (t_{4213}), costs for environmental protection that affect the spatial development of land use regions (t_{4214}), volume of capital investments for environmental protection by region (t_{4215}), the ratio of the cost of environmental protection and the average number in regions (t_{4216}) are determined according to the State statistics service of Ukraine.

Indicators of the level of valuation and accounting of waste management ($t_{431}, t_{432}, t_{433}, t_{434}, t_{435}, t_{436}, t_{437}$) are determined according to the following criteria:

a) 0 – absence of directions of perfection of system of rationing and accounting of waste management;

b) 1 – a low level of formation of directions of perfection of system of rationing and accounting of waste management;

c) 2 – low level of implementation of directions of perfection of system of rationing and accounting of waste management;

d) 3 – implemented the particular directions of improving the system of valuation and accounting of waste management;

e) 4 – systematically implemented the directions of improving the system of valuation and accounting of waste management;

f) 5 – system implements the directions of improving the system of valuation and accounting of waste management that increases environmental safety in the use of land in region;

h) 6 – systematically implemented the directions of improving the system of valuation and accounting of waste management, leading to increased ecological security of land use in regions;

i) 7 – systematically implemented the directions of improving the system of valuation and accounting of waste management that increases the efficiency of the implementation of the relevant programmes in the system of land use in regions;

j) 8 – systematically implemented the directions of improving the system of valuation and accounting of waste management that leads to increased effectiveness of the programmes in the system of land use in regions;

k) 9 – systematically implemented the directions of improving the system of valuation and accounting of waste management, leading to increased efficiency of land use in regions;

l) 10 – system implements the directions of improving the system of valuation and accounting of waste management that leads to higher levels of formation and use of marginal waste generation in technological processes, indicators of waste, use and losses of raw materials in technological processes, development of other regulations, the implementation of state accounting and certification of waste to ensure full maintenance of a register of objects of formation, treatment and disposal of waste, ensure complete management of the registry of waste disposal sites, ensure the monitoring of the generation, storage and disposal of waste.

Functional performance reduction or waste prevention (t_{441}, $t_{442}, t_{443}, t_{444}, t_{445}, t_{446}, t_{447}$, t_{448}, $t_{449}, t_{4410}, t_{4411}, t_{4412}, t_{4413}$, $t_{4414}, t_{4415}, t_{4416}, t_{4417}, t_{4418}, t_{4419}, t_{4420}, t_{4421}, t_{4422}, t_{4423}, t_{4424}, t_{4425}, t_{4426}$, $t_{4427}, t_{4428}, t_{4429}, t_{4430}, t_{4431}, t_{4432}, t_{4433}, t_{4434}, t_{4435}, t_{4436}, t_{4437}, t_{4438}, t_{4439}$, t_{4440}) are defined according to the criteria, the characteristics of which are presented in Annex F, table F.15.

Indicators of the level of alert about the threat or occurrence of emergency situations (t_{451}, $t_{452}, t_{453}, t_{454}, t_{455}$) are characterized by such criteria:

a) 0 – no directions warning about the threat or occurrence of emergency situations in the system of land use in regions;

b) 1 – are being developed, but not implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions;

c) 2 – implements certain areas of warning about the threat or occurrence of emergency situations in the system of land use in regions;

d) 3 – system implements the directions warning about the threat or occurrence of emergency situations in the system of land use in regions;

f) 4 – systematically implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which lead to the improvement of separate elements of system alerts;

e) 5 – system implemented directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which cause the formation of the information notification system;

g) 6 – systematically implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which lead to growth of efficiency of functioning of the information notification system;

h) 7 – systematically implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which lead to growth of efficiency of interaction among all stakeholders;

i) 8 – systematically implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which lead to the prevention of threats or emergencies;

j) 9 – systematically implemented the directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which increase effectivenessaccutane;

k) 10 – system implemented directions warning about the threat or occurrence of emergency situations in the system of land use in regions, which lead to higher levels of functioning nation-wide, territorial and local automated systems of centralized warning about threat or emergency situations, special, local, and facility alert systems of centralized telecommunication networks, including mobile (mobile) communication, departmental telecommunications networks and telecommunications networks of economic entities in the order established by the Cabinet of Ministers of Ukraine, as well as networks of national, regional and local

radio and television and other technical means of transmission (display) of information, automation of the process of transferring signals and messages about threats or emergencies; operation of the high risk of automated systems of early detection emergencies and notification, organizational and technical integration of various systems of centralized warning about the threat or occurrence of emergency situations and the automated systems of early detection emergencies and notification, functioning in the settlements and places of mass stay of people the signal loud-speaking devices and electronic boards for the transmission of information on civil protection.

Indicators of the level of informing about the origin and prevention of emergency situations (t_{461}, $t_{462}, t_{463}, t_{464}$) is evaluated according to the criteria:

a) 0 – no system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

b) 1 – lack of information system about the origin and prevention of emergency situations in the field of spatial development land use in regions, however, are implemented in separate directions;

c) 2 – low level functioning of the system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

d) 3 – non-systemic implementation of the directions of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

f) 4 – a system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

e) 5 – system implements direction of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

g) 6 – functioning system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions;

h) 7 – functioning system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions, which ensures the implementation of the tactical areas of the environmental policy;

i) 8 – functioning system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions, which ensures the implementation of the strategic directions of the environmental policy;

j) 9 – functioning system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions, which ensures the implementation of strategic and tactical areas of environmental policy;

k) 10 – functioning system of informing about the origin and prevention of emergency situations in the field of spatial development land use in regions, which provides growth of efficiency of formation and use of information about emergency situations that are predicted or have arisen with the definition of their classification, the limits of spread and consequences, as well as the ways and methods of protection against them, providing the management bodies of civil protection to the population through the media of timely and accurate information specified in part one of this article, as well as on its activities on civil protection, including the available to persons with vision problems and hearing the form, the increase in completeness of information on emergency situations, the possibilities of disclosure of the consequences of emergency situations is carried out in accordance with the law on information.

Indicators of the level of the shelter population in protective structures of civil protection (t_{471}, $t_{472}, t_{473}, t_{474}, t_{475}$) are defined according to the criteria, the characteristics of which are presented in Annex F, table F.16.

Indicators of the level of implementation of measures on evacuation (t_{481}, $t_{482}, t_{483}, t_{484}, t_{485}$, t_{486}, t_{487})are determined by the criteria:

a) 0 – no directions of implementation of measures on evacuation in the system of territorial development of land use in regions;

b) 1 – a low level of implementation of measures for evacuation in the system of territorial development of land use in regions;

c) 2 – implements certain measures for evacuation in the system of territorial development of land use in regions;

d) 3 – systematically implemented measures for evacuation in the system of territorial development of land use in regions;

e) 4 – systematically implemented measures for evacuation in the system of territorial development of land use in regions, providing development of an appropriate information system;

f) 5 – system implemented in the evacuation in the system of territorial development of land use in regions, ensuring the formation and use of relevant information systems;

g) 6 – systematically implemented measures for evacuation in the system of territorial development of land use in regions, which increases the efficiency of interaction between stakeholders;

h) 7 – systematically implemented measures for evacuation in the system of territorial development of land use in regions, leading to increased efficiency of interaction between stakeholders;

i) 8 – system modernize measures for evacuation in the system of territorial development of land use in regions;

j) 9 – system modernize measures for evacuation in the system of territorial development of land use in regions, which provides innovative development of the regional actors;

k) 10 – system modernize measures for evacuation in the system of territorial development use of land in regions that provides increasing levels of education and the performance of regional, local and object authorities for evacuation, plan the evacuation, identify safe areas suitable for accommodation of evacuated population and assets levels of the organization notification of managers of business entities and population about the beginning of the evacuation, organization of evacuation, increase in the level of life support of the evacuated population in their places of secure accommodation, the effectiveness of study population actions during the evacuation.

The level of engineering protection of territories (t_{491}, $t_{492}, t_{493}, t_{494}, t_{495}, t_{496}, t_{497}, t_{498}, t_{499}$) are evaluated on the following criteria:

a) 0 – not provided by engineering protection of territories in the system of land use in regions;

b) 1 – not implemented directions of engineering protection of territories in the system of land use in regions;

c) 2 – implemented the particular directions of engineering protection of territories in the system of land use in regions;

d) 3 – system implements the directions of engineering protection of territories in the system of land use in regions;

e) 4 – systematically implemented the directions of engineering protection of territories in the system of land use in regions, which allows to generate a corresponding information system;

f) 5 – system implements the directions of engineering protection of territories in the system of land use in regions that allows the use of an appropriate information system;

g) 6 – systematically implemented the directions of engineering protection of territories in the system of land use in regions, which improves the efficiency of operation of the respective institutions;

h) 7 – systematically implemented the directions of engineering protection of territories in the system of land use in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – system implements the directions of engineering protection of territories in the system of land use in regions, which provides growth of efficiency of interaction between stakeholders;

j) 9 – systematically implemented the directions of engineering protection of territories in the system of land use in regions, which enables prevention of emergency situations and environmental problems;

k) 10 – system implements the directions of engineering protection of territories in the system of land use in regions that ensures the growth of quality in the zoning

of land for the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of occurrence of emergency situations associated with them; the assignment of cities to the appropriate groups of civil protection and the assignment of business entities to corresponding categories of civil protection, development and inclusion of requirements engineering activities of civil protection of the species concerned urban planning and design documentation and their implementation during construction and operation, the increase taking into account the possible manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and the negative consequences of accidents in the development of master plans of settlements and conducting town-planning, allocation high risk given the consequences of accidents that could occur at such facilities, the effectiveness of the design and implementation of measures for accident-free operation of high-risk facilities, improving the quality of construction, buildings, engineering networks and transport communications with desired levels of safety and reliability of the construction of anti-landslide, flood control, protivobolevykh, anti-avalanche, anti-erosion and other engineering installations of special purpose, their content in a functional state, the growth complete, and systematic survey of buildings, structures, engineering networks and transport communications, development and implementation of measures for their safe operation, increase the quality and efficiency of implementation of other measures of engineering protection of territories, depending on the situation there.

Indicators of the level of radiation and chemical protection of population and territories $(t_{4101}, t_{4102}, t_{4103}, t_{4104}, t_{4105}, t_{4106}, t_{4107}, t_{4108}, t_{4109}, t_{41010}, t_{41011})$ are evaluated on the following criteria:

a) 0 – not provided with radiation and chemical protection of population and territories in the system of land use in regions;

b) 1 – not implemented directions of radiation and chemical protection of population and territories in the system of land use in regions;

c) 2 – implemented a separate stream of radiation and chemical protection of population and territories in the system of land use in regions;

d) 3 – system implements direction of radiation and chemical protection of population and territories in the system of land use in regions;

e) 4 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions, which allows to generate a corresponding information system;

f) 5 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions that allows the use of an appropriate information system;

g) 6 – systematically implements direction of radiation and chemical protection of population and territories in the use of land in regions, which allows to increase the efficiency of the functioning of relevant institutions;

h) 7 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions, the increase of efficiency of interaction between stakeholders;

j) 9 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions, which ensures prevention of emergency situations and environmental problems;

k) 10 – system implements direction of radiation and chemical protection of population and territories in the use of land in regions, the increase of the level of identifying and assessing the radiation and chemical situation, the quality of the organization and implementation of dosimetric and chemical control, development and introduction of typical modes of radiation protection, the level of use of means of collective protection, individual protection, devices Raduzhnaya and rescue forces and specialized services of civil protection, involved in carrying out rescue and other emergency operations, fighting fires in the lesions of radiation and

chemically dangerous objects and people living in areas of dangerous pollution, the quality and intensity of the conduct iodine prophylaxis rescuers involved in the elimination of radiation accident, the personnel of radiation-hazardous facilities and population living in zones of possible contamination by radioactive isotopes of iodine to prevent exposure of the thyroid gland, providing people with the possibility of acquiring the personal use of individual protection equipment, devices of radiation and chemical control, sanitary treatment of the population and special processing of clothes, property and transport quality to develop General criteria, methods and techniques of observations on assessing the radiation and chemical situation, the quality of implementation of other measures of radiation and chemical protection, depending on the situation and chemical reconnaissance, dosimetric and chemical control.

Indicators of the level of health protection, provision of sanitary and epidemic wellbeing of the population are evaluated according to the criteria:

a) 0 – not provided with health protection, the formation of sanitary and epidemic wellbeing of the population in the system of land use in regions;

b) 1 – not implemented directions of health protection, provision of sanitary and epidemic wellbeing of the population in the system of land use in regions;

c) 2 – implemented separate areas of health protection, provision of sanitary and epidemic wellbeing of the population in the system of land use in regions;

d) 3 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the system of land use in regions;

e) 4 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, which allows to generate a corresponding information system;

f) 5 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions that allows the use of an appropriate information system;

g) 6 – systematically implemented the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, which allows to increase the efficiency of the functioning of relevant institutions;

h) 7 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, the increase of efficiency of interaction between stakeholders;

j) 9 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions that ensures growth in the quality of life of the population;

k) 10 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, the increase of level of rendering of medical aid to victims in emergency situations, rescuers and others who were involved in rescue and other emergency operations, fighting fires, conducting medical and psychological rehabilitation, timely application of preventive medical preparations and timely implementation of sanitary and anti-epidemic measures, the growth of control over the quality and safety of food products and food raw materials, drinking water and water sources the growth of the level and quality of early creation and training of special medical groups, the growth of education in emergencies required number of additional temporary mobile medical units or the involvement of additional healthcare facilities, the growing accumulation of medical and special property and equipment, the quality of training and retraining of health workers for emergency medical care, educating the public about ways of providing pre-medical aid and rules of personal hygiene, improving the quality and effectiveness of implementation of measures to prevent the negative impact on health of harmful factors of environment and of consequences of emergency situations and the conditions for the emergence and spread of infectious diseases organization and monitoring of state of environment,

sanitary-hygienic and epidemiological situation; sanitary protection of territories and entities in the emergency area, to increase efficiency of implementation of other activities related to health protection, depending on the situation there.

Indicators of the level of biological protection of the population, animals and plants $(t_{4121},\ t_{4122}, t_{4123}, t_{4124}, t_{4125}, t_{4126}, t_{4127}, t_{4128}, t_{4129})$ are defined according to characteristics, presented in Annex F, table F.17.

Indicators of the level of psychological protection of the population in territorial development of land use in regions $(t_{4131},\ t_{4132}, t_{4133}, t_{4134})$ are evaluated on the following criteria:

a) 0 – not provided psychological protection of the population in territorial development of land use in regions;

b) 1 – not implemented the direction of the psychological protection of the population in territorial development of land use in regions;

c) 2 – implemented a separate stream of psychological protection of the population in territorial development of land use in regions;

d) 3 – system implements the direction of the psychological protection of the population in territorial development of land use in regions;

e) 4 – systematically implemented the direction of the psychological protection of the population in territorial development of land use in regions that allows you to create an appropriate system of protection;

f) 5 – system implements the direction of the psychological protection of the population in territorial development of land use in regions, which allows to apply the relevant protection system;

g) 6 – systematically implemented the direction of the psychological protection of the population in territorial development of land use in regions, which improves the efficiency of operation of the respective institutions;

h) 7 – systematically implemented the direction of the psychological protection of the population in territorial development of land use in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – system implements the direction of the psychological protection of the population in territorial development of land use in regions, which provides growth of efficiency of interaction between stakeholders;

j) 9 – system implements the direction of the psychological protection of the population in territorial development of land use in regions that ensures growth in the quality of life of the population;

k) 10 – system implements the directions of health protection, provision of sanitary and epidemic wellbeing of the population in the use of land in regions, the increase of the levels of quality planning activities related to psychological protection; timely use of licensed and permitted for use in Ukraine, informational, psycho-prophylactic and psychocorrectional methods of influence on the person, the identification by means of psychological methods factors that contribute to the emergence of socio-psychological tension, the level of use of modern psychological techniques to neutralize the negative effects of emergencies on the population, realization of other measures of psychological protection, depending on the situation there.

Level indicators the level of technological safety (t_{4141}, $t_{4142}, t_{4143}, t_{4144}, t_{4145}, t_{4146}, t_{4147}, t_{4148}, t_{4149}, t_{41410}, t_{41411}$) are characterized by criteria:

a) 0 – not achieved technological protection in territorial development of land use in regions;

b) 1 – not implemented directions of technological security in territorial development of land use in regions;

c) 2 – implemented the particular directions technological security in territorial development of land use in regions;

d) 3 – system implements the directions of technological security in territorial development of land use in regions;

e) 4 – systematically implemented the directions of technological security in territorial development of land use in regions, which allows to generate a corresponding information system;

f) 5 – system implements the directions of technological security in territorial development of land use in regions that allows the use of an appropriate information system;

g) 6 – systematically implemented the directions of technological security in territorial development of land use in regions, which improves the efficiency of operation of the respective institutions;

h) 7 – systematically implemented the directions of technological security in territorial development of land use in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – systematically implemented the directions of technological security in territorial development of land use in regions, which provides growth of efficiency of interaction between stakeholders;

j) 9 – systematically implemented the directions of technological security in territorial development of land use in regions that ensures the growth of innovation and application of modern technologies;

k) 10 – system implements the directions of technological security in territorial development of land use in regions, which provides a significant reduction in the level of potentially dangerous objects and objects of increased danger; buildings and structures in violation of the conditions, possibilities of creation of business entities with the critical state assets and violation of operation conditions, the possibility of nuclear facilities in violation of the conditions of exploitation, development of terrorist activities, the increase of technological safety of hydraulic structures, reducing the uncontrolled importation, storage and use on the territory of Ukraine technogenic dangerous technologies, substances, materials, excessive and disordered accumulation of household and industrial waste, unusable plant protection products; the impact of military and other environmentally hazardous activities that increase the formation and effective functioning of business entities on which objects are the production, storage, and disposal of explosive devices, reducing the occurrence of critical infrastructure in violation of the terms of use, any other objects that may pose a threat of occurrence of an accident, rising levels of

directions of formation and implementation of automated system of early detection of threats of emergencies and notification of population in case of their occurrence (at high risk for timely detection of the risk of occurrence of emergency situations and implementation of alert personnel and the population, which falls in the zone of possible destruction, are established and operated automated systems for early detection of threats of emergencies and notification of population in case of their occurrence).

Indicators of the level of fire safety in territorial development of land use in regions (t_{4151}, t_{4152}, t_{4153}, t_{4154}, t_{4155}) are determined according to the following criteria:

a) 0 – events are not generated and the directions of strengthening of fire safety in territorial development of land use in regions;

b) 1 – not implemented activities and directions for strengthening of fire safety in territorial development of land use in regions;

c) 2 – there have been isolated efforts and directions of strengthening of fire safety in territorial development of land use in regions;

d) 3 – systematically implemented activities and directions for strengthening of fire seafety in territorial development of land use in regions;

e) 4 – systematically implemented activities and directions for strengthening of fire safety in territorial development of land use in regions, which allows to generate a corresponding information system;

f) 5 – systematically implemented activities and directions for strengthening of fire safety in territorial development of land use in regions that allows the use of an appropriate information system;

g) 6 – systematically implemented activities and directions for strengthening of fire safety in territorial development of land use in regions, which improves the efficiency of operation of the respective institutions;

h) 7 – systematically implemented activities and directions for strengthening of fire safety in territorial development of land use in regions, which allows to increase the efficiency of interaction between stakeholders;

i) 8 – system implements the directions of activities and directions for strengthening of fire safety in territorial development of land use in regions, which provides growth of efficiency of interaction between stakeholders;

j) 9 – system implements the directions of activities and directions for strengthening of fire safety in territorial development of land use in regions that ensures the growth of innovation and application of modern technologies;

k) 10 – system implements the directions of technological security in territorial development of land use in regions that provides increasing levels of fire safety on the territory of Ukraine, regulating relations in this sphere by the bodies of state power, bodies of local self-government and economic entities and citizens, fire safety entities, authority in the field of fire safety associations, corporations, corporations, other business associations, the duties to ensure fire safety during the design and building of settlements, construction of buildings and structures is vested in the bodies of architecture, customers, developers, design and construction organizations, responsibilities to ensure fire safety in residential buildings of state, municipal, public housing Fund, the housing co-operatives rests with the tenants and owners of apartments and residential premises of the private housing stock and other buildings, private houses farmsteads, cottages and garden houses with farm buildings and buildings for their owners or employers, if required by a contract of employment.

Consequently, the proposed local environmental indicators are defined according to the criteria that allow you to create models and to evaluate the corresponding integral the factor that affects General indicator of territorial development land use in regions.

The proposed evaluation criteria and indicators identified provide the basis for the development and implementation of a methodological approach to integrated assessment of territorial development land use in regions.

6 Methodological approach to integral assessment of territorial development of regional land use

6.1 Assessment of the condition and use of underground real estate to ensure the territorial development of land use in regions

For the development of a methodological approach to the integrated assessment of the territorial development of land use in regions, the factors that determine the condition and use of underground real estate are of particular importance.

In the existing scientific developments [1, 2, 8, 9, 10, 11, 12, 13, 14, 15] there are no common approaches to assessing the condition and use of underground real estate in cities to ensure the territorial development of land use in regions. This process is influenced by factors that can be grouped by the following characteristics and characteristics:

- condition;
- urban planning;
- spatial;
- investment and innovation;
- social and legal;
- security.

Based on the author's developments [4, 5, 6], an integrated assessment approach is used to assess the condition and use of underground real estate, which consists in the synthesis of analytical (quantitative) and expert (qualitative) methods and covers the following stages:

1. Formation of a system of partial indicators of the state and use of underground real estate by components.

2. Evaluation of partial indicators using analytical (quantitative) and expert (qualitative) methods.

3. Calculation of reliability coefficients by partial indicators ($K_{нij}$)

4. Evaluation of integrated indicators characterizing the condition and level of use of underground real estate.

5. To determine the importance of integrated indicators within the component by weighting factors using the method of hierarchy analysis.

6. Evaluation of generalizing integrated indicator of the status and use of underground real estate.

It should be noted that the system of private indicators defines the condition and level of use of underground real estate, given the urban, spatial, investment and innovation, socio-legal and dangerous characteristics. Assessment of the partial indicators is based on the use of expert method. Assessing the significance of indicators of the status and use of underground real estate within a component is carried out with weighting factors using the method of hierarchy analysis.

The calculation of the coefficients of reliability for partial performance is characterized by the actual performance results of the evaluation (y_{ij})to the maximum possible values. The rating system used a scale from 0 to 10. Therefore, the maximum possible value is 1.

Evaluation of integrated indicators characterizing the condition and level of use of underground real estate is carried out by use of safety factors and generalizing criteria of partial indicators.

Evaluation of the generalized indicator of the condition and use of underground real estate synthesizes the above stages and takes into account the results of the assessment weighting and integrated indicators.

Summarizing the above evaluation method of the generalized indicator of the condition and use of underground real estate.

Value to identify areas describing the risks of the status and use of underground real estate (tabl. 6.1). In particular, for the critical risk of underground real estate is in decline, its use is ineffective, that requires action on the growth components of the integral indicator or its decommissioning. High risk is characterized by the inefficient functioning of the underground real estate for the critical physical and moral condition.

Table 6.1

Areas that determine the condition and use of underground real estate

Value t_{1245}	Risk areas	Level of use	State
0 – 2	critical	low	critical
3 – 4	high	minor	low
5	mediocre	mediocre	mediocre
6 – 8	satisfactory	considerable	considerable
9	low	high	high
10 and above	absent	absolute	absolute

The zone of moderate risk consistent with the trends of reduced efficiency of use of underground real estate in the event of a reduction in the level of its technical readiness. Satisfactory risk area characterizes the «normal» level of functioning of underground real estate. The low risk zone determines the performance of the components of generalizing integrated indicator of the status and use of underground real estate, a high level of technical readiness and investment attractiveness of objects.

A value of 10 and above there are no risks on the use of underground real estate, an increase of use efficiency, apply modern technologies, develops, programs are being implemented actively under construction, underground provides real estate development in regions.

It should be noted that the use of underground real estate are defined by low, insignificant, moderate, significant, high or absolute level. According to the proposed scale defines the critical, low, medium, significant, high or absolute as underground real estate.

So, the study designed an approach to generalizing indicator of the condition and use of underground real estate in the system of territorial development of land use in regions, which is based on an integral approach that includes the method of expert evaluations by applying qualitative indicators characterizing the condition and level of use of underground real estate, given the urban, spatial, investment and innovation, socio-legal and dangerous characteristics. Under the proposed method of assessment the method of analysis of hierarchies, which allowed to determine the importance of each of the factors affecting the generalizing integrated indicator of

the status and use of underground real estate. The proposed method creates the methodological basis for integrated assessment and use of underground real estate in the system of territorial development of land use in regions.

6.2 Methodological approach to the integrated assessment of territorial development of land use in regions

For the evaluation of territorial development land use in the region in the monograph methodological approach to the integrated assessment. The essence of this approach consists in applying the totality of integrated analytical, expert methods and methods of analysis of hierarchies, neural networks, determination of the average geometrical values quasimetric methods to assess the level of territorial development land use in regions, given the spatial, urban, investment, and environmental factors.

Implementation of methodological approach to integrated assessment of territorial development land use in regions is based on the following principles:

- scientific validity: is characterized by determining the level of territorial development based on scientific-methodical development, regulatory support;

- comprehensiveness: covers a set of indicators that combine the spatial, urban, investment and environmental factors and is determined by the interrelated actions, aimed to determine the level of territorial development land use in regions;

- consistency: this is determined by a tiered system of spatial, urban, investment and environmental performance that create a grading basis of territorial development land use in regions;

- integrity: characterized by the creation of a unified system of assessing the level of territorial development land use in regions, which allows to obtain the integral indicator for informed decision-making;

- client: determined focus on the achievement of objectives aimed at ensuring the territorial development of land use in regions, given the complex spatial, urban, investment, and environmental factors;

- structured and it is characterized by a clear structure of indicators that are defined at different levels;

- development determined by the development of activities to ensure spatial development land use in regions based on established levels;

- adequacy: is characterized by the definition of the relevant levels of territorial development, reflecting the direction and the peculiarities of the influence and changes in the spatial, urban, investment and environmental security.

Development and implementation of a methodological approach to integrated assessment of territorial development land use in regions includes a set of interrelated stages:

1. The formation of complex spatial, urban, investment, and environmental factors influencing spatial development land use in regions based on existing scientific and methodological developments and regulatory support.

2. Building a multi-tiered system of factors.

3. The selection of factors that affect spatial development land use in regions by applying the method of expert estimations.

4. Formation of multilevel system of indicators by applying quasiperiodic methods of transition from the proposed factors at the appropriate spatial, urban, investment and environmental performance, given the values of the coefficients estimates.

5. Evaluation of spatial, urban, investment and environmental performance of the third level through the application of analytical and expert evaluations.

6. The definition of spatial, urban, investment, and environmental indicators of the second level by constructing mathematical models based on the method estimates the median value.

7. The construction of a mathematical model defining the integrated spatial, urban, investment, environmental indicators, territorial development land use in regions.

8. To determine the weights that characterize the importance of spatial, urban, investment, and environmental indicators in territorial development of land use in regions based on the application of the method of analysis of hierarchies.

9. The definition of integrated spatial, urban, investment, environmental indicators, territorial development land use in regions.

10. Evaluation of the integral index of land use in regions.

11. Development and validation of a scale of levels of spatial development land use in regions.

12. Interpretation of the results.

In accordance with the proposed stages, it is determined that the formation of a set of spatial, urban, investment and environmental factors affecting the territorial development of land use in regions is based on analysis and systematization of existing scientific and methodological developments and regulations. Within the proposed stage, restrictions are introduced related to the application of factors that, in turn, are related to land use and affect the territorial development in regions. In addition, only the regional level is taken into account, where the impact of urban land use, other settlements, a separate land plot at the state level is reduced.

However, the levels are indirectly accounted for in the system of territorial development of land use in regions. Osoblyve importance of international experience and the formation of spatial, urban, investment, and environmental factors. In this context, of particular importance geoinformation systems, which are integrated in the shaping and processing information, allowing to construct a tiered system that takes into account the influence of the relevant factors.

Proposed geoinformation system allows to build a modern integrated system of land administration. Building a multi-tiered system of factors take into account spatial, urban, investment and environmental areas and features and consists of three levels. To visualize the multi-level system of the factors influencing territorial development land use in regions built the pyramid of levels. The selection of indicators that affect the spatial development of land use in regions, is based on the application of the method of expert estimates.

This allows to justify the selection of indicators through the use of appropriate tools, which creates a quantitative basis for integrated assessment of territorial development land use in regions. Formation of multilevel system of indicators with the use of quasimetrics methods of transition from the proposed factors at the appropriate spatial, urban, investment and environmental performance. It identifies relevant factors that justify the feasibility of the transition. Built quasimetrics transition model from the factors in the spatial, urban, investment and environmental performance using mathematical tools.

Evaluation of spatial, urban, investment and environmental performance of the third level is implemented with the use of appropriate tools. Used analytical method, which allows to obtain quantitative estimates of indicators based on the data of the State statistics service of Ukraine and the Ukrainian State service on geodesy, cartography and cadastre. In the framework of the analytical method used indicators at the regional level. Method of expert assessments to determine the spatial, urban, investment and environmental indicators, which are qualitative characteristics. Reasonable quantitative scale for evaluation of the presented indicators. During the application of the method of expert evaluations carried out the selection of experts.

The definition of spatial, urban, investment, and environmental indicators of the second level based on the mathematical models. The presented model is developed using the method estimates the median value. At this stage, a restriction which consists in determining the average, which reduced the influence of boundary factors and «flatten» the trajectory of their changes.

The construction of a mathematical model defining the integrated spatial, urban, investment, environmental indicators, territorial development land use is based on the values of the indices represented the second level and weighting factors.

The weights that determine the importance of the proposed indicators in territorial development of land use in regions, are estimated on the basis of the analysis of hierarchy by implementing a pairwise comparison of the spatial, urban, investment and environmental performance.

Evaluation of the integral index of land use in regions is based on the developed mathematical model. The value of the integral indicator forms the quantitative basis of the levels of territorial development land use in regions.

Development and validation of a scale of levels of spatial development land use in regions is formed according to the scale of T. Saaty, the value of the integral index which varies from 0 to 10 and higher.

The resulting phase is the interpretation of the obtained results, which allows to develop measures to ensure the territorial development of land use in regions.

Development and implementation of a methodological approach to integrated assessment of territorial development use of land in regions covers 3 blocks:

1. Information, which is characterized by the formation of information-analytical, normative-legal support in relation to territorial development land use in regions. On the basis of a particular provision formed a complex spatial, urban, investment, and environmental factors influencing spatial development land use in regions. The result of the application of information support built multi-level system of the factors. This block is formed the information basis for the implementation of the methodological approach to integrated assessment of territorial development land use in regions. In addition, the rationale for the estimated parameters, which are used to define the spatial, urban, investment and environmental performance;

2. Instrumental determined by a set of methods and tools enabling the selection of spatial, urban, investment and environmental factors by applying the method of neural networks. In the result of the study formed the optimal system of indicators to measure teritorio development of land use in regions.

On this unit impose restrictions regarding the optimality of certain indicators. In particular, on the third level, the level of optimality is determined in the range up to 5 indicators that is most important to ensure territorial development land use in regions. It should be noted, if not the condition of the optimization parameters (the algorithm is «No»), then return to the initial level of the information block «Formation of information and analytical support to territorial development land use in regions».

If the condition of optimization of the parameters («Yes»), then the evaluation of spatial, urban, investment and environmental performance in accordance with the directions of formation of the methodological approach to integrated assessment of territorial development land use in regions. However, methods used: analytical, expert assessments, analysis of hierarchies, the geometric mean value;

3. The result – aimed at the definition of the integral index of territorial development land use in regions according to the developed methodological approach. For the development based activities to the growth of the integral index of territorial development is its modeling and establishes causal relationships between the indicators that influence it. If built context through the development of models based on mathematical modeling («Yes»), the cycle of territorial development land use in regions has been completed, and research starts at the beginning. At the same time achieved the result, respectively the growth of the integral indicator and secured territorial development at the regional level in the field of land use. If «No», then fails the corresponding condition is the provision of territorial development, the study is carried out by selection of the spatial, urban, investment, and environmental factors.

Formed a closed system that allows you to develop and implement a methodological approach through the application of information management, appropriate techniques and models to achieve a result on the growth of the integral index of land use in regions, given the spatial, urban, investment and environmental performance.

The study developed a methodological approach to integrated assessment, based on the application which creates a scoring basis for territorial development of land use in regions, informed decision-making on the formation and implementation of spatial, urban, investment, and environmental areas.

6.3 Selection of indicators of integrated assessment of territorial development land use in regions: practical aspects

Implementation of the methodological approach to the integrated assessment of territorial development of land use in regions requires the selection of indicators at the third level. In this context, the method of expert evaluations is used and a limit is introduced on the number of indicators of the third level - their number is determined to five.

The results of the selection of spatial indicators of the third level of territorial development of land use in regions in accordance with the established criteria are presented in table 6.2.

Table 6.2

The results of the selection of spatial indicators of the third level of territorial development of land use in regions, rel. units

Indicators	The value of the criteria	Decision
1	2	3
Territorial		
t_{111}	0,875	used for evaluation
t_{1114}	0,85	used for evaluation
t_{1115}	0,85	used for evaluation
t_{1116}	0,95	used for evaluation
t_{1117}	1,0	used for evaluation
Functional		
t_{122}	0,95	used for evaluation
t_{1217}	0,75	used for evaluation
t_{123}	0,85	used for evaluation
t_{124}	0,85	used for evaluation
t_{125}	0,95	used for evaluation
Social		
t_{131}	0,55	used for evaluation
t_{132}	0,55	used for evaluation
t_{133}	0,625	used for evaluation
t_{134}	0,75	used for evaluation
t_{135}	0,55	used for evaluation
Political		

Continuation of table 6.2

1	2	3
t_{1415}	0,55	used for evaluation
t_{1418}	0,625	used for evaluation
t_{1419}	0,55	used for evaluation
t_{1422}	0,55	used for evaluation
Indicators of cartographic and geodetic support of land use in regions		
t_{151}	0,75	used for evaluation
t_{152}	0,78	used for evaluation
t_{153}	0,82	used for evaluation
t_{1511}	0,84	used for evaluation
t_{1524}	0,77	used for evaluation

Identify indicators of the third level used for the integrated assessment of territorial development land use in regions:

1 Spatial:

1.1 territorial:

- indicator of the level of stimulation of development in regions is determined according to the results of expert evaluation;

- level of implementation of sectoral guidelines for territorial development: according to the results of expert evaluation;

- level of implementation of the territorial areas of development: according to the results of expert evaluation;

- level of implementation of management guidelines for territorial development: according to the results of expert evaluation;

- level of implementation of instrumental ways of ensuring territorial development: according to the results of expert evaluation;

1.2 functional:

- level of use of lands of residential and public buildings is determined according the results of expert evaluation;

- level of inventory of land when implementing land management: according to the results of expert evaluation;

- coefficients that determine the influence of local factors in the location of cadastral quarter on the territorial-planning, engineering-geological, historical, cultural, natural landscape, sanitary-hygienic and other conditions: according to a preset criterion;

- the proportion of agricultural land in total land in regions: according to the State service of Ukraine for geodesy, cartography and cadastre;

- of level and use of underground real estate: according to the proposed method;

1.3 social:

- indicator of the level of housing provision: according to the results of expert assessment;

- level of provision of children's preschool institutions: according to the results of expert assessment;

- level of provision of secondary schools: according to the results of expert evaluation;

- level of provision of medical institutions (hospitals, clinics, pharmacies: according to the results of expert assessment;

- level of provision of cultural facilities (theaters, cinemas, dance halls, clubs, libraries): according to the results of expert evaluation;

1.4 political:

- indicator of the level of strengthening the material base of local governments and increasing the level of their resource provision: according to the results of expert assessment;

- level of strengthening the responsibility of representatives of local governments, village, town, city mayors to the territorial communities that elected them: according to the results of expert assessment;

- level of creation of effective mechanisms to ensure the active participation of territorial communities and local governments in the formation and implementation of state regional policy: according to the results of expert assessment;

- level of achieving high functional capacity of the human resources of the regions, primarily through the creation of a system and technologies for attracting

investment for the training of highly professional managers: according to the results of expert evaluation;

- level of infrastructure of land market, provision of registration of title documents on the property right to the earth: according to the results of expert evaluation;

1.5 cartographic and geodetic support of land use in regions: an indicator of the level of compliance with requirements of standards and normative-technical documentation; according to the results of the expert assessment; level of implementation of progressive technologies and methods of surveying and map production: according to the results of the expert assessment; level of development, implementation and organization of the program, technological and technical support effective use of digital mapping and geographic information systems: according to the results of the expert assessment; level of geodetic, topographic, herasimovich and other special works for other surveys and special works; according to the results of expert evaluation; the level of interaction of regional authorities with bodies of the state geodetic supervision in the implementation of topographic, geodetic and cartographic works and use of media surveying and mapping information that is state property; according to the results of expert evaluation.

The results of the selection of urban indicators in the third level of territorial development land use area are presented in table 6.3.

Table 6.3

The results of the selection of urban indicators in the third level of territorial development land use in regions, rel. units

Indicators	The value of the criteria	Decision
1	2	3
Zonal		
t_{211}	0,75	used for evaluation
t_{212}	0,75	used for evaluation
t_{216}	0,875	used for evaluation
t_{217}	0,85	used for evaluation
t_{218}	0,85	used for evaluation
Functional and planning		
t_{221}	0,85	used for evaluation
t_{222}	0,75	used for evaluation
t_{223}	0,75	used for evaluation
t_{224}	0,75	used for evaluation

Continuation of table 6.3

1	2	3
t_{2215}	0,75	used for evaluation
Structural and planning		
t_{231}	0,75	used for evaluation
t_{232}	0,75	used for evaluation
t_{233}	0,75	used for evaluation
t_{237}	0,75	used for evaluation
t_{238}	0,75	used for evaluation
Planning and restrictive		
t_{242}	0,75	used for evaluation
t_{244}	0,85	used for evaluation
t_{247}	0,75	used for evaluation
t_{248}	0,75	used for evaluation
t_{2410}	0,75	used for evaluation
Indicators of engineering training and equipment of territories		
t_{251}	0,85	used for evaluation
t_{252}	0,875	used for evaluation
t_{253}	0,85	used for evaluation
t_{256}	0,85	used for evaluation
t_{257}	0,85	used for evaluation
Transportation		
t_{261}	0,75	used for evaluation
t_{262}	0,75	used for evaluation
t_{263}	0,75	used for evaluation
t_{266}	0,75	used for evaluation
t_{267}	0,75	used for evaluation
Historical and cultural		
t_{271}	0,85	used for evaluation
t_{272}	0,75	used for evaluation
t_{273}	0,75	used for evaluation
t_{274}	0,75	used for evaluation
t_{277}	0,75	used for evaluation
Indicators that characterize the functioning of the construction industry in regions		
t_{281}	0,875	used for evaluation
t_{282}	0,875	used for evaluation
t_{283}	0,875	used for evaluation
t_{284}	0,875	used for evaluation
The level of application of spatial information in urban development of land use in region		
t_{2111}	0,875	used for evaluation
t_{2113}	0,875	used for evaluation
t_{2114}	0,875	used for evaluation
t_{2115}	0,875	used for evaluation
t_{2116}	0,85	used for evaluation
The level of formation of cadastral information in the field of land use of regions for urban planning		
t_{2121}	0,85	used for evaluation
t_{2122}	0,85	used for evaluation
t_{21219}	0,875	used for evaluation
t_{21220}	0,85	used for evaluation
t_{21223}	0,85	used for evaluation

2 Urban:

2.1 zonal:

- indicator of the level of the decision making process regarding planning and development of the territory: according to the results of expert evaluation;

- level display of the existing development areas, engineering and transport infrastructure, as well as the main elements of the planning structure of the territories; taking into account local conditions when defining functional zones according to the results of expert evaluation;

- determine the level of the public area of the region: according to the results of expert evaluation;

- level the definition of residential area of the region: according to the results of expert evaluation;

- level definition of a recreational zone of the region: according to the results of expert evaluation;

2.2 functional design:

- indicator of the level of introduction and implementation of the principles of planning and spatial organization of buildings according to the results of expert evaluation;

- level of establishing red lines and control lines construction: according to the results of expert evaluation;

- level establish functional purpose, determining modes and parameters of one or several land plots, allocation of territories in accordance with the construction norms, state standards and regulations: according to the results of expert evaluation;

- level of provision of urban conditions and restrictions (in the absence of a zoning plan), or refinement of urban conditions and restrictions under the zoning plan: according to the results of expert evaluation;

- level and completeness of the formation of architectural spatial composition: according to the results of expert evaluation;

2.3 structural planning:

- proportion of residential areas (estate, low-rise, Serednikovo, high-rise buildings, multifunctional, public and residential buildings): community centers of citywide and regional significance, public and business buildings, existing buildings,

identified on the basis of mapping, major and residential streets and squares (t_{231}) – according to the results of expert evaluation;

- specific gravity of green areas green areas special purpose (green sanitary protection zone, coastal protective strip, nurseries and quoteoriginally households) (t_{232}) – according to the results of expert evaluation;

- specific weight of industrial, municipal and warehouse territories (t_{233}) – according to the results of expert evaluation;

- specific weight of agricultural areas (t_{237}) - according to the results of expert evaluation;

- the proportion of territories, engineering infrastructure (t_{238}) – according to the results of expert evaluation;

2.4 planning-restrictive:

- an indicator of the level of certain areas of air pollution, excessive noise, electromagnetic radiation, radiation pollution (t_{242}) – according to the results of expert evaluation;

- specific level of sanitary protection zones of industrial enterprises, cemeteries, and other public facilities (t_{244}) – according to the results of expert evaluation;

- level of certain zones of sanitary protection of water supply sources, water treatment plants (t_{247}) – according to the results of expert evaluation;

- level of protective zones, quarries, dumps, pipelines, and other objects (t_{248}) – according to the results of expert evaluation;

- level of the territories and protective zones of natural reserves, monuments of nature, architecture, history and culture and zones of regulation of building, landscapes that are protected (t_{2410}) – according to the results of expert evaluation;

2.5 engineering training and equipment of territories:

- indicator of zoning of industrial and communal territories according to the sanitary classification of productions (t_{251}) - according to the results of expert assessment;

- level of implementation of measures that require a significant amount of backfilling or cutting of soils, drainage, peat (t_{252}) - according to the results of expert assessment;

- level of implementation of measures for the formation and reconstruction of urban hydraulic structures (t_{253}) - according to the results of expert assessment;

- level of implementation of measures for the reclamation of disturbed areas (t_{256}) - according to the results of expert assessment;

- level of implementation of measures for the formation and reconstruction of engineering

- structures and springs (t_{257}) - according to the results of expert assessment;

2.6 transport support:

- indicator of establishing the classification of the road network (t_{261}) - according to the results of expert assessment;

- level of provision of the main objects and lines of urban and external transport (t_{262}) - according to the results of expert assessment;

- level of provision of routes and structures of off-street rail public transport (t_{263}) - according to the results of expert assessment;

- level of implementation of the designed transport facilities (t_{266}) - according to the results of expert assessment;

- level of activity of traffic and passenger flows (t_{267}) - according to the results of expert assessment;

2.7 historical and cultural:

- indicator of the level of provision of monuments of national and local significance of all types and species according to the classification of cultural heritage sites (t_{271}) - according to the results of expert assessment;

- level of provision of cultural heritage sites of all types and kinds according to the classification of cultural heritage sites (t_{272}) - according to the results of expert assessment;

- level of historical buildings (significant and ordinary historical buildings: public, in particular religious (t_{273}) - according to the results of expert assessment;

- level of provision of residential and commercial, industrial and fortification structures of the territories that have the status of lands of historical and cultural purpose (t_{274}) - according to the results of expert assessment;

- level of provision of natural monuments, nature reserves, valuable natural landscapes (t_{277}) - according to the results of expert assessment;

2.8 characterize the functioning of the construction industry in regions:

- index of construction products index (t_{281}) - according to the State statistics services of Ukraine;

- index of construction work volume (t_{282}) - according to the State Statistics Service of Ukraine;

- standardized value of the housing commissioning indicator (t_{283}) - according to the State Statistics Service of Ukraine;

- standardized value of the indicator of commissioning of apartments in residential buildings at the place of construction (t_{284}) according to the State Statistics Service of Ukraine;

2.9 application of spatial information in urban planning the development of land use in regions:

- an indicator of the level of formation of the unified digital topographic base of the territory of the Autonomous Republic of Crimea and oblasts on the basis of topographic maps and planning and cartographic basis of the state land cadastre on the territory (t_{2111}) – according to the results of expert evaluation;

- level of development of schemes of planning of the territory of the Autonomous Republic of Crimea, regions and individual parts of the territory and objects of regional significance outside the settlements (t_{2113}) – according to the results of expert evaluation;

- level of development and application of the results of monitoring the state of formation of the General plans of settlements, plans of zoning of territories (zoning) and detailed plans (t_{2114}) – according to the results of expert evaluation;

- level of formation and implementation of information resources industry inventories and information systems on land use, environmental, engineering-geological, seismic, hydrogeological, and other zoning of the region based on data received from the respective sectoral inventories and information systems (t_{2115}) – according to the results of expert evaluation;

- level of implementation of legal acts in the sphere of urban development and building codes, state standards and rules based on the decisions of approval in accordance with the legislation (t_{2116}) – according to the results of expert evaluation;

2.10 level of the cadastral information in the field of land use areas for urban planning:

- level of interaction with the basic subjects of the urban cadastre and the constant receipt of information from them, is subject to registration in the urban cadastre: according to the results of expert evaluation;

- level of primary processing, input control and systematization of the obtained data and documents and their introduction into the database of the information system of the urban cadastre: according to the results of expert evaluation;

- level of formation of program-technical complexes on the creation and use of the urban cadastre: according to the results of expert evaluation;

- level of organization of work on the information content of databases on the creation of urban cadastre: according to the results of expert assessment;

- level of funding for the activities defined by the program for the creation of urban cadastre and its maintenance, formation and maintenance of the Urban Cadastre Service at the state level, which are carried out at the expense of the state budget, at regional and basic (administrative district, city) levels funds of relevant local budgets or other sources not prohibited by law: according to the results of expert assessment.

The results of the selection of investment indicators of the third level of territorial development of land use in regions are presented in table 6.4.

Table 6.4

The results of the selection of investment indicators of the third level of territorial development of land use in regions, rel. units

Indicators	The value of the criteria	Decision
1	2	3
Evaluative indicators influencing the formation of investment attractiveness in the system of territorial development of land use in regions		
t_{311}	0,625	used for evaluation
t_{312}	0,55	used for evaluation
t_{313}	0,75	used for evaluation
t_{314}	0,625	used for evaluation
t_{316}	0,75	
The level of use of funds, property and property rights that affect the formation of investment attractiveness in the system of territorial development of land use in regions		
t_{321}	0,55	used for evaluation
t_{322}	0,55	used for evaluation
t_{323}	0,55	used for evaluation
t_{324}	0,75	used for evaluation
Intellectual indicators influencing investment attractiveness in the system of territorial development of land use in regions		
t_{331}	0,55	used for evaluation
t_{332}	0,55	used for evaluation
t_{333}	0,625	used for evaluation
t_{334}	0,55	used for evaluation
Stakeholder indicators influencing investment attractiveness in the system of territorial development of land use in regions		
t_{341}	0,55	used for evaluation
t_{342}	0,75	used for evaluation
$t343$	0,75	used for evaluation
$t344$	0,625	used for evaluation
$t346$	0,75	used for evaluation
Innovative indicators that form the investment attractiveness in the system of territorial development of land use in regions		
t_{351}	0,55	used for evaluation
t_{353}	0,55	used for evaluation
t_{354}	0,55	used for evaluation
t_{355}	0,55	used for evaluation
t_{356}	0,625	used for evaluation
Investment indicators that ensure the territorial development in regions		
t_{361}	0,75	used for evaluation
t_{362}	0,625	used for evaluation
t_{363}	0,625	used for evaluation
t_{364}	0,75	used for evaluation
t_{366}	0,75	used for evaluation
Indicators of attracting foreign investment in the field of land relations in regions		
t_{371}	0,55	used for evaluation
t_{372}	0,525	used for evaluation
t_{373}	0,525	used for evaluation
t_{374}	0,525	used for evaluation
t_{375}	0,525	used for evaluation
Indicators of public-private partnership that affect the formation of investment in land use in regions		
t_{383}	0,525	used for evaluation

Continuation of table 6.4

1	2	3
t_{385}	0,525	used for evaluation
t_{386}	0,525	used for evaluation
t_{387}	0,525	used for evaluation
t_{389}	0,525	used for evaluation
The level of investment activity in the field of land use in regions by domestic investors		
t_{391}	0,55	used for evaluation
t_{392}	0,55	used for evaluation
t_{393}	0,55	used for evaluation
t_{394}	0,525	used for evaluation
t_{399}	0,55	used for evaluation
The level of formation of special economic zones to ensure investment in the use of land in regions		
t_{3101}	0,525	used for evaluation
t_{3102}	0,525	used for evaluation
t_{3103}	0,525	used for evaluation
t_{3104}	0,525	used for evaluation
t_{3105}	0,525	used for evaluation
The level of providing a special regime of innovation activities of technology parks in the field of land use in regions		
t_{3111}	0,525	used for evaluation
t_{3112}	0,525	used for evaluation
t_{3113}	0,525	used for evaluation
t_{3114}	0,525	used for evaluation
t_{3115}	0,525	used for evaluation
Indicators of implementation of investment projects in the field of land use in regions on the principle of «single window»		
t_{3121}	0,55	used for evaluation
t_{3122}	0,525	used for evaluation
t_{3123}	0,525	used for evaluation
t_{3124}	0,525	used for evaluation
t_{3125}	0,525	used for evaluation

3 Investment:

3.1 influence on the formation of investment attractiveness in the system of territorial development of the land use in regions:

- indicator of the level of soil evaluation: according to the results of expert evaluation;

- level economic valuation of land: according to the results of expert evaluation;

- level changes in the normative monetary value of land per hectare in regions: according to the State service of Ukraine for geodesy, cartography and cadastre;

- level of application of expert evaluation in the system of monetary valuation of land: according to the results of expert evaluation;

- indicator that specifies the proportion of the number of settlements that do not have a standard monetary assessment in the total amount of: according to the State service of Ukraine for geodesy, cartography and cadastre;

3.2 level of use of funds, assets and property rights that influence the formation of investment attractiveness in the system of territorial development of the land use in regions:

- level of use of funds, target Bank deposits, shares, shares and other securities (except promissory notes) used in the sphere of land relations: according to the results of expert evaluation;

- level of use of movable and immovable property (buildings, constructions, equipment and other material assets) at the disposal of regional authorities: according to the results of expert evaluation;

- level of formation and use of capital investments in creation, reconstruction and technical re-equipment of fixed assets that are used in the sphere of land relations: according to the results of expert evaluation;

- index of capital investment by region: according to the State statistics service of Ukraine;

3.3 intellectual factors influencing investment attractiveness in the system of territorial development of the land use in regions:

- level of use of intellectual property rights, used in the sphere of land relations: according to the results of expert evaluation;

- level using a combination of technical, technological, commercial and other knowledge issued in the form technical documentation, skills and production experience, necessary for the organization of a particular type of production, but not patented ("know-how"): according to the results of expert evaluation;

- the level of use of rights to use land, buildings, equipment, and other property rights: according to the results of expert evaluation;

- level of use of other values: according to the results of expert evaluation;

3.4 stakholders factors influencing investment attractiveness in the system of territorial development of the land use in regions:

- indicator of the level of interaction of public authorities, Verkhovna Rada of the Autonomous Republic of Crimea, Council of Ministers of the Autonomous Republic of Crimea and bodies of local self-government in the system of land use: according to the results of expert evaluation;

- level of interaction of legal and physical persons in the settlements in the system of land use in regions: according to the results of expert evaluation;

- level of engagement of landowners and land users: according to the results of expert evaluation;

- level of cooperation between the integrated territorial communities: according to the results of expert evaluation;

- level of interaction construction enterprises, providing construction areas: according to the results of expert evaluation;

3.5 innovation indicators forming the investment attractiveness in the system of territorial development of the land use in regions:

- indicator of the level of formation and implementation of innovative programs and projects in the field of land use in regions: according to the results of expert evaluation;

- level of application of modern production equipment and processes: according to the results of expert evaluation;

- level of the infrastructure of production and entrepreneurship in the field of land use in regions: according to the results of expert evaluation;

- level of implementation of organizational and technical decisions of industrial, administrative, commercial or other nature, which significantly improve the structure and quality of land use regions: according to the results of expert evaluation;

- level of formation and implementation of the legislative framework for the sphere of innovation activity, which is used for land use regions: according to the results of expert evaluation;

3.6 investment performance, ensure the territorial development in regions:

- standardized values of the index of physical volume of gross regional product: according to the State statistics service of Ukraine;

- standardized values of the index of agricultural production in regions: according to the State statistics service of Ukraine;

- standardized values of the volumes of forestry products: according to the State statistics service of Ukraine;

- standardized values of volumes of extraction of water resources: according to the State statistics service of Ukraine;

- index of industrial production: according to the Public service statistics of Ukraine;

3.7 indicators of attracting foreign investments into the sphere of the land relations in regions:

- level of support to the development of trade-economic, scientific-technical and investment cooperation of Ukraine with foreign States on mutual benefits in the sphere of land relations: according to the results of expert evaluation;

- level to enhance international cooperation in the sphere of land relations with the aim of attracting foreign investment, advanced technologies and management experience to the national economy in the interests of its reform modernization and innovation development: according to the results of expert evaluation;

- level of provision by subjects of foreign economic activity of Ukraine services the foreign subjects of economic activities in the sphere of land relations in regions: according to the results of expert evaluation;

- level of scientific, scientific-technical, scientific-industrial, industrial, educational and other cooperation with foreign subjects of economic activities in the sphere of land relations in regions: according to the results of expert evaluation;

- level of credit and settlement operations between subjects of foreign economic activity and foreign subjects of economic activities in the sphere of land relations regions: according to the results of expert evaluation;

3.8 indicators of public-private partnerships, influencing the development of investment in land use in regions:

- indicator of the level of coordination of interests of public and private partners with the aim of obtaining mutual benefits: according to the results of expert evaluation;

- level ensure they remain during the entire term of the contract, concluded within state-private partnership, the purpose and ownership of objects in state or communal ownership or owned by the Autonomous Republic of Crimea, transferred to the private partner according to the results of expert evaluation;

- level of recognition of public and private partners the rights and duties stipulated by the legislation of Ukraine and defined by terms of the contract concluded in the framework of public-private partnerships: according to the results of expert evaluation;

- level to ensure equitable distribution among public and private partners of the risks associated with the implementation of the agreements concluded in the framework of public-private partnerships: according to the results of expert evaluation;

- use of land in regions for the implementation of public-private partnerships, which are the objects of state-private partnership, with the object of public-private partnership for a period specified by the agreement concluded under the public-private partnership, provides not later than the date of entry into force of the agreement concluded in the framework of public-private partnership, receipt of a private partner the right to use the land granted in the prescribed manner for the construction of a public-private partnership: according to the results of expert evaluation;

3.9 indicators of the level of investment activity in the field of land use in regions by domestic investors:

- indicator of the level of investment carried out by citizens, non-state enterprises, business associations, unions and societies, as well as public and religious organizations, other legal entities based on collective ownership: according to the results of expert assessment;

- level of public investment carried out by public authorities at the expense of the state budget, borrowed funds, as well as state enterprises and institutions at the expense of own and borrowed funds: according to the results of expert assessment;

- level of local investment carried out by local governments at the expense of local budgets, borrowed funds, as well as utilities and institutions at the expense of own and borrowed funds: according to the results of expert assessment;

- level of state support for the implementation of domestic investment projects: according to the results of expert evaluation;

- level of implementation of organizational, technical and legal measures aimed at creating conditions conducive to the preservation of investment, achieving the goal of investment, effective operation of investment and reinvestment, protection of legal rights and interests of investors, including the right to profit (income) from investments: according to the results of expert evaluation;

3.10 indicators of the level of formation of special economic zones for making investments in the sphere of land use in regions:

- indicator of the level of determination of perspective directions of development of special (free) economic zones: according to the results of expert evaluation;

- level of operation and construction of networks of transport, communications, energy supply and other production infrastructure used in the field of land use in regions: according to the results of expert evaluation;

- level of development of network communication links with partners beyond the special (free) economic zones: according to the results of expert evaluation;

- level of compiling and providing to entities of special (free) economic zones in the use of land: according to the results of expert evaluation;

- level of issuing permits to business entities of special (free) economic zone for the construction of new economic objects, registration of subjects of economic activities and investments implemented in special (free) economic zone in the area of land use in regions: according to the results of expert evaluation;

3.11 the indicators of the level of provision of special regime of innovation activity of technological parks in the sphere of land use in regions:

- indicator of the level of financial support for technological parks projects for which you can enter budget programme support activities of the technological parks: according to the results of expert evaluation;

- level of formation and use of the amounts of import duties, which are charged according to the customs legislation of Ukraine, when imported into Ukraine for the realization of projects of technological parks of new equipment, devices and components as well as materials that are not produced in Ukraine in the sphere of land use in regions: according to the results of expert evaluation;

- level of formation and use of special accounts of participants of technology parks and joint ventures that are implementing technological parks projects and is credited 50 percent of the amounts of import duties, and the remaining 50 percent of the amounts of import customs duties shall be credited to the special account of the governing body of the appropriate technology Park: according to the results of expert evaluation;

- level scientific, research and developmental works on priority directions of activity of technological parks in the sphere of land use regions: according to the results of expert evaluation;

- level the creation, development, modernization and reconstruction of scientific and technological, experimental and experimental-industrial sites, in particular on the tools and equipment used for the purposes of innovative activity in the sphere of land use regions: according to the results of expert evaluation;

3.12 the indicators of the implementation of investment projects in the sphere of land use in regions on the principle of «single window»:

- indicator of the level of voluntary application of the principle of «single window»: according to the results of expert evaluation;

- level of equality of the rights and legitimate interests of all applicants: according to the results of expert evaluation;

- level to establish a uniform list of documents required for implementation of the investment project, depending on its specificity: according to the results of expert evaluation;

- level of transparency of procedures for issuance of documents granting the right on realization of the investment project: according to the results of expert evaluation;

- level of responsibility of officials of the authorized body for violation of legislation on the issuance of documents granting the right on realization of the investment project: according to the results of expert evaluation.

The results of the selection of environmental indicators the third level of territorial development land use area are presented in table 6.5.

Table 6.5

The results of the selection of environmental indicators of the third level of territorial development of land use in regions, rel. from

Indicators	The value of the criteria	Decision
1	2	3
Environmental development		
t_{411}	0,85	used for evaluation
t_{412}	0,875	used for evaluation
t_{413}	0,85	used for evaluation
t_{414}	0,85	used for evaluation
t_{415}	0,85	used for evaluation
The level of waste management in the system of territorial development of land use in regions		
t_{421}	0,875	used for evaluation
t_{4213}	0,875	used for evaluation
t_{4214}	0,875	used for evaluation
t_{4215}	0,875	used for evaluation
t_{4216}	0,85	used for evaluation
Level of rationing and accounting of waste management		
t_{431}	0,85	used for evaluation
t_{432}	0,85	used for evaluation
t_{433}	0,875	used for evaluation
t_{434}	0,85	used for evaluation
t_{437}	0,75	used for evaluation
Functional indicators for reducing or preventing waste generation		
t_{441}	0,85	used for evaluation
t_{4413}	0,85	used for evaluation
t_{4421}	0,75	used for evaluation
t_{4429}	0,85	used for evaluation
t_{4440}	0,75	used for evaluation

Continuation of table 6.5

1	2	3
The level of notification of the threat or occurrence of emergencies		
t_{451}	0,75	used for evaluation
t_{452}	0,75	used for evaluation
t_{453}	0,625	used for evaluation
t_{454}	0,625	used for evaluation
t_{455}	0,625	used for evaluation
Level of information on the occurrence and prevention of emergencies		
t_{461}	0,75	used for evaluation
t_{462}	0,75	used for evaluation
t_{463}	0,625	used for evaluation
t_{464}	0,625	used for evaluation
The level of shelter of the population in protective structures of civil defense		
t_{471}	0,55	used for evaluation
t_{472}	0,55	used for evaluation
t_{473}	0,625	used for evaluation
t_{474}	0,55	used for evaluation
t_{475}	0,625	used for evaluation
Level of implementation of evacuation measures		
t_{481}	0,55	used for evaluation
t_{482}	0,55	used for evaluation
t_{483}	0,55	used for evaluation
t_{484}	0,55	used for evaluation
t_{485}	0,55	used for evaluation
Level of engineering protection of territories		
t_{491}	0,85	used for evaluation
t_{492}	0,85	used for evaluation
t_{493}	0,75	used for evaluation
t_{497}	0,75	used for evaluation
t_{498}	0,75	used for evaluation
Level of radiation and chemical protection of the population and territories		
t_{4101}	0,55	used for evaluation
t_{4102}	0,525	used for evaluation
t_{4103}	0,525	used for evaluation
t_{4104}	0,525	used for evaluation
t_{4105}	0,525	used for evaluation
Level of medical protection, ensuring sanitary and epidemic well-being of the population		
t_{4111}	0,65	used for evaluation
t_{4116}	0,65	used for evaluation
t_{4119}	0,525	used for evaluation
t_{41110}	0,525	used for evaluation
t_{41111}	0,525	used for evaluation
Level of biological protection of the population, animals and plants		
t_{4121}	0,55	used for evaluation
t_{4122}	0,55	used for evaluation
t_{4123}	0,55	used for evaluation
t_{4124}	0,525	used for evaluation
t_{4125}	0,525	used for evaluation
The level of psychological protection of the population in the system of territorial development of land use in regions		
t_{4131}	0,55	used for evaluation
t_{4132}	0,525	used for evaluation
t_{4133}	0,525	used for evaluation
t_{4134}	0,55	used for evaluation
Level of technological security		
t_{4141}	0,75	used for evaluation
t_{4142}	0,625	used for evaluation

Continuation of table 6.5

1	2	3
t_{4147}	0,625	used for evaluation
t_{4149}	0,55	used for evaluation
t_{41411}	0,55	used for evaluation
The level of fire safety in the system of territorial development of land use in regions		
t_{4151}	0,85	used for evaluation
t_{4152}	0,85	used for evaluation
t_{4153}	0,75	used for evaluation
t_{4154}	0,75	used for evaluation
t_{4155}	0,75	used for evaluation

4 Environmental:

4.1 environmental development:

- indicator of the state of the environment or its objects of the land, water, subsoil, atmospheric air, flora and fauna and their level of contamination: according to the results of expert evaluation;

- level formed of biological diversity and its components, together with genetically modified organisms and their interaction with environmental objects: according to the results of expert evaluation;

- level of influence of factors of materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) on the state of the environment and human health: according to the results of expert evaluation;

- level of threats occurrence and the causes of environmental emergencies, results of elimination of these phenomena: according to the results of expert evaluation;

- level of implementation of recommendations on measures aimed at reducing their negative impact on natural features and human health: according to the results of expert evaluation;

4.2 indicators of the level of waste management in territorial development of land use in regions:

- indicator of the level ensure full collection and timely disposal and waste management, as well as compliance with the rules of ecological safety during handling; minimizing waste generation and reduction: according to the results of expert evaluation;

- standardized ratio of the excess of generated waste compared to the volumes of waste recycled, incineration, and removal to designated areas or sites and average population: according to the State statistics service of Ukraine;

- standardized value of the expenditure on environmental protection, which affect the spatial development of land use in regions: according to the State statistics service of Ukraine;

- standardized value of the capital expenditure on environmental protection in regions: according to the State statistics service of Ukraine;

- standardized value of the ratio of the cost of environmental protection and the average number in the regions, according to the State statistics service of Ukraine;

4.3 indicators of the level of valuation and accounting of waste management:

- indicator of the level of formation and use of marginal waste generation in technological processes: according to the results of expert evaluation;

- level of formation and use of indicators of waste, use and losses of raw materials in production processes: according to the results of expert evaluation;

- level of development of other standards: according to the results of expert evaluation;

- level of implementation of the state registration and certification of waste: according to the results of expert evaluation;

- level ensure monitoring of places of formation, storage and disposal of waste: according to the results of expert evaluation;

4.4 functional performance reduction or waste prevention:

- indicator of the level of development and implementation of scientifically based standards for waste per unit of production (raw materials and energy), performance of works and provision of services, regulating their quantitative and qualitative composition, in accordance with advanced technological achievements: according to the results of expert evaluation;

- level of compliance with environmental regulations on the siting of enterprises, installations, landfills, complexes, warehouses and other facilities of waste management, to design and build regional and inter-regional processing,

neutralization, disposal and waste management if they do not meet environmental and sanitary requirements: according to the results of expert evaluation;

- level storage and disposal are carried out in accordance with the requirements of ecological safety and ways to maximize the use of waste or transfer them to other consumers (except burial): according to the results of expert evaluation;

- level of use of measures aimed at accident prevention, limitation and elimination of their consequences and protect people and the environment from exposure to them: according to the results of expert evaluation;

- level the establishment of funds for target funding of waste management through voluntary contributions from waste producers, their owners, domestic and foreign economic entities, private citizens, environmental insurance, ensure the formation of the state Bank of data on implementation in Ukraine of a waste management technology and PR: according to the results of expert evaluation;

4.5 the indicators of the level of threat alert or emergency situations:

- indicator of the level of functioning of the national, territorial and local automated systems of centralized warning about threat or emergency situations, special, local, and facility alert systems: according to the results of expert evaluation;

- level of centralized telecommunication networks, including mobile (mobile) communication, departmental telecommunications networks and telecommunications networks of economic entities in the order established by the Cabinet of Ministers of Ukraine, as well as networks of national, regional and local radio and television and other technical means of transmission (display) information: according to the results of expert evaluation;

- level of automation to the process of transferring signals and messages about threats or emergencies; operation of the high risk of automated systems of early detection emergencies and notification: according to the results of expert evaluation;

- level of organizational and technical integration of various systems of centralized warning about the threat or occurrence of emergency situations and the automated systems of early detection emergencies and notification: according to the results of expert evaluation;

- level of functioning in the settlements and places of mass stay of people the signal loud-speaking devices and electronic boards for the transmission of information on civil protection: according to the results of expert evaluation;

4.6 indicators of the level of informing about the origin and prevention of emergency situations:

- indicator of the level of formation and use of information about emergency situations that are predicted or have arisen with the definition of their classification, the limits of spread and consequences, as well as the ways and methods of protection against them: according to the results of expert evaluation;

- level of provision of the management bodies of civil protection to the population through the media of timely and accurate information specified in part one of this article, as well as on its activities on civil protection, including the available to persons with vision problems and hearing form: according to the results of expert evaluation;

- level of completeness of information about the emergency situation: according to the results of expert evaluation;

- level of disclosure of the consequences of emergency situations is carried out according to the law on information: according to the results of expert evaluation;

4.7 indicators of the level of the shelter population in protective structures of civil protection:

- indicator of the level of implementation of measures for creation of protective structures: according to the results of expert evaluation;

- level of design, construction, fixtures and placement of protective structures and of dual-use objects are carried out in accordance with the rules: according to the results of expert evaluation;

- level of compliance with requirements for maintenance and operation of protective structures determined by the Central Executive body which provides forming and implements the state policy in the field of civil protection: according to the results of expert evaluation;

- levels of protective structures of civil protection in readiness for the intended use is carried out by economic entities on the balance sheet which they are located (in particular structures that are not included in their statutory capital in the process of privatization (corporatization), at the expense of own funds: according to the results of expert evaluation;

- level of control over the readiness of protective structures of civil protection to use what is provided by the Central Executive authority which carries out state supervision in the spheres of technogenic and fire safety, in cooperation with relevant organs and units of civil protection, local state administrations: according to the results of expert evaluation;

4.8 indicators of the level of implementation of measures on evacuation:

- indicator of the level of education and the performance of regional, local and object authorities for the evacuation: according to the results of expert evaluation;

- level evacuation planning: according to the results of expert evaluation;

- level definition of secure areas suitable for accommodation of evacuated population and property: according to the results of expert evaluation;

- organization level alert managers of business entities and population about the beginning of the evacuation: according to the results of expert evaluation;

- level of organization of the evacuation: according to the results of expert evaluation;

4.9 indicators of the level of engineering protection of territories:

- indicator of the level of the zoning of land for the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of occurrence of emergency situations associated with them; the assignment of cities to the appropriate groups of civil protection and the assignment of business entities to corresponding categories of civil protection: according to the results of expert evaluation;

- level design and the inclusion of requirements engineering activities of civil protection of the species concerned urban planning and design documentation and

their implementation during construction and operation: according to the results of expert evaluation;

- level taking into account the possible manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and the negative consequences of accidents in the development of master plans of settlements and conducting town-planning: according to the results of expert evaluation;

- construction of anti-landslide, flood control, protivobolevykh, anti-avalanche, anti-erosion and other engineering installations of special purpose, their content in functional status: according to the results of expert evaluation;

- engineering networks and transport communications, development and implementation of measures for their safe operation: according to the results of expert evaluation;

4.10 indicators of the level of radiation and chemical protection of population and territories:

- level metrics identifying and assessing the radiation and chemical situation: according to the results of expert evaluation;

- level of organization and implementation of dosimetric and chemical control: according to the results of expert evaluation;

- level of development and implementation of typical modes of radiation protection: according to the results of expert evaluation;

- level of use of means of collective protection: according to the results of expert evaluation;

- level of use of individual protection equipment, devices of radiation and chemical reconnaissance, dosimetric and chemical control rescue services, formations and specialized services of civil protection, involved in carrying out rescue and other emergency operations, fighting fires in the lesions of radiation and chemically hazardous facilities and population living in areas of dangerous pollution: according to the results of expert evaluation;

4.11 indicators of the level of health protection, provision of sanitary and epidemic wellbeing of the population:

- indicator of the level of medical care to victims of emergencies, rescue workers and others who were involved in rescue and other emergency operations, fighting fires, conducting medical and psychological rehabilitation: according to the results of expert evaluation;

- accumulation level medical and special property and equipment: according to the results of expert evaluation;

- level of implementation of measures to prevent the negative impact on health of harmful factors of environment and of consequences of emergency situations and the conditions for the emergence and spread of infectious diseases: according to the results of expert evaluation;

- level of organization and monitoring of state of environment, sanitary-hygienic and epidemiological situation: according to the results of expert evaluation;

- level of sanitary protection of territories and entities in the disaster area: according to the results of expert evaluation;

4.12 indicators of the level of biological protection of the population, animals and plants:

- level indicators of timely detection of the factors and biological hotbed of infection, its localization and elimination: according to the results of expert evaluation;

- levels predict the magnitude and consequences of biological contamination, the development and implementation of timely antiepidemic, preventive, anti-epizootic, protiein and therapeutic measures: according to the results of expert evaluation;

- level emergency nonspecific and specific prevention of biological contamination of the population: according to the results of expert evaluation;

- level timely application of means of individual and collective protection according to the results of expert evaluation;

- level restrictive anti-epidemic measures, observation and quarantine, according to the results of expert evaluation;

4.13 indicators of the level of psychological protection of the population in territorial development of land use in regions:

- indicator of the level of planning activities related to psychological protection; timely use of licensed and permitted for use in Ukraine, informational, psycho-prophylactic and psychocorrectional methods of influence on the personality: according to the results of expert evaluation;

- level detection using psychological methods factors that contribute to the emergence of socio-psychological tension: according to the results of expert evaluation;

- level of use of modern psychological techniques to neutralize the negative effects of emergencies on populations: according to the results of expert evaluation;

- level of implementation of other measures of psychological protection depending on the current situation: according to the results of expert evaluation;

4.14 indicators of the level of technological safety:

- indicator of the level of potentially dangerous objects and objects of increased danger; buildings and structures in violation of the conditions of exploitation: according to the results of expert evaluation;

- level of origination entities with critical state assets and violation of operating conditions: according to the results of expert evaluation;

- level excessive and disordered accumulation of household and industrial waste, unusable plant protection products; the impact of military and other environmentally hazardous activities according to the results of expert evaluation;

- level of appearance of public infrastructure in violation of the conditions of exploitation: according to the results of expert evaluation;

- level of directions of formation and implementation of automated system of early detection of threats of emergencies and notification of population in case of their occurrence (at high risk for timely detection of the risk of occurrence of emergency situations and implementation of alert personnel and the population, which falls in the zone of possible destruction, are established and operated

automated systems for early detection of threats of emergencies and notification of population in case of their occurrence): according to the results of expert evaluation;

4.15 indicators of the level of fire safety in territorial development of land use in regions:

- indicator of the level of fire safety on the territory of Ukraine, regulating relations in the sphere of public authorities, local authorities and business entities and citizens: according to the results of expert evaluation;

- level of fire safety business entities: according to the results of expert evaluation;

- level of authority in the field of fire safety associations, corporations, corporations, other business associations: according to the results of expert evaluation;

- level responsibilities for fire safety during the design and building of settlements, construction of buildings and structures is vested in the bodies of architecture, customers, developers, design and construction organizations (according to the results of expert evaluation;

- level responsibilities for fire safety in dwellings from municipalities, public housing Fund, the housing co-operatives rests with the tenants and owners of apartments and residential premises of the private housing stock and other buildings, private houses farmsteads, cottages and garden houses with farm buildings and buildings on their owners or employers, if required by a contract of employment: according to the results of expert evaluation.

Thus, the study made the selection of indicators of the third level that forms the quantitative basis for the implementation of the methodological approach to integrated assessment of territorial development land use in regions.

7 Formation of investment attractiveness of the lands in coastal regions of China

7.1 Comparative analysis of the economic status of China, USA, Russia, Ukraine

Over the past decade, China has provided significant economic development, becoming the world leader of the production. In particular, there is the growth of gross domestic product in 2010 to 10.3% in 2015 and 6.9%, 2016 to 6.7% in 2017 and 6.3%, 2018 or 6.6 %, 2019 – 6%. However, in recent years is the slowdown of the Chinese economy.

The study determined that for 1990-2018 he observed the growth of gross domestic product in China, Russia, and USA (Annex G, table G. 1). Moreover, the growth rate of China's GDP is the largest among the presented countries. In addition, the proportion of gross domestic product, purchasing power parity grew only in China. In three countries an increase in the volume of gross investment in fixed capital (Gross Fixed Capital Formation) and foreign direct investment (FDI inflows).

During the studied period dynamics of indicators of total investment in percent of GDP (Total investment as a percentage of GDP) and the consumer price index (Consumer Price Index) increased only in China. The average monthly payroll grew in the three countries.

During the investigated period there was a growth in international reserves at the end of the year, including gold (International reserves at the end of the year, including gold), and total external debt at end of year (Total external debt at the end of the year). Increase defense spending and export of goods. Along with this, a greatly increased share of the world’s expert in China. In three countries there is a growth of imports.

Characterizing the performance of the sectors of the economy, it should be noted that in the energy sector primary energy consumption (Primary energy consumption) and production (Crude oil production) and oil consumption (Oil

consumption) have experienced increases in China and the United States while reducing them in Russia. Along with this, the rate of production of natural gas (Extraction of natural gas), natural gas consumption (Natural gas consumption), coal production (Coal production), electricity production (Electricity production), installed capacity of power plants (Installed capacity of power plants) and the growth for the three countries. Moreover, the highest rates showed China.

Industry value added (including construction) (Industry, value added (incl. construction) grew in China, Russia and the United States. The increase in production in all industries takes place in China and the United States. In Russia during the studied period reduced the volume of steel production, the capacity of refineries, manufacture of sulfuric acid, chemical threads and fibers, cement, and personal computers. Construction volumes increased in China, USA and Russia there is no complete information regarding its functioning that affects the activity of the sphere.

The growth of value added in agriculture, forestry, fishing (Agriculture, forest and fishing, value added), grain production (Production of cereals), potatoes (Potato production, million tons), meat of livestock and poultry (slaughter weight) (Production of meat of livestock and poultry (carcass weight), milk (Milk), eggs (Eggs), fruits, excluding melons (Fruit production, incl. melons), apples (Production of apples), it can be argued in China and the United States. Russia in terms of reduced production volumes in agriculture.

Demographic policy of China aimed at slowing population growth, however, as in the US, the number of population in comparison with 1990 has increased. The healthcare sector is characterized by the absence of data for 1990 in all countries. It should be noted that the incidence of tuberculosis (per 100,000 population) (Incidence of tuberculosis (per 100,000 population) increased only in Russia, indicating the accumulation of negative phenomena in this sphere and reduce opportunities for countering them.

Thus, a comparative analysis shows that over the past 29 years, China has shown significant growth in key economic indicators compared to Russia and the

US. This allowed China to enter the world's most developed countries and, in some areas, become a leader.

In this process it is necessary to note the tendencies of economic functioning of developing countries, in particular Ukraine. In the table 7.1 presents changes in GDP in Ukraine.

Table 7.1

GDP changes of Ukraine for 2012–2019, mln. according to [500]

Years	Nominal GDP	Real GDP	Difference	
2012	1408889	1304064	-104825	-7,4%
2013	1454931	1410609	-44322	-3,0%
2014	1566728	1365123	-201605	-12,9%
2015	1979458	1430290	-549168	-27,7%
2016	2383182	2034430	-348752	-14,6%
2017	2982920	2445587	-537333	-18,0%
2018	3558706	3083409	-475297	-13,4%
2019	3974564	3675728	-298836	-7,5%

For 2012–2019, there is a negative trend in real and nominal GDP, which is characterized by negative values. Gross domestic product is much lower than the GDP of China, Russia and the USA (table 7.2). This indicates the country's low capacity to maintain its functioning and, moreover, its development.

Table 7.2

Nominal GDP of Ukraine from 2002–2019 [471]

Years	UAH million	Actual changes (UAH million)	Changes in %	million dollars USA	Actual changes (million USD)	Changes in %
2002	225810	-	-	42393	-	-
2003	267344	41534	18,4	50133	7740	18,3
2004	345113	77769	29,1	64883	14750	29,4
2005	441452	96339	27,9	86142	21259	32,8
2006	544153	102701	23,3	107753	21611	25,1
2007	720731	176578	32,5	142719	34966	32,5
2008	948056	227325	31,5	179992	37273	26,1
2009	913345	-34711	-3,7	117228	-62765	-34,9
2010	1082569	169224	18,5	136419	19192	16,4
2011	1316600	234031	21,6	163160	26740	19,6
2012	1408889	92289	7,0	175781	12622	7,7
2013	1454931	46042	3,3	183310	7529	4,3
2014	1566728	111797	7,7	131805	-51505	-28,1
2015	1979458	412730	26,3	90615	-41190	-31,3
2016	2383182	403724	20,4	93270	2655	2,9
2017	2982920	599738	25,2	112154	18884	20,2
2018	3558706	575786	19,3	130832	18678	16,7
2019	3974564	415858	11,7	-	-	-

The nominal GDP of Ukraine per capita from 2002–2019 is presented in table 7.3.

Table 7.3

Nominal GDP of Ukraine per capita from 2002–2019

Years	UAH million	Actual changes (UAH million)	Changes in %	million dollars USA	Actual changes (million USD)	Years	Population, thousand people
2002	4681,9	-	-	879	-	-	48230
2003	5592,9	911,0	19,5	1048,8	169,8	19,3	47801
2004	7273,5	1680,6	30,0	1367,5	318,7	30,4	47448
2005	9374,3	2100,9	28,9	1829,2	461,8	33,8	47091
2006	11634,3	2260,0	24,1	2303,8	474,6	25,9	46771
2007	15499,1	3864,8	33,2	3069,1	765,3	33,2	46501
2008	20502,8	5003,6	32,3	3892,5	823,4	26,8	46240
2009	19836,3	-666,4	-3,3	2546	-1346,5	-34,6	46044
2010	23603,6	3767,3	19,0	2974,4	428,4	16,8	45865
2011	28813,9	5210,2	22,1	3570,8	596,4	20,0	45693
2012	30912,5	2098,6	7,3	3856,8	286,1	8,0	45577
2013	31988,7	1076,2	3,5	4030,3	173,5	4,5	45483
2014	35834	3845,3	12,0	3014,6	-1015,7	-25,2	43722
2015	46210,2	10376,1	29,0	2115,4	-899,2	-29,8	42836
2016	55853,5	9643,3	20,9	2185,9	70,5	3,3	42668
2017	70224,3	14370,8	25,7	2640,3	454,4	20,8	42477
2018	84192	13967,7	19,9	3095,2	454,9	17,2	42269
2019	94589,8	10397,8	12,4	-	-	-	42019

The study found that the nominal GDP of Ukraine per capita increased from 2002 to 2019 in most periods, but this growth is not comparable to that of developed countries. In addition, GDP per capita in Ukraine has slowed significantly in recent years, especially in dollar terms.

The GDP structure of Ukraine by end use for 2005–2019 is presented in table 7.4.

Table 7.4

GDP structure of Ukraine by end use 2005 - 2019, mln. [471]

Years	Nominal GDP for the year	Consumer spending	in% to GDP	Gross savings	in% to GDP	Export of goods and services	in% to GDP	Import of goods and services	in% to GDP
1	2	3	4	5	6	7	8	9	10
2005	441452	337879	76,5	99876	22,6	227252	51,5	-223555	-50,6
2006	544153	424060	77,9	134740	24,8	253707	46,6	-269200	-49,5
2007	720731	558581	77,5	203318	28,2	323205	44,8	-364373	-50,6
2008	948056	758902	80,0	264883	27,9	444859	46,9	-520588	-54,9
2009	913345	772826	84,6	155815	17,1	423564	46,4	-438860	-48,0
2010	1082569	914230	84,5	199918	18,5	549365	50,7	-580944	-53,7
2011	1316600	1105201	83,9	282474	21,5	707953	53,8	-779028	-59,2
2012	1408889	1269601	90,1	257335	18,3	717347	50,9	-835394	-59,3

Continuation of table 7.4

1	2	3	4	5	6	7	8	9	10
2013	1454931	1350220	92,8	228474	15,7	681899	46,9	-805662	-55,4
2014	1566728	1409772	90,0	220968	14,1	770121	49,2	-834133	-53,2
2015	1979458	1715636	86,7	303297	15,3	1044541	52,8	-1084016	-54,8
2016	2383182	2018854	84,7	512830	21,5	1174625	49,3	-1323127	-55,5
2017	2982920	2552525	85,6	618914	20,7	1430230	47,9	-1618749	-54,3
2018	3558706	3196756	89,8	667953	18,8	1608890	45,2	-1914893	-53,8
2019	3974564	3785133	95,2	500614	12,6	1636416	41,2	-1947599	-49,0

In the structure of GDP of Ukraine by end use in 2005–2019, the largest percentage is occupied by consumer expenditures. In addition, the value of imports of goods and services as a percentage of GDP should be noted.

The population of Ukraine in 2019 by region is presented in table 7.5.

Table 7.5

Population of Ukraine in 2019, by region, persons according to [500]

Regions	Existing population		Permanent population		Changes in the current population, rel. units.
	As of January 1, 2020	the average number in 2019	As of January 1, 2020	the average number in 2019	
Ukraine	41902416	42027809	41732779	41858172	1,003
Vinnytsia	1545416	1552905	1538331	1545820	1,005
Volyn	1031421	1033375	1028693	1030647	1,002
Dnepropetrovsk	3176648	3191562	3173339	3188253	1,005
Donetsk	4131808	4148854	4118923	4135969	1,004
Zhytomyr	1208212	1214202	1208981	1214971	1,005
Transcarpathian	1253791	1255296	1250958	1252463	1,001
Zaporozhye	1687401	1696619	1686612	1695830	1,005
Ivano-Frankivsk	1368097	1370674	1365371	1367948	1,002
Kyiv	1781044	1774492	1775265	1768713	0,996
Kirovograd	933109	939329	926694	932914	1,007
Luhansk	2135913	2143873	2131316	2139276	1,004
Lviv	2512084	2517053	2493714	2498683	1,002
Mykolayivska	1119862	1125479	1119147	1124764	1,005
Odessa	2377230	2378769	2366170	2367709	1,001
Poltava	1386978	1393708	1379140	1385870	1,005
Rivne	1152961	1155131	1151901	1154071	1,002
Sumy	1068247	1074833	1066055	1072641	1,006
Ternopil	1038695	1042287	1035444	1039036	1,003
Kharkiv	2658461	2667030	2642825	2651394	1,003
Kherson	1027913	1032777	1026481	1031345	1,005
Khmelnytsky	1254702	1259704	1251539	1256541	1,004
Cherkasy	1192137	1199244	1188508	1195615	1,006
Chernivtsi	901632	903003	898567	899938	1,002
Chernihiv	991294	998520	982752	989978	1,007

In 2019, the population of Ukraine as a whole and by region is growing. However, this process is characterized by minor trends.

The number of live births and deaths in Ukraine and regions in 2019 is presented in table 7.6.

Table 7.6

Number of live births and deaths in Ukraine and regions in 2019, persons

according to [500]

Regions	Number of live births	Number of deaths	Number of dead children under 1 year of age	The ratio of the number of deaths to the number of live births, rel. units
Ukraine	27928	53610	175	1,92
Vinnytsia	1045	2286	6	2,188
Volyn	991	1262	6	1,273
Dnepropetrovsk	2038	4843	8	2,376
Donetsk	1182	3629	7	3,07
Zhytomyr	899	1880	8	2,091
Transcarpathian	1278	1471	17	1,151
Zaporozhye	1079	2646	5	2,452
Ivano-Frankivsk	1009	1596	9	1,582
Kyiv	1258	2649	8	2,106
Kirovograd	580	1426	3	2,459
Luhansk	422	1365	6	3,235
Lviv	2023	3013	7	1,489
Mykolayivska	776	1506	6	1,941
Odessa	2106	3162	9	1,501
Poltava	816	2056	3	2,520
Rivne	1115	1322	6	1,186
Sumy	617	1724	2	2,794
Ternopil	734	1398	7	1,905
Kharkiv	1541	3690	13	2,395
Kherson	756	1531	7	2,025
Khmelnytsky	903	1775	5	1,966
Cherkasy	691	1795	4	2,598
Chernivtsi	695	1107	5	1,593
Chernihiv	546	1614	6	2,956

Negative trends include a significant excess of deaths over live births. Moreover, this tendency is observed both in Ukraine as a whole and in regions, in particular.

The number of arrivals and departures in regions in 2019 is presented in table 7.7.

Table 7.7

Number of people who arrived and left in regions in 2019, according to data [500]

Regions	Number of arrivals	Number of departures	The ratio of the population that left to the population that arrived
Ukraine	41862	38692	0,924
Vinnytsia	1344	1470	1,094
Volyn	1019	964	0,946
Dnepropetrovsk	2809	2430	0,865
Donetsk	1385	1687	1,218
Zhytomyr	1800	1761	0,978
Transcarpathian	593	546	0,921
Zaporozhye	1358	1298	0,956
Ivano-Frankivsk	1207	1184	0,981
Kyiv	4398	2142	0,487
Kirovograd	977	1179	1,207
Luhansk	571	779	1,364
Lviv	2194	2300	1,048
Mykolayivska	961	969	1,008
Odessa	2828	2298	0,813
Poltava	1767	1538	0,870
Rivne	1292	1342	1,039
Sumy	1243	1250	1,006
Ternopil	1117	965	0,864
Kharkiv	3743	3306	0,883
Kherson	803	928	1,156
Khmelnytsky	1729	1629	0,942
Cherkasy	1360	1300	0,956
Chernivtsi	681	680	0,999
Chernihiv	971	996	1,026

It is determined that, as a whole, there is an excess of the population of Ukraine that has dropped out of the population that has arrived. Such changes occurred in regions: Volyn, Dnipropetrovsk, Zhytomyr, Transcarpathian, Zaporizhia, Ivano-Frankivsk, Kiev, Odesa, Poltava, Ternopil, Kharkiv, Khmelnitsky, Cherkasy, Chernivtsi.

The migration movement of the population of Ukraine in 2019 is presented in table 7.8.

Table 7.8

Migration movement of the population of Ukraine in 2019, persons according to [500]

Regions	Number of arrivals	Number of cases of disposal	Migration growth, reduction (-)
1	2	3	4
Ukraine	576032	554520	21512
Vinnytsia	21049	23773	-2724
Volyn	14641	15638	-997

Continuation of table 7.8

1	2	3	4
Dnepropetrovsk	34983	36409	-1426
Donetsk	17304	24984	-7680
Zhytomyr	20231	21898	-1667
Transcarpathian	7247	7747	-500
Zaporozhye	16761	18916	-2155
Ivano-Frankivsk	16578	16310	268
Kyiv	59518	32175	27343
Kirovograd	13364	16709	-3345
Luhansk	7131	12071	-4940
Lviv	35083	33984	1099
Mykolayivska	12534	14647	-2113
Odessa	38529	29454	9075
Poltava	25659	25248	411
Rivne	18563	21037	-2474
Sumy	16979	19229	-2250
Ternopil	16232	16558	-326
Kharkiv	48296	42860	5436
Kherson	11736	13810	-2074
Khmelnytsky	22232	22775	-543
Cherkasy	18204	20336	-2132
Chernivtsi	9627	9580	47
Chernihiv	13211	15207	-1996

In 2019, there is a migration growth of population in Ukraine due to their growth in the regions: Ivano-Frankivsk, Kiev, Lviv, Odessa, Poltava, Kharkiv, Chernivtsi. In most regions there is a population outflow.

The main indicators of the labor market in Ukraine for 2010–2019 are presented in table 7.9.

Table 7.9

The main indicators of the labor market in Ukraine for 2010–2019 [500]

Years	Workforce			
	at the age of 15-70 years		working age	
	on average, thousand people	in% to the population of the corresponding age group	on average, thousand people	in% to the population of the corresponding age group
2010	20894,1	63,6	19164,0	71,9
2011	20893,0	64,2	19181,7	72,6
2012	20851,2	64,5	19317,8	72,9
2013	20824,6	64,9	19399,7	72,9
2014	19920,9	62,4	19035,2	71,4
2015	18097,9	62,4	17396,0	71,5
2016	17955,1	62,2	17303,6	71,1
2017	17854,4	62,0	17193,2	71,5
2018	17939,5	62,6	17296,2	72,7
2019	18066,0	63,4	17381,8	74,0

From 2010 to 2019, the development of the labor force is characterized by the largest share of the population in the age group of 15–70 years, most of which are able to work. During the study period it decreased.

The indicator of the number of unemployed population for 2010–2019 is presented in table 7.10.

Table 7.10

The number of unemployed population for 2010–2019 according to [500]

Years	unemployed population (according to the ILO methodology)			
	at the age of 15-70 years		working age	
	on average, thousand people	in% to the population of the corresponding age group	on average, thousand people	in% to the population of the corresponding age group
2010	1713,9	8,2	1712,5	8,9
2011	1661,9	8,0	1660,9	8,7
2012	1589,8	7,6	1589,2	8,2
2013	1510,4	7,3	1510,3	7,8
2014	1847,6	9,3	1847,1	9,7
2015	1654,7	9,1	1654,0	9,5
2016	1678,2	9,3	1677,5	9,7
2017	1698,0	9,5	1697,3	9,9
2018	1578,6	8,8	1577,6	9,1
2019	1487,7	8,2	1486,9	8,6

The unemployment rate for the studied period ranged from 7.3% to 9.5% for the labor force aged 15–70 years. The indicator of the dynamics of nominal and real average monthly wages for 2010 - 2019 is presented in table 7.11.

Table 7.11

Dynamics of nominal and real average monthly wages for 2010 - 2019 according to [500]

Years	The average monthly salary		
	nominal		real
	UAH	in% to the subsistence level for able-bodied persons	in% to the previous year
2010	2250	244,0	110,2
2011	2648	263,7	108,7
2012	3041	268,2	114,4
2013	3282	269,5	108,2
2014	3480	285,7	93,5
2015	4195	304,4	79,8
2016	5183	323,9	109,0
2017	7104	403,2	119,1
2018	8865	461,5	112,5
2019	10497	499,4	109,8

Between 2010 and 2019, the average monthly wage increased and the real wage increased. The household structure of Ukraine for 2017–2018 is presented in table 7.12.

Table 7.12

Household Structure of Ukraine for 2017–2018 According to [500]

Structural components	All households		including living			
			in urban settlements		in the countryside	
	2017	2018	2017	2018	2017	2018
Number of households (thousands)	14985,6	14934,9	10085,5	10061,3	4900,1	4873,6
Average household size (persons)	2,6	2,6	2,5	2,5	2,7	2,7
Household composition (%)						
children under 3 years	3,6	3,4	4,0	4,0	2,7	2,3
3-6 years	4,5	4,5	4,9	4,6	3,8	4,3
7-13 years	7,3	7,4	7,5	7,4	7,0	7,2
adolescents aged 14–15 years	1,8	2,1	1,7	1,9	1,9	2,4
16-17 years old	1,8	1,5	1,7	1,5	1,9	1,5
women aged 18–29	7,3	7,0	7,8	7,5	6,3	5,9
men 18–29 years old	7,6	7,5	7,4	7,7	8,1	7,1
women 30-58 years old	22,0	22,0	22,4	22,3	21,1	21,6
men 30-59 years old	20,8	20,9	20,7	20,4	21,2	21,8
women aged 59 years and older	15,3	15,5	14,3	14,8	17,2	16,9
men aged 60 years and older	8,0	8,2	7,6	7,9	8,8	9,0
Total,%	100,0	100,0	100,0	100,0	100,0	100,0

The structure of households in Ukraine for 2017–2018 is characterized by their decline due to urban settlements and rural areas. Most households consist of women and men 30–59, 59 years old.

Dynamics of total expenditures of households in Ukraine for 2010–2018 are presented in Annex H, table H.1.

Over the period under review, there has been an increase in household expenditure, which consists mainly of consumer aggregate spending.

Formation of the housing stock of Ukraine for 1990–2018 is presented in table 7.13.

Table 7.13

Formation of the Housing Fund of Ukraine for 1990–2018 according to [500]

Years	Total area, million m2	On average per capita, m2	Number of apartments, thousand	Number of families and singles who are on the housing register at the end of the year, thousand	Number of families and single peo
1990	922,1	17,8	17656	2638	235
1991	932,7	18,0	17827	2728	179
1992	944,7	18,2	17947	2696	166
1993	960,6	18,5	17978	2636	144
1994	962,9	18,7	18021	2578	104
1995	978,3	19,2	18303	2411	82
1996	995,2	19,7	18565	2297	56
1997	1002,6	20,0	18784	2164	47
1998	1008,4	20,2	18858	2029	37
1999	x	x	x	x	x
2000	1015,0	20,7	18921	1765	32
2001	1026,1	21,0	18960	1624	29
2002	1031,7	21,3	19023	1533	25
2003	1035,7	21,6	19049	1460	25
2004	1040,0	21,8	19075	1414	23
2005	1046,4	22,0	191324	1323	20
2006	1049,2	22,2	19107	1300	20
2007	1057,6	22,5	19183	1252	17
2008	1066,6	22,8	19255	1216	17
2009	1072,2	23,0	19288	1174	11
2010	1079,5	23,3	19322	1139	11
2011	1086,0	23,5	19327	1084	7
2012	1094,2	23,7	19370	1022	7
2013	1096,6	23,8	19368	808	6
2014	966,1	22,6	16785	657	3
2015	973,8	22,9	16886	x	x
2016	977,9	23,1	16912	x	x
2017	984,8	23,3	16987	x	x
2018	993,3	23,7	17100	x	x
Relation (2018 / 1990)	1,077	1,331	0,969	-	-

1990–2018 the growth of total area housing stock while reducing the number of apartments. Increasing the amount of square meters on average per resident.

It should be noted that during the investigated period of slowing business activity of business entities, Number entities by types of economic activity in 2018 is presented in Annex H, table H.2.

In the structure of the number of economic entities (companies) all of them are formed in the following types of activities: wholesale and retail trade; repair of motor vehicles and motorcycles; agriculture, forestry and fisheries; industry; operations with real estate.

Dynamics of volume of products (works, services) by kinds of economic activities for 2010 and 2018 are presented in Annex H, table H.3.

In 2010 and 2018 is growth of volume of products (works, services) by kinds of economic activities and entities, in addition to the scope provision of other services medium-sized business entities (physical persons).

Dynamics of value added cost of production of economic subjects by economic activity for 2013–2018 are presented in Annex H, table H.4.

Dynamics of value added cost production of business entities by industry, 2013–2018 there is growth only in Ukraine and in the spheres of economic activities: agriculture, farming and fisheries; industry; construction; wholesale and retail trade; repair of motor vehicles and motorcycles; temporary accommodation and catering information and communication financial and insurance activities; real estate activities with own property; professional, scientific and technical activities; administration and support services; education; health and social care provision.

In the field of art, sport, entertainment and leisure, a decrease in the amount of value added in the production costs of business entities for 2010–2018.

Dynamics of the main indicators of functioning of economic entities for 2010–2018, depending on their size are presented in Annex H, table H.5.

Dynamics of the main indicators of functioning of economic entities for 2010–2018 indicates growth of sales volumes. However, most of the other indicators (the number of entities number of business entities per 10 thousand persons of present population, the number of employed workers, number of employees) have generally declined. This indicates a decline in functioning capabilities of business entities.

Dynamics of financial results before tax by industry, 2010–2018 are presented in Annex H, table H.6.

In 2010 and 2018 is growth of financial results in General in Ukraine due to their increasing in the fields of agriculture, farming and fisheries; industry; construction; wholesale and retail trade; repair of motor vehicles and motorcycles; temporary accommodation and catering information and communication financial and insurance activities; real estate activities with own property; professional,

scientific and technical activities; administration and support services; education; health and social assistance; referral to other services.

In the field of art, sport, entertainment and leisure is loss-making activities, the increase in losses is observed in the sphere of transport, the warehousing, postal and courier activities.

On the formation and use of production and economic potential of enterprises by economic activity indicated by the numbers balance, the dynamics of currency which is presented in Annex H, table H.7.

In most areas for 2013–2018 strengthening the production and commercial potential due to the growth of balance sheet total.

Thus, the study identified significant growth of the Chinese economy compared with others (USA, Russia). Installed ambiguous trends of economic processes taking place in Ukraine, which by their scale are much lower compared to the spheres of the functioning of the Chinese economy. The analysis presented shows the growth of investment attractiveness of China's economy, increasing possibilities of its development.

7.2 China's state and development

Describing regional development indicators, it should be noted that China's prefecture-level cities in 2016 are 21, the number of district-level cities is 20, the number of autonomous districts is 3, the number of port cities is 11, the number of ethnic port cities is 7 (table 7.14).

Table 7.14

The structure of the administrative structure of China in 2016

City	Num-ber of Cities at Prefec-ture Level	Nu-mber of Cities at Cou-nty Level	Number of Counties	Number of Auto-nomous Counties	Number of Districts under the Juris-diction of Cities	Num-ber of Towns under the Juris-diction of Cities	Num-ber of Town-ships	Ethnic Town-ships	Num-ber of Street Com-muni-ties
Provincial Total	21	20	34	3	64	1128	11	7	461
Guangzhou	1				11	34			136
Shenzhen	1				8				74
Zhuhai	1				3	15			9
Shantou	1		1		6	32			37
Foshan	1				5	21			11
Shunde					1	6			4
Shaoguan	1	2	4	1	3	93	1	1	10
Heyuan	1		5		1	94	1	1	5
Meizhou	1	1	5		2	104			6
Huizhou	1		3		2	52	1	1	18
Shanwei	1	1	2		1	44			10
Dongguan	1					28			4
Zhongshan	1					18			6
Jiangmen	1	4			3	61			12
Yangjiang	1	1	1		2	38			10
Zhanjiang	1	3	2		4	82	2		37
Maoming	1	3			2	87			22
Zhaoqing	1	1	4		3	91	1	1	12
Qingyuan	1	2	2	2	2	77	3	3	5
Chaozhou	1		1		2	41			9
Jieyang	1	1	2		2	61	2		20
Yunfu	1	1	2		2	55			8

The port cities are located in the provinces: Qingyuan – 3 cities; Zhanjiang, Jieyang – 2; Shaoguan, Heyuan, Huizhou, Zhaoqing – 1. A similar trend remained in 2017 (table 7.15).

Table 7.15

The structure of the administrative structure of China in 2017

City	Num-ber of Cities at Prefec-ture Level	Num-ber of Cities at Cou-nty Level	Number of Counties	Number of Auto-nomous Counties	Num-ber of Districts under the Juris-diction of Cities	Num-ber of Towns under the Juris-diction of Cities	Number of Town-ships	Ethnic Town-ships	Num-ber of Street Com-muni-ties
Provincial Total	21	20	34	3	64	1124	11	7	466
Guangzhou	1				11	34			136
Shenzhen	1				8				74
Zhuhai	1				3	15			9
Shantou	1		1		6	32			37
Foshan	1				5	21			11
Shunde	1	2	4	1	3	93	1	1	10
Shaoguan	1		5		1	94	1	1	6
Heyuan	1	1	5		2	104			6
Meizhou	1		3		2	48	1	1	22
Huizhou	1	1	2		1	44			10
Shanwei	1					28			4
Dongguan	1					18			6
Zhongshan	1	4			3	61			12
Jiangmen	1	1	1		2	38			10
Yangjiang	1	3	2		4	82	2		37
Zhanjiang	1	3			2	87			22
Maoming	1	1	4		3	91	1	1	12
Zhaoqing	1	2	2	2	2	77	3	3	5
Qingyuan	1		1		2	41			9
Chaozhou	1	1	2		2	61	2		20
Jieyang	1	1	2		2	55			8
Yunfu	21	20	34	3	64	1124	11	7	466

In 2018, there were minor changes in the structure of China's administrative structure, but this did not affect the functioning in coastal regions and port cities (table 7.16).

Table 7.16

The structure of the administrative structure of China in 2018

City	Num-ber of Cities at Prefec-ture Level	Num-ber of Cities at Coun-ty Level	Number of Counties	Number of Auto-nomous Counties	Num-ber of Districts under the Juris-diction of Cities	Number of Towns under the Juris-diction of Cities	Num-ber of Town-ships	Ethnic Town-ships	Num-ber of Street Com-muni-ties
1	2	3	4	5	6	7	8	9	10
Provincial Total	21	20	34	3	65	1123	11	7	467
Guangzhou	1				11	34			136

Continuation of table 7.16

1	2	3	4	5	6	7	8	9	10
Shenzhen	1				9				74
Zhuhai	1				3	15			9
Shantou	1		1		6	32			37
Foshan	1				5	21			11
Shunde	1	2	4	1	3	93	1	1	10
Shaoguan	1		5		1	94	1	1	6
Heyuan	1	1	5		2	104			6
Meizhou	1		3		2	48	1	1	22
Huizhou	1	1	2		1	44			10
Shanwei	1					28			4
Dongguan	1					18			6
Zhongshan	1	4			3	61			12
Jiangmen	1	1	1		2	38			10
Yangjiang	1	3	2		4	82	2		37
Zhanjiang	1	3			2	86			23
Maoming	1	1	4		3	91	1	1	12
Zhaoqing	1	2	2	2	2	77	3	3	5
Qingyuan	1		1		2	41			9
Chaozhou	1	1	2		2	61	2		20
Jieyang	1	1	2		2	55			8
Yunfu	21	20	34	3	65	1123	11	7	467

Dynamics of Principal Aggregate Indicators on National Economic and Social Development and Growth Rates for 1978–2018 are presented in Annex I, table I.1.

In the period under review, a slowdown in the population index with permanent registration has been observed in China. The indicator of the level of permanent population had a similar tendency. In the population structure there is an increase in urban compared to a decrease in rural. The growth of major macroeconomic and investment indicators is slowing down, while investment in the construction of the total area of buildings is declining, the activity of export-import operations is decreasing. The volume of funds forming the state and local budgets is decreasing. The growth of energy production is slowing down. In most areas of China's economy, there is an increase in key indicators of their functioning, which indicates their development.

The number of Corporate Units by Sector and by Status of Registration in 2017 is presented in Annex I, table I.2.

The number of corporate units by sector and registration status in 2017 indicates a significant number of them in Farming, Forestry, Anima Husbandry and Fishery, Manufacture, Construction Wholesale and Retail Trades, Transportation,

Storage and Postal Services, Education, Public Administration, Social Security and Social Organizations.

The number of Corporate Units by Sector by City in 2017 is presented in Annex I, table I.3.

It should be noted that most of the corporate enterprises by operation are observed in: Guangzhou, Shenzhen, Foshan, Dongguan and in the regions: Pearl River Delta, Mountainous Region.

The number of Corporate Units by Status of Registration by City in 2017 is presented in Annex I, table I.4.

In 2017, the largest number of Corporate Units by Status of Registration by City by economy is observed in cities: Guangzhou, Shenzhen, Foshan and regions: Pearl River Delta, Mountainous Region.

Main Indicators on Private Economy for the years 2002–2018 are presented in table 7.17.

Table 7.17

Main Indicators on Private Economy 2002–2018

Indicator	2002	2010	2016	2017	2018	2018 2017 (%) Growth Rate in 2018 over 2017 (%)
1	2	3	4	5	6	7
Number of Units (10000 units)	210,39	438,66	872,54	999,82	1120,12	12,0
Private	25,86	94,82	317,17	381,58	447,07	17,2
Individual	175,31	334,63	541,17	600,96	649,36	8,1
Number of Employed Persons (10000 persons)	1002,45	2616,21	3364,50	3462,86	3619,15	4,5
Private	422,35	953,44	1329,49	1375,65	1524,46	10,8
Individual	430,82	978,41	1152,13	1167,33	1212,00	3,8
Gross Domestic Product (100 million yuan)	5265,20	22865,32	43059,44	48142,76	52611,59	7,3
Primary Industry	438,48	2184,07	3350,66	3450,97	3759,20	4,2
Secondary Industry	2129,35	10075,26	17674,12	19718,83	21726,76	8,8
Industry	1857,07	9169,01	16264,14	18062,86	19691,18	8,4
Construction	272,28	906,24	1443,32	1690,30	2070,62	13,0
Tertiary Industry	2697,36	10605,99	22034,66	24972,95	27125,63	6,4
Wholesale and Retail Trades	1054,80	3245,98	6138,28	6435,47	6695,07	0,9
Transport, Storage and Postal Services	287,09	852,11	1746,21	1998,56	2344,05	16,1

Continuation of table 7.17

1	2	3	4	5	6	7
Hotels and Catering Services	280,41	914,44	1338,78	1413,37	1465,41	0,7
Finance	36,25	629,51	1816,17	1996,97	2136,43	6,8
Real Estate	552,50	1954,45	4221,81	5169,07	5368,53	1,8
Other Services	486,30	3009,51	6653,71	7831,86	8969,59	12,2
Investment in Fixed Assets (100 million yuan)	1501,71	7325,07	20504,39	23158,46		8,9
Total Value of Imports and Exports	85,61	1688,86	4144,70	4641,78	5304,39	14,2
(USD 100 million)						
Exports	41,48	1002,44	2644,23	2930,05	3166,18	8,0
Imports	44,13	686,42	1500,47	1711,73	2138,21	24,9
Transportation, Postal and Telecommunication Services						
Business Revenue (100 million yuan)	122,10	313,78	680,30	824,06	973,86	18,2
Wholesale and Retail Trades(100 million yuan)						
Sales Value of Wholesale and Retail Trades	8821,17	30264,58	93806,985	103394,52	110743,04	7,1
Retail Value of Wholesale and Retail Trades	3455,13	12098,52	25483,163	28162,82	30022,85	6,6
Taxes (100 million yuan)	535,71	4163,26	9455,09	11263,89	13435,99	19,3
Private	141,72	763,64	1563,02	2195,1	3571,41	
Individual	139,46	418,47	826,35	950,35	1014,03	6,7

The dynamics of Main Indicators on Private Economy for the years 2002–2018 indicate their growth in most areas of the private sector, except Wholesale and Retail Trades, Hotels and Catering Services.

7.3 Characteristics of China's coastal development

The development of the Chinese economy is particularly evident in coastal regions. In this context, it is important to point out the particularities of land use and to focus on the economic indicators that shape the investment attractiveness in China's coastal regions.

Considering China's land management system, it was determined that it occupies one of the leading places by area of arable land – 92.5 million hectares or 9.9% of the total land area. The majority of the land fund is state-owned and managed to increase the efficiency of its use at national, regional and local levels.

The Land Management of China is implemented by the Ministry of Land and Natural Resources, which includes various structural divisions: State Land Monitoring Bureau, State Geodetic Administration, State Maritime Administration, State Land Surveillance Department.

China has not developed a land code that affects land management, but codifies it coding.

Therefore, it is of particular importance to develop and implement a land administration system for the formation of a geoinformation system, taking into account the peculiarities of China's land relations.

According to the Law of China «On Land Management» it is determined that the owners of agricultural land are agricultural production cooperatives and other collective economic organizations.

However, decreasing the value of small units, functioning in the sphere of land relations. It is also a limiting factor for investment by farmers.

Unlike mainland China, Hong Kong has a more open economic relations that affect the provision of land administration. A feature of this process is the emergence in the coastal cities (including Hong Kong), bonded areas and areas that have a high level of investment attractiveness. In General, coastal areas include eleven administrative units that is a 1297 sq., home to 435 million. The majority of the employed population works in agriculture. However, a growing proportion of the employed population in the industry.

Land administration coastal cities (Guangdong-Hong Kong-Macau) aimed at the development of trade relations and the development of modern transport and logistics centers [525]. Feature of land administration, in particular of the territory of Guangdong, is the establishment of the Guangdong free trade zone (GDFTZ), the operation of which is aimed at:

- the creation of an international, market-oriented and regulated business environment on the basis of the pilot reform to be implemented during a period of three to five years;

- the installation of a new and open economic system, the deepening of cooperation between Guangdong-Hong Kong-Macau;

- the creation of new advantages in international economic cooperation;

- the Park establishment of free trade with a regulated environment that meets the highest international standards for attracting investments and facilitates trade, which provides safe and efficient use of land resources.

The study determined the direction and development of the coastal areas of China. Percentage of National Total of Main Indicators of Economic and Social Development of Guangdong in 2017–2018 is presented in table 7.18.

Table 7.18

Percentage of National Total of Main Indicators of Economic and Social Development of Guangdong in 2017–2018

Item	2017			2018		
	Guang-dong	National Total	As Perce-ntage of Natio-nal Total	Guang-dong	National Total	As Perce-ntage of National Total
1	2	3	4	6	7	8
Population						
Permanent Population at the Year-end (10000 persons)	11169	139008	8,0	11346	139538	8,1
Land Area (10000 sp.km)	17,97	960	1,9	17,97	960	1,9
Gross Domestic Product(100 million yuan)	89705,23	820754,3	10,6	97277,77	900309,5	10,6
Primary Industry	3611,44	62099,5	5,8	3931,44	64734,0	5,9
Secondary Industry	38008,06	332742,7	10,7	40695,15	366000,9	10,8
Tertiary Industry	48085,73	425912,1	11,2	52751,18	469574,6	11,1
Per Capita Gross Domestic Product (yuan)	80932	59201	-	86412	64644	-
Output of Major Farm Products and Industrial Products						
Grain (10000 tons)	1208,56	66161,0	1,8	1193,49	65789,0	1,8
Oil-bearing Crops (10000 tons)	101,28	3475,2	2,9	106,25	3433,4	3,1
Meat (10000 tons)	444,08	8654,4	5,1	449,90	8624,6	5,2
Aquatic Products (10000 tons)	833,54	6445,3	12,9	842,44	6457,7	13,0
Fruits (10000 tons)	1538,70	25241,9	6,1	1669,20	25688,4	6,5
Tea (10000 tons)	9,29	246,0	3,8	9,99	261,0	3,8
Chemical Fertilizer (10000 tons)	77,06	6184,3	1,2	24,16	5424,4	0,4
Electricity (100 million kwh)	4407,20	66044,5	6,7	4369,60	71117,7	6,1
Cement (100 million tons)	1,58	23,4	6,7	1,63	22,1	7,4
Cloth (100 million m)	27,01	691,1	3,9	25,55	657,3	3,9
Machine-made Paper and Paperboard (10000 tons)	2177,74	12542,0	17,4	2028,88	11660,6	17,4
Steel (10000 tons)	4213,69	104642,1	4,0	4503,26	110551,7	4,1

Continuation of table 7.18

1	2	3	4	5	6	7
Sugar (10000 tons)	82,27	1472,0	5,6	263,29	1524,1	17,3
Flat Glass (10000 wt.cases)	9146,24	83765,8	10,9	10595,77	86863,5	12,2
Household Refrigerators (10000 units)	1556,37	8314,5	18,7	1628,45	7993,2	20,4
Household Washing Machines (10000 units)	749,62	7500,9	10,0	677,42	7150,7	9,5
Color Television Sets (10000 sets)	8399,88	15932,6	52,7	10758,27	18834,8	57,1
Room Air Conditioners (10000 sets)	5374,97	17861,5	30,1	6187,43	20486,0	30,2
Vehicles	321,06	2901,8	11,1	323,27	2781,9	11,6
Microcomputers (10000 units)	4338,56	30678,4	14,1	5248,95	30700,2	17,1
Investment in Fixed Assets						
Real Estate Development (100 million yuan)	12075,69	109798,5	11,0	14412,19	120263,5	12,0
Transport, Postal and Telecommunication Services						
Freight Traffic (100 million ton-kilometers)	28192,23	197373	14,3	28644,77	204686	14,0
Passenger Traffic (100 million personkilometers)	4140,29	32813	12,6	4501,97	34218	13,2
Volume of Freight Handled at Major Coastal Ports (10000 tons)	198015	1400700	14,1	211037	1435100	14,1
Total Business Volume of Postal and Telecommunication Services (100 million yuan)	6107,19	37320	16,4	11010,28	77901	14,7
Government Finance and Banking Local Public Budgetary Revenue (100 million yuan)	11320,35	91469,4	12,4	12105,26	97904,5	12,4
Local Public Budgetary Expenditure (100 million yuan)	15037,48	173228,3	8,7	15729,26	188198,3	8,4
Savings Deposits by Residents in Renminbi (100 million yuan)	61890,08	643768,0	9,6	69231,95	716038,0	9,7
Foreign Trade and International Tourism Total Exports (RMB 100 million)	42192,86	153309,4	27,5	42744,06	164176,7	26,0
Total Imports (RMB 100 million)	25976,00	124789,8	20,8	28901,67	140873,7	20,5
Foreign Direct Investment (USD 100 million)	229,07	1310,4	17,5	-	-	-
Foreign Direct Investment (RMB 100 million)	-	-	-	1450,88	8856,1	16,4
Total Foreign Exchange Earnings from	196,63	1234,2	15,9	205,12	1271,0	16,1
Total Amount of Retail Sales of Consumer Goods (100 million yuan)	38200,07	366261,6	10,4	39501,12	380986,9	10,4
General Consumer Price Index	101,5	101,6	-	102,2	102,1	-
General Retail Price Index	101,6	101,1	-	102,1	101,9	-
People's Livelihood Earnings of Urban Employed Persons (100 million yuan)	15511,55	129889,1	11,9	17717,16	141692,2	12,5
Per Capita Disposable Incom Permanent Households (yuan)	33003,29	25973,8	-	35809,90	28228,0	-

Continuation of table 7.18

1	2	3	4	5	6	7
Per Capita Disposable Income of Permanent Urban Households(yuan)	40975,14	36396,2	-	44340,97	39250,8	-
Per Capita Net Income of Permanent Rural Households (yuan)	15779,74	13432,4	-	17167,74	14617,0	-
Education, Science and Technology and Health Care Students Enrolled in Colleges and Universities (10000 persons)	192,58	2753,6	7,0	196,32	2831,0	6,9
Internal Expenditure on R&D (100 million yuan)	2343,63	17500	13,4	-	-	-
Number of Hospital Beds (10000 units)	49,21	794,0	6,2	51,70	840,4	6,2
Number of Medical Technical Personnel (10000 persons)	70,99	898,8	7,9	75,78	951,9	8,0

The analysis shows that in 2017–2018, Guangdong Province has seen an increase in population in the region, with no change in the size of its territories. There is an increase in gross domestic product. At the same time, the deceleration of trends in the industrial sector, where in most industries there is a decrease in production of production over the studied period, is identified. At the same time, there are active processes in the field of formation and use of Investment in Fixed Assets, which testifies to the investment attractiveness in Guangdong coastal region.

E-commerce Transactions in Commodities and Services of Guangdong in 2017 is presented in table 7.19.

Table 7.19

E-commerce Transactions in Commodities and Services of Guangdong in 2017

Item	2017	Growth Rate in 2017 over 2016 (%)
E-commerce transactions in commodities and services of Guangdong	37291,67	21,3
According to the Transaction Platform E-commerce Transaction Volume of Guangdong on the Local Platform	17293,15	12,6
E-commerce Transaction Volume of Guangdong not on the Local Platform According to the Transaction Object	19998,52	30,1
B2B+B2G	18453,09	11,0
B2C+C2C	18838,58	33,6
According to the Transaction Content		
Commodity	29883,71	19,0
Service	7407,96	32,0

In 2017, E-commerce Transactions in Commodities and Services of Guangdong is growing in the following areas:

- E-commerce transactions in commodities and services of Guangdong;
- According to the Transaction Platform E-commerce Transaction Volume of Guangdong on the Local Platform;
- E-commerce Transaction Volume of Guangdong not on the Local Platform
- According to the Transaction Object;
- B2B + B2G;
- B2C + C2C;
- According to the Transaction Content Commodity;
- According to the Transaction Content Service.
- E-commerce Transactions in Commodities and Services of Guangdong in 2018 is presented in table 7.20.

Table 7.20

E-commerce Transactions in Commodities and Services of Guangdong in 2018

Item	2018	Growth Rate in 2018 over 2017(%)
E-commerce transactions in commodities and services of Guangdong	48884,76	14,8
According to the Transaction Platform		
E-commerce Transaction Volume of	23435,15	8,3
Guangdong on the Local Platform		
E-commerce Transaction Volume of Guangdong not on the Local Platform	25449,61	21,5
According to the Transaction Object		
B2B+B2G	26025,38	8,7
B2C+C2C	22859,38	22,5
According to the Transaction Content		
Commodity	40147,91	14,5
Service	8736,86	16,0

Similar trends in E-commerce Transactions in Commodities and Services of Guangdong are observed in 2018.

The Main Indicators of Guangdong-Hong Kong-Macao Greater Bay Area (Maritime Regions) in 2018 are presented in table 7.21.

Table 7.21

2018 Main Indicators of Guangdong-Hong Kong-Macao Greater Bay Area (Maritime Regions)

Region	Land Area of Hong Kong (sq.m)	Gross Domestic Product			Per Capital GDP		
		Absolute (100 million yuan)	Absolute (USD 100 million)	Index (prece-ding year =100)	Absolu-te (100 million yuan)	Absolute (USD)	Index (prece-ding year =100)
Guangzhou	7249,27	22859,35	3454	106,2	155491	23497	103,1
Shenzhen	1997,47	24221,98	3660	107,6	189568	28647	103,2
Zhuhai	1736,46	2914,74	440	108,0	159428	24092	101,6
Foshan	3797,72	9935,88	1501	106,3	127691	19296	103,2
Huizhou	11347,39	4103,05	620	106,0	85418	12908	105,4
Dongguan	2460,08	8278,59	1251	107,4	98939	14951	106,6
Zhongshan	1783,67	3632,70	549	105,9	110585	16711	104,6
Jiangmen	9506,92	2900,41	438	107,8	63328	9570	107,2
Zhaoqing	14891,23	2201,80	333	106,6	53267	8050	105,8
Hong Kong Special Administ-rative Region	1106,7	28453	3630	103,0	381870	48721	102,2
Macau Special Administ-rative Region	30,8	4403,1	545	104,7	666893	82609	102,9

Region	Population at the Year-end (10000 persons)	Labour Force (10000 persons)	Container Throughput (10000 TEUs)	Total Exports and Imports (USD 100 million)	Total Exports (USD 100 million)	Total Imports (USD 100 million)
Guangzhou	1490,44	896,54	2192,21	1485,05	848,50	636,55
Shenzhen	1302,66	1050,25	2573,59	4539,23	2463,36	2075,86
Zhuhai	189,11	115,97	230,77	493,53	286,51	207,01
Foshan	790,57	440,91	399,49	697,66	535,60	162,06
Huizhou	483,00	290,33	43,42	505,58	334,62	170,96
Dongguan	839,22	667,17	355,95	2033,49	1204,42	829,06
Zhongshan	331,00	212,99	145,09	355,09	273,22	81,87
Jiangmen	459,82	247,13	151,37	223,19	170,35	52,84
Zhaoqing	415,17	225,30	75,05	59,04	35,99	23,05
Hong Kong Special Administrative Region	748,25	397,9	-	11327,74	5304,38	6022,96
Macau Special Administrative Region	66,74	39,2	13,86	126,71	15,10	111,61

In 2018, China's coastal regions (Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen, Zhaoqing, Hong Kong Special

Administrative Region, Macau Special Administrative Region) have seen an increase in gross domestic product and gross domestic product per capital.

It is worth noting the significant human capital base in the coastal regions of China and the excess of exports over imports in: Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen, Zhaoqing.

This indicates an increase in the own production capacity of most in coastal regions. At the same time, in Hong Kong and Macau Special Administrative Region, by contrast, imports exceed exports, indicating dependence on mainland China and other foreign destinations. This is due to the territorial features oin regions, as well as their limited spatial and resource support.

Thus, the analysis of the state and development of the coastal regions of China, which is determined by the growth of industrial and social potential, strengthening human capital, increasing the level of investment attractiveness. However, over the last year there has been a slowdown in the growth of key indicators of development, which is in line with the general tendency of functioning of the Chinese economy.

7.4 Mathematical modeling of the impact of factors on the gross domestic product in China's coastal regions

Mathematical modeling of the influence of factors on the gross domestic product in coastal regions of China is carried out in the following stages:

- formation of information and analytical support based on the data presented in the previous section;
- development of models of influence of factors on the gross domestic product in coastal regions of China;
- determining the degree of influence of factors on the use of correlation and determination coefficients;
- development of mathematical models of the influence of factors on the gross domestic product in coastal regions of China;

- application of criteria of adequacy of mathematical models (t – Student test (determines the level of reliability and completeness of the established connections);

- F – Fisher test (evaluates the level of relevance of the connections);

- interpretation of the results.

The information and analytical support provided determines the factors affecting the Gross Domestic Product Index (IGDP) in coastal regions of China:

- Population at the Year-end (10,000 persons) (P);

- Labor Force (10,000 persons) (LF);

- Container Throughput (10000 TEUs) (CT);

- Total Exports (USD 100 million) (E);

- Total Imports (USD 100 million) (Im);

- Hong Kong Land Area (sq.m) (LA).

Applying the information and analytical support provided and the defined areas of mathematical modeling, the models are constructed and the correlation coefficients (r) and determinations (R^2) are constructed.

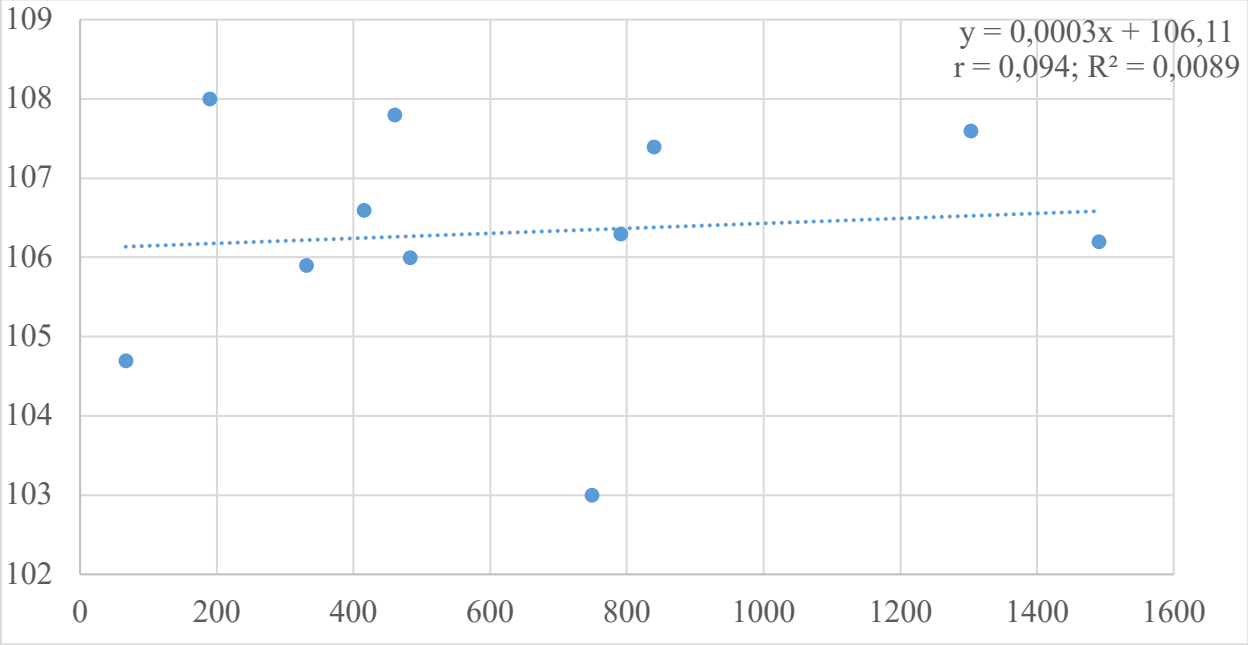

Fig. 7.1 – Mathematical Model (7.1) and Correlation and Determination Factors of Population Factor (P) and Gross Domestic Product Index (IGDP), rel. units

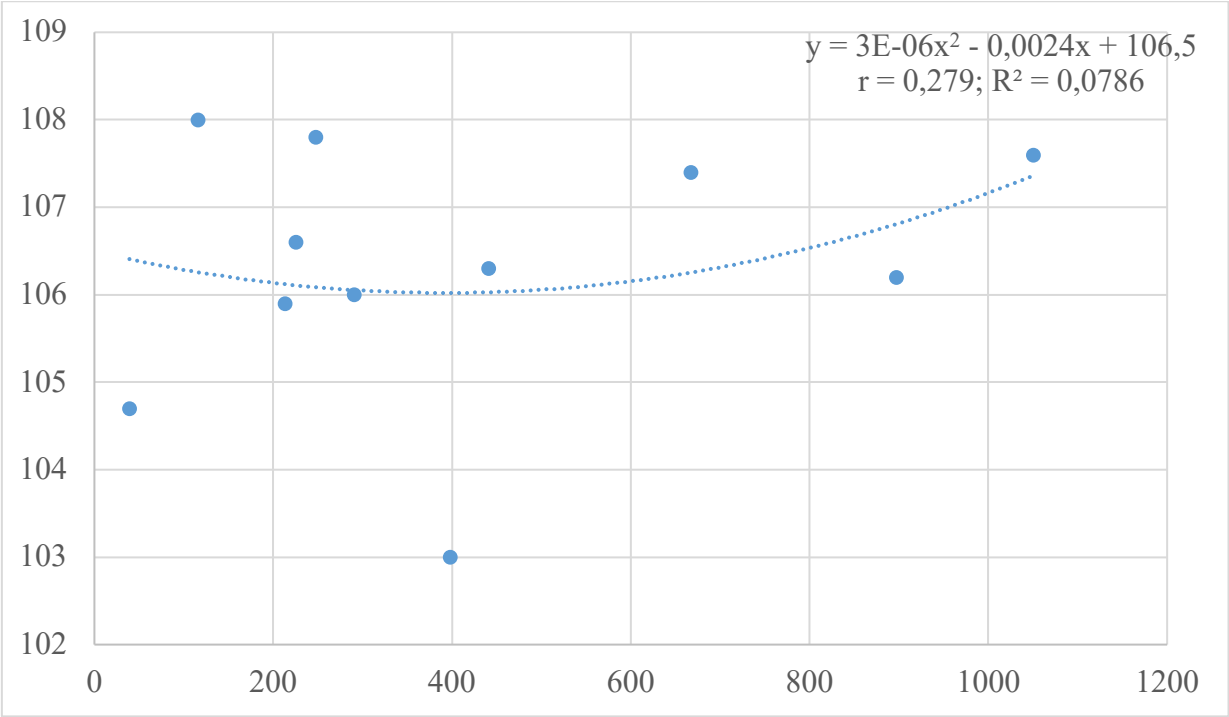

Fig. 7.2 – Mathematical Model (7.2) and Correlation and Determination Factors of Labor Force Factor (LF) and Gross Domestic Product Index (IGDP), rel. units

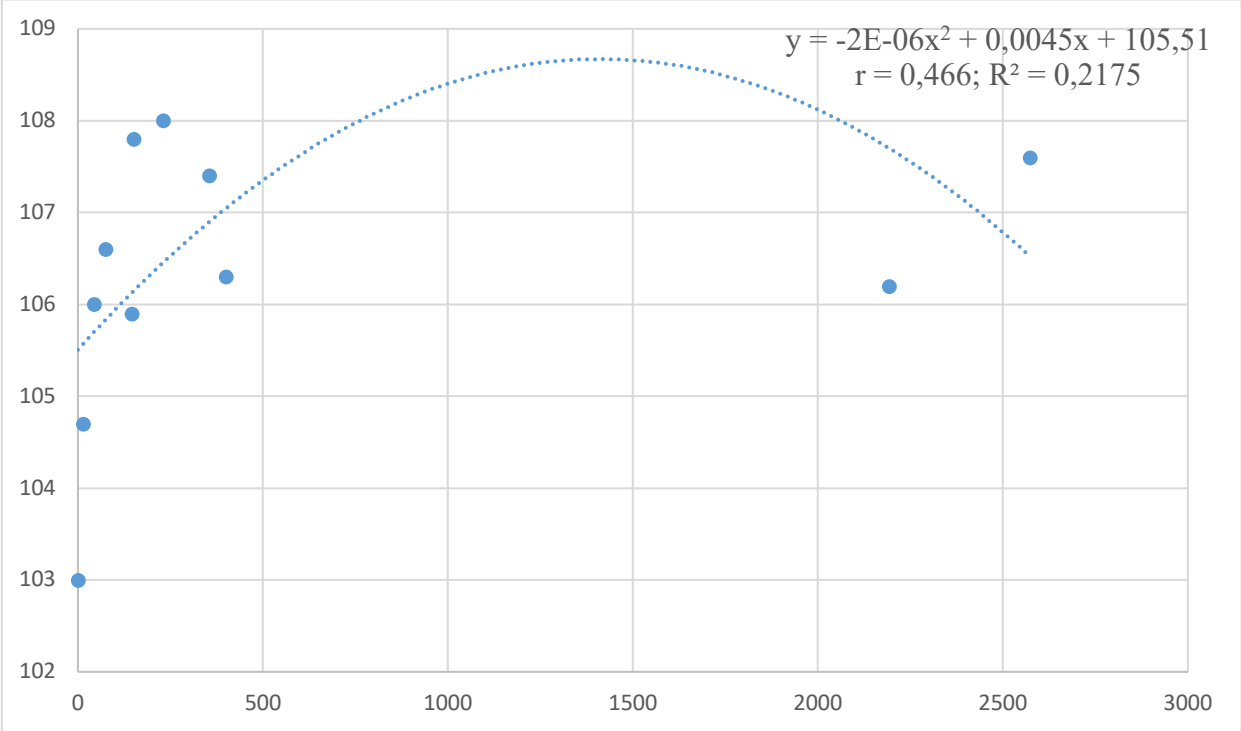

Fig. 7.3 – Mathematical model (7.3) and correlation coefficients and determinants of influence of container throughput factor (CT) and gross domestic product index (I_{GDP}), rel. units

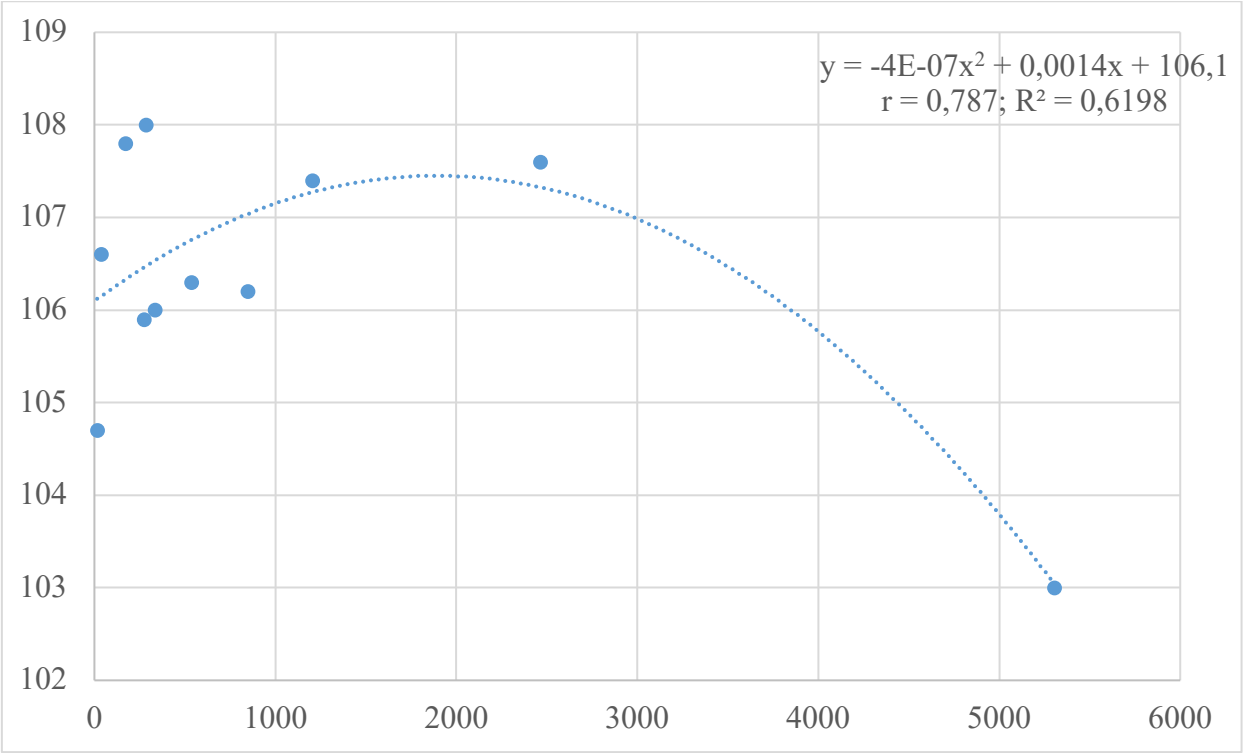

Fig. 7.4 – Mathematical model (7.4) and correlation coefficients and determinants of influence of export operations factor (E) and gross domestic product index (I_{GDP}), rel. units

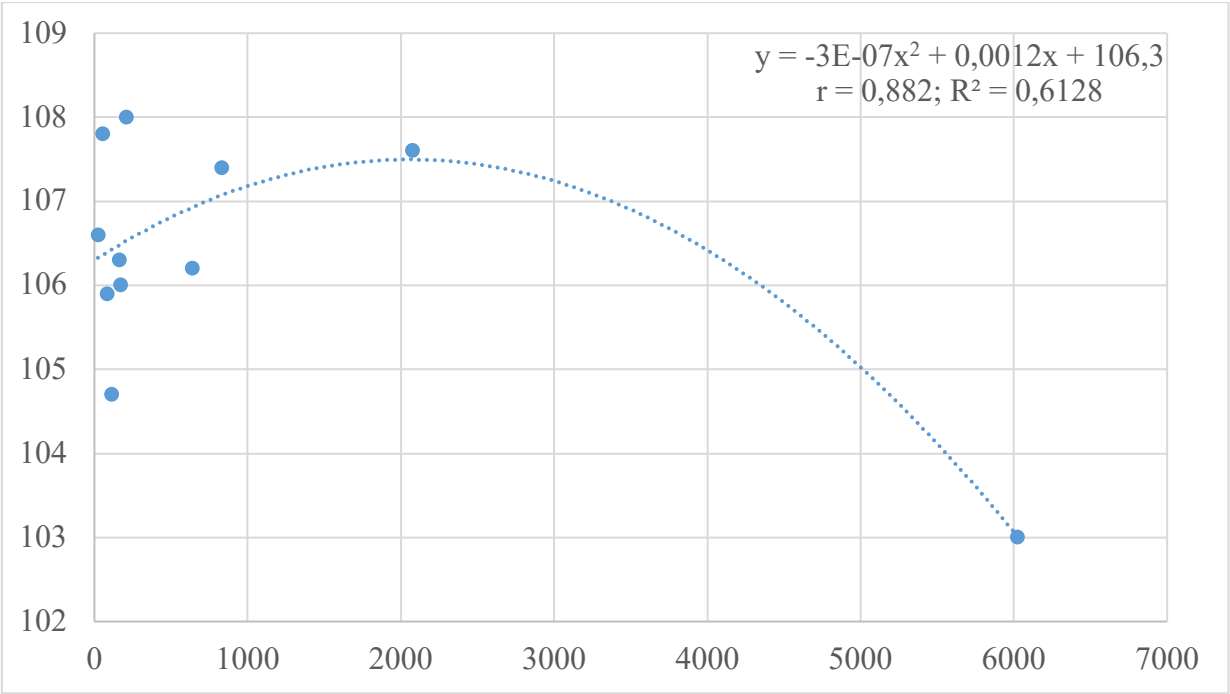

Fig. 7.5 – Mathematical model (7.5) and correlation coefficients and determinants of influence of factor of import operations (I) and gross domestic product index (I_{GD}), rel. units

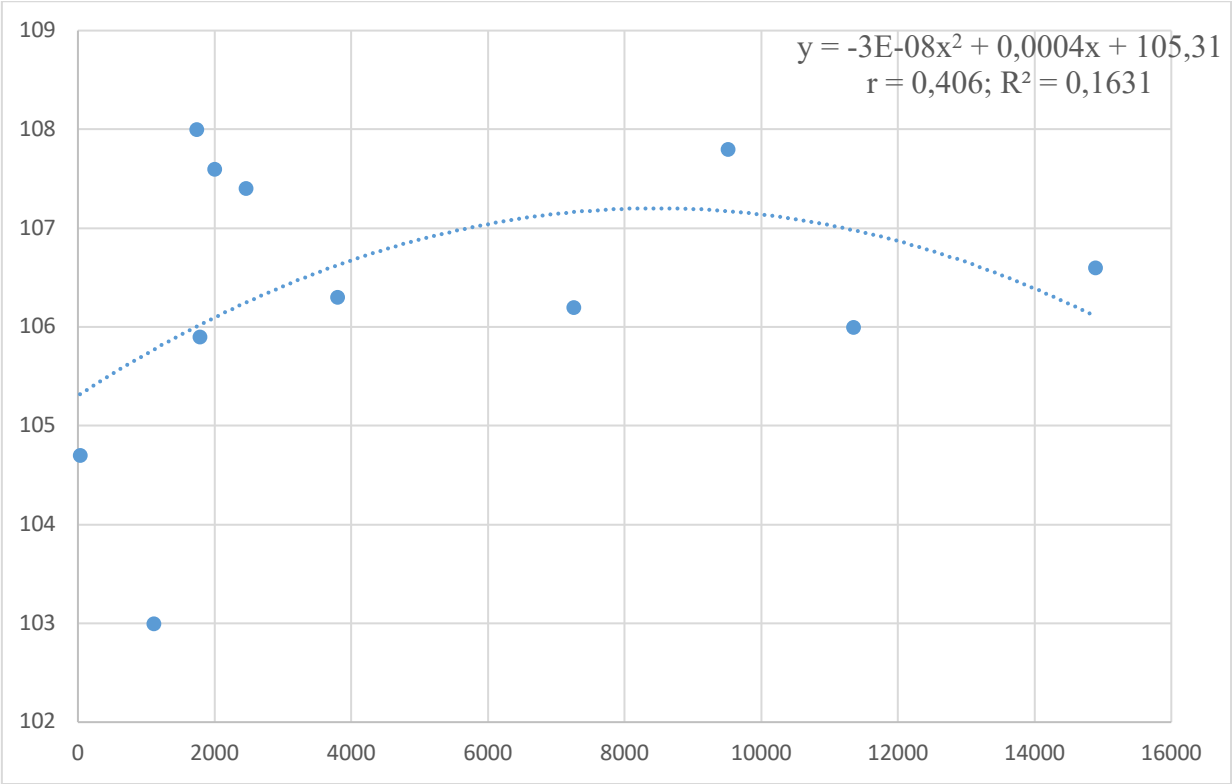

Fig. 7.6 – Mathematical model (7.6) and correlation coefficients and determinants of influence of territory area factor (LA) and gross domestic product index (I_{GD}), rel. units

The results of the evaluation of the adequacy criteria of the mathematical models (t-Student test and F-Fisher test are presented in table 7.22.

Table 7.22

Results of the evaluation of the adequacy criteria of mathematical models (t – Student's t test and F – Fisher's test, rel. units

Mathematical models	Calculated t – Student's test and F – Fisher's test	Normative t – Student's test and F – Fisher's test at a significance level of 0.05
1	2	3
Model (6.1)	$t_{f1} = 1,32$ $t_{fv} = 1,19$ $F_f = 2,21$	$t_n = 2,23$ $F_n = 4,84$
Model (6.2)	$t_{f1} = 1,14$ $t_{f2} = 0,63$ $t_{fv} = 0,13$ $F_f = 1,12$	
Model (6.3)	$t_{f1} = 2,44$ $t_{f2} = 2,28$ $t_{fv} = 2,25$ $F_f = 4,92$	

Continuation of table 7.22

1	2	3
Model (6.4)	$t_{f1} = 4{,}67$ $t_{f2} = 3{,}26$ t_{fv}= 3,01 F_f=7,88	
Model (6.5)	$t_{f1} = 4{,}71$ $t_{f2} = 3{,}34$ t_{fv}= 3,02 F_f=7,91	
Model (6.6)	$t_{f1} = 2{,}3$ $t_{f2} = 2{,}26$ t_{fv}= 2,28 F_f=4,97	

The study found that export-import operations have a significant impact on the formation of the Gross Domestic Product (IGDP) of China's coastal regions, creating the conditions for the development of these territories. At the same time, the low level causes the formation of the gross domestic product of the creation and use of human capital (Population at the Year-end (10000 persons) (P); Labor Force (10000 persons) (LF). China's Container Throughput (10000 TEUs) (CT) and Spatial Formation Factor of the Land Area of Hong Kong (sq.m) (LA), the adequacy criteria of mathematical models indicate the reliability and completeness of the established relationships of the Gross Domestic Product Index with factors (throughput Container capacity (CT), EXPORT (E) and import (I) operations area area (LA). is inadequate mathematical models (7.1) and (7.2).

Thus, on the basis of the analysis of the state and development in coastal regions of China, the trends of their development are determined, which are caused by an increase in the gross domestic product index due to the growth and influence of the factors of container throughput (CT), export (E) and import (I) operations, Area Areas (LA), development of Internet resources and electronic technologies, E-commerce Transactions in Commodities and Services. At the same time, this process reduces the value of human capital, which requires measures to increase the efficiency of its formation and use.

CONCLUSION

It has been solved the urgent scientific and practical problem of determining the directions for ensuring the territorial development of land use in coastal regions, taking into account the influence of spatial, urban, investment and environmental factors. As the result the following conclusions and suggestions have been received:

1. The systematization of theoretical and methodological provisions, a definition of the territorial development of land use in coastal regions has been proposed and characterized as a combination of spatial, urban, investment and environmental factors, which interaction leads to the achievement of a qualitatively new state of land relations comparing to the past, taking into account social, institutional, managerial features and the level of interaction of stakeholders operating in the field of land use in regions.

2. On the base of the provided regulatory, it has been proposed to form a group of factors: spatial, urban, investment and environmental. The groups of factors are determined that allow you to build a system of indicators for assessing the territorial development of land use in regions and form; the contours of the functioning of the regional system of development of land relations; catalysts for building information and analytical support for the territorial development of land use in the region, based on the principles of completeness and reliability; dominating directions for solving the problem of increasing the efficiency of land use for the territorial development in regions; problematic aspects occurring in the sphere of land relations and characterize the level of destruction of the traditional land use model; directions for the introduction of modern land use models to ensure the territorial development in regions; methodological aspects that allow combining the positive directions of the existing theoretical and methodological approaches and developing a comprehensive toolbox for the implementation of modern methods and models for ensuring the territorial development of land use in regions; scientifically substantiated directions of the territorial development of the region arising from the internal nature of land relations, their technical and technological levels and the

prevailing social and economic relations, taking into account the environmental features of functioning.

3. It has been identified the transformation processes occurring in the area of territorial development of land use in coastal regions. It is characterized by information and analytical support, land inventory results, directions of their distribution, taking into account the economic, environmental and social aspects in regional development, improvement and implementation of the legal support for the territorial development of land use in regions. The need for a systematic approach and a system of land administration to identify areas of land use has been identified. As a result of the analysis of international experience it has been identified the directions and features of the territorial development of the use of land in regions where special attention is focused on modern tools and the possibilities of representation in 2D and 3D in the formation of cadastral information, creates the information basis for territorial development.

4. It has been determined the methods that are used in the system of territorial development of land use in regions in accordance with the functional areas (expert examination of the ecological and state of land use, field research, their processing, the formation of information support on the environmental state and level of land use, determination of spatial, urban, environmental and investment indicators and their modelling). To assess the influence of factors on territorial development, methods of correlation and regression analysis, mathematical modelling, and hierarchy analysis have been used. The proposed models allow us to determine the organizational direction of the territorial development of land use in regions, taking into account spatial, urban, environmental and investment factors, evaluate their quantitative impact, and offer tools for their integrated development assessment. An approach is not proposed in the system for assessing the territorial development of land use in regions, comprehensively takes into account the influence of spatial, urban, investment and environmental factors, and allows developing a methodological approach for integrated assessment to determine a general indicator. Therefore, the solution of the presented scientific and practical

problem for a comprehensive assessment of the territorial development of land use in regions are defined as the directions of further research.

5. Methods and models have been implemented on the basis of tools for the formation of the territorial development of land use in coastal regions: geodetic and photogrammetric and other measuring equipment, stationary and mobile software for software systems, methods of generating information support for factors affecting the territorial development of land use in coastal regions.

6. A multilevel system of factors influencing the territorial development of land use in regions has been built. It consists of three levels, which form a hierarchy of factors and allows to determine the level of their influence for the implementation of integrated assessment. The multilevel system takes into account a wide range of spatial, urban, investment and environmental factors that affect the territorial development of land use in regions.

7. It has been defined the criteria that allow the selection of factors influencing the formation and implementation of territorial development of land use and form an information and analytical basis for the development of a methodological approach to integrated assessment.

8. It is offered the system of spatial, urban, investment and environmental indicators of integrated assessment of territorial development of land use in regions, which allows forming a quantitative basis for its provision on the basis of relevant guidelines.

9. The criteria of estimation of spatial, town-planning, investment and ecological indicators by application of analytical and methods of expert estimations allowing to form models and to define the corresponding integral factor influencing the general indicator of territorial development of land use in regions are offered.

10. As a result of research it has developed the methodological approach to an integrated estimation by use of a complex of interconnected stages, methods and models on the basis of which the estimation basis for territorial development of use of lands in regions, acceptance of the proved decisions according to formation and realization of spatial, town-planning, investment.

11. The directions of spatial selection, town-planning, investment and ecological indicators of territorial development of use of lands in regions are offered, restrictions (to 5 indicators) and criteria have been defined. This allowed forming the basis for the implementation of a methodological approach to integrated assessment of territorial development of land use in regions.

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ANNEX

Annex A

Theoretical and methodological approaches to the definition of the category of «development»

Table A.1

Theoretical and methodological approaches to the definition of the category of «development»

№	The name of the approach	Author (s)	Characteristic approach	Advantages	Disadvantages
1	2	3	4	5	6
1.	Evolutionary	I. Ansoff, A. Gaponenko, D. Joy-Matthews, D. Megginson, M. Surte, Zabrodsky, L. Zabrodska, D. Evdokimova, A. Yvin, I. Kondrashin, V. Konstantinov, Y. Maslechenkov, S. Mochernii, M. Ozhegov, N. Shvedova, V. Stepin, A. Toynbee	consists in defining the concept of «development» from the position of achieving a qualitative new state of the system compared to the past, taking into account quantitative and qualitative changes in the long term that occur under the influence of external and internal factors and do not go beyond the internal essence of the presented system	allows certain evolutionary directions that allow for the development of the system	difficulties arise in the formation of information and analytical support for the formation of development directions and the determination of its structural elements. In addition, there are no clear criteria for determining development within the framework of the presented approach.
2.	Functional	S. Dunda, V. Ilyin, Y. Kulagin, Y. Pogorelov, V. Ponomarenko, O. Tridid, M. Kizim, E. Smirnov	the concept of “development” is defined under the prism of its functional characteristics of the directions of its formation, given	clear directions are determined that ensure the development of the system in modern conditions	low level of substantiation of theoretical provisions for determining indicators of quantitative assessment of system development

Continuation of table A.1

1	2	3	4	5	6
			the current aspects of the functioning of the system		
3.	Sociable	T. Parsons, N. Chernysh	consists in determining the development based on the account of the mutual-son and the characteristics of the interaction between people and various social groups	allows you to determine the social aspects of the development of the system	difficulties arise in the theoretical and methodological substantiation of the directions of formation of development, given the social conditions.
4.	Factorial	A. Bakaev, V. Gritsenko, L. Bazhan, L. Bakaev, K. Beaver, L. Melnik, L. Shilo, S. Zavalnyuk	Within the framework of the approach, the characteristics and factors that influence the formation of the development of systems are determined: movement (advancement) from simple to complex; the presence of changes of various economic nature; transition from one state to another; increase in the scale of the phenomenon (quantitative growth) structure improvement (qualitative improvement);	allows you to form a theoretical and methodological basis for a quantitative assessment of development	difficulties arise regarding the completeness of the determination of characteristics and factors affecting the formation of development.

Continuation of table A.1

1	2	3	4	5	6
			course under the influence of various factors, needs, interests, economic super-transcendental; irreversibility; focus; regularity; spasms, cyclicity; long term nature; improving adaptability to external changes; orderliness; the active role of internal mechanisms of self-organization; investment; innovative; technical; technological		
5.	An approach where attention is focused on the cyclical aspects of system development	V. Vasilenko	consists in determining the development through the prism of cyclical changes that occur in the system	within the framework of the presented approach, changes that are continuous and cyclical in nature are revealed. In addition, an important characteristic of development is indicated - the permanence	requires considerable attention to the rationale for determining the parameters of the cycles that mark the development of the system.

Continuation of table A.1

1	2	3	4	5	6
				of changes and their continuity	
6.	System	M. Bogira, M. Degree, D. Gvishiani, I. Dorosh, A. Dorosh, A. Kovtun, I. Mosiyuk, S. Mosiyuk, V. Pinchuk, I. Sidorenko, E. Seraya, N. Tkachenko	lies in the fact that development is considered as a system category, consisting of interacting subsystems, which include: contradictions; stages and steps; reversible and irreversible processes; progressive growth; internal factors. The necessity of building a system to ensure the development of land relations through the unity and logical sequence of methodological approaches is determined; geographical determinism; taking into account regional climatic, economic, social and other	allows us to consider the process of formation of development as a system that includes interacting elements	difficulty in forming and determining the elements of the system.

Continuation of table A.1

1	2	3	4	5	6
			conditions; preparation of design solutions from national to regional and local levels		
7.	Institutional	Yu. Bilyk, V. Leonets, V. Boklag, P. Gerliga, A. Danilenko, A. Evgrafov, P. Kulinich, M. Latynin, G. Shary, L. Novakovsky, A. Tretyak, D. Dobryak, V. Peresolyak, S. Povazhny, A. Shaporenko, N. Tretyak	characterized by the functioning directions of organizations, state institutions, local governments, ensuring the development of land relations	allows you to determine the directions and characteristics of the interaction of organizations, government agencies, local self-governments, affecting the development of land relations	it is limited in nature and does not take into account other stakeholders that affect the development of land relations, in particular, financial institutions.
8.	Managerial	I. Bystryakov, T. Bukhalsky, L. Velikhov, J. Williamson, With Enemark, V. Gorlachuk, V. Vyun, A. Sokhnich, A. Damashke, S. Demyanenko, D. Dobryak, D. Babmindra, V. Dudar, A. Kireytseva, A. Konik, Y. Kulakovsky-cue, K. Lemmen, A. Martin, A. Mikhailovskiy, A. Petra-Kowski, A. Popov, V. Rudenko, M. Degree, R. Gulko, A. Mikula, V. Totomyants,	determined by the directions and features of land relations management, the growth of the effectiveness of the implementation of which affect and ensure development. Within the framework of the presented approach, the development of a land administration system is of particular importance, which allows	the advantages of the approach are the justification of land relations management directions to ensure development	the complexity of ensuring the completeness of information and analytical support for determining areas of land relations management, which will ensure development.

Continuation of table A.1

1	2	3	4	5	6
		M. Fedorov, A. Shaporenko, N. Shpik, V. Shipulin	you to combine the main functions that affect the development of land relations: the formation, distribution, assessment and use of land		
9.	Stakeholder	A. Ammar, M. Greek, R. Gudiyk, P. Dunselmee, T. Donaldson, M. Jensen, A. Tooth, D. Mitchell, L. Preston, A. Sakal, E. Freeman, E. Sterndock, Laws of Ukraine «On Land Management» dated 05.22.2003, № 858-IV, «On Voluntary Association of Territorial Communities» dated 05.02.2015, № 157-VIII, «On Regulation of Urban Planning» dated 02.17.2011, № 3038-VI, «On the valuation of property, property rights and professional valuation activities in Ukraine» dated 12.07.2001, № 2658-III, the Law of Ukraine «On the State Land	characterized by a system of interaction of stakeholders, ensuring the development of land relations	allows you to determine the groups of stakeholders that affect the development of land relations, to identify the level of effectiveness of their interaction	difficulties arise in the formation of information and analytical support for determining the interaction and level of mutual influence of stakeholders in ensuring the development of land relations.

Continuation of table A.1

1	2	3	4	5	6
		Cadastre» dated 07.07.2011 year № 3613-VI, Resolution of the Cabinet of Ministers of Ukraine «On Urban Planning Cadastre» dated 05.25.2011 № 559			

Annex B

Regulatory support of the territorial development of land use in the region

Table B.1

Description of the main provisions of the Law of Ukraine «On stimulating the development in regions» [314]

The main sections of the Law of Ukraine	Characteristic
1	2
The purpose and principles of stimulating the development in regions	Stimulation of regional development is carried out in order to: ensuring their sustainable development in the interests of all of Ukraine, raising the standard of living of the population, overcoming poverty and unemployment, the formation of the middle class; effective use of economic, scientific, labor potential, natural and other resources, as well as the characteristics of the regions to achieve on this basis an increase in the standard of living of people, the optimal specialization of the regions in the production of goods and services; creation of equal conditions for a dynamic, balanced socio-economic development in regions of Ukraine; ensuring compliance with state guarantees of social guarantees for each citizen, regardless of place of residence; overcoming the depressive state of certain territories, timely and comprehensive solution of environmental problems. Stimulation of regional development is carried out on the basis of: balancing national, regional and local development interests, determining by the state, taking into account the proposals of local authorities, scientifically based priority areas for regional development; program-targeted approach to solving problems of socio-economic development, creating a favorable investment environment in regions; maximum approximation of services by state bodies and local governments to the consumers of these services; concentration on a competitive basis of the funds of the State budget of Ukraine, local budgets, as well as other resources in order to achieve the most efficient use of them for regional development purposes; cooperation and mutual responsibility of central and local executive authorities, local governments, scientific and public organizations and other entities in the implementation of regional development tasks.
Organization of state support stimulation of regional development	State stimulation of the development of regions is carried out in accordance with the foundations of the state regional policy, laws on the State Budget of Ukraine, state programs, other laws and legislative acts of Ukraine, as well as economic and social development programs of the Autonomous Republic of Crimea, regions, cities of Kiev and Sevastopol, local budgets. The implementation of state policy to stimulate the development of regions is provided by the Cabinet of Ministers of Ukraine, the central executive body, which ensures the formation of state regional policy, other central and local executive authorities and local governments in accordance with their powers.

Continuation of table B.1

1	2
Depressed territory	Depressive territories are divided into the following groups: region, industrial region, rural area, city of regional, republican significance in the Autonomous Republic of Crimea. The territory is given the status of depressive in order to create legal, economic and organizational foundations for the adoption by state bodies and local authorities of special measures to stimulate the development of such territories. In order to stimulate the development of depressive territories within their limits, the following measures can be taken: target direction of state capital investments in the development of production, communication and social infrastructure; providing state support, including financial support, to small enterprises, facilitating the formation of infrastructure for entrepreneurship development, such as business centers, business incubators, innovation and consulting centers, venture capital funds, etc. sending international technical assistance to solve pressing socio-economic and environmental problems, as well as the implementation of other major activities; promoting employment, providing targeted funding for retraining and professional development of labor resources, stimulating labor migration, improving the social sphere, in particular housing construction, healthcare and environmental protection; providing other state support for the development of such territories. The main principles of state stimulation of the development of depressed territories include: objectivity and openness in determining territories for state stimulation of their development; simultaneous concentration of efforts and resources in a relatively small number of territories in order to achieve maximum socio-economic development; the inadmissibility of using targeted state support to finance the current needs of the territories; maximum use of the capabilities of the territories themselves in the development and implementation of a system of measures to overcome depression. Depressive may be recognized: 1) a region in which over the past five years the average rate of gross regional product (until 2004 - gross value added) per person is the lowest; 2) an industrial region in which over the past three years the registered unemployment rate and the share of people employed in industry are much higher, and the volume of industrial products (work, services) sold per person and the average monthly wage are significantly lower than the corresponding average indicators for the development of the territories of this group; 3) a rural area in which over the past three years the density of the rural population, the rate of natural population growth, the level of average monthly wages and the volume of agricultural products (work, services) sold per person are significantly lower, and the share of people employed in agriculture is much higher than the corresponding average indicators of the

Continuation of table B.1

1	2
	development of the territories of this group; 4) a city of regional, republican significance in the Autonomous Republic of Crimea, in which over the past three years the level of registered, in particular long-term, unemployment is much higher, and the average monthly wage is significantly lower than the corresponding average indicators for the development of the territories of this group; 5) the locality on the territory of which coal mining and coal processing enterprises were liquidated since 1996, but the measures to resolve socio-economic and environmental issues stipulated by the liquidation projects of these enterprises have not been fully implemented. The program for overcoming territory depressiveness provides, in particular: a brief description of the depressed territory, an analysis of the causes of the depressive state; measures of central and local executive authorities, local authorities to overcome the state of depression of the territory, the time period for their implementation, the amount of funding from state, local budgets and other sources provided by law; the procedure for monitoring the implementation of the program, development indicators by which the results of its implementation will be determined; general assessment of the expected socio-economic effectiveness of the program. The program for overcoming depressive territory is approved by the Cabinet of Ministers of Ukraine.
Development Incentive Financing regions and overcoming depression territories	Financing of stimulating the development of regions and overcoming depressive territories is carried out at the expense of the funds provided for these purposes in the laws of Ukraine on the State budget and decisions on local budgets (Autonomous Republic of Crimea, regional, city cities of regional (republican - Autonomous Republic of Crimea) values and district budgets) for relevant years, and other sources in accordance with the law. The amount of funding for the implementation of agreements on regional development and the implementation of programs to overcome the state of depression in the territories is annually provided for in the draft State Budget of Ukraine and decisions on local budgets by relevant budget programs. The financial support for the implementation of agreements on regional development and the implementation of programs to overcome the state of depression in the territories, if necessary, is updated annually after the entry into force of the Law of Ukraine on the State Budget of Ukraine for the corresponding year and approval of the relevant local budgets. The main managers of the State Budget of Ukraine allocated to stimulate the development of regions and to overcome the depressive territories is the central executive body, which ensures the formation of state regional policy, and other central executive bodies. When determining the amount of funds intended to stimulate the development of regions and to overcome the depressiveness of territories, the sums of equalization subsidies and subventions allocated to the fulfillment by local authorities of their own and statutory powers of the executive authorities, as well as funds allocated in accordance with legislation to eliminate the consequences, are not taken into account environmental emergencies, man-made disasters and natural disasters.

Continuation of table B.1

1	2
Organization of control and reporting	The central executive authority, which ensures the formation of state regional policy, annually in April of the year following the reporting one, submits for consideration by the Cabinet of Ministers of Ukraine a report on the implementation of regional development agreements and programs for overcoming depressive territories, and the use of funds allocated for these purposes from the State Budget of Ukraine.

Table B.2

Principles, priorities and directions for the implementation of state regional policy affecting territorial development [304]

Principles, priorities and directions for the implementation of state regional policy	Characteristic
1	2
Principles	1) legality - compliance with the Constitution and laws of Ukraine, international treaties, the consent of which is provided by the Verkhovna Rada of Ukraine; 2) cooperation - coordination of goals, priorities, tasks, activities and actions of central and local executive authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, executive authorities of the Autonomous Republic of Crimea, local governments, ensuring cooperation between them in the formation and implementation of state regional policy; 3) parity - ensuring equal opportunities for access of regional policy objects to the resources of state financial support for regional development; 4) openness - ensuring free access to information, determines the state regional policy and disposes of state authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, executive authorities of the Autonomous Republic of Crimea and local authorities; 5) subsidiarity - the transfer of power to the lowest level of government for the most effective implementation; 6) coordination - interconnection and coherence of long-term development strategies, plans and programs at the regional and local levels;

Continuation of table B.2

1	2
	7) unitarity - ensuring the spatial, political, economic, social, humanitarian integrity of Ukraine; 8) historical continuity - taking into account and maintaining the positive achievements of the previous development of the regions; 9) ethnocultural development - the revival of ethnic identity and the preservation of the spiritual and material culture of ethnic groups, the promotion of the development of their ethnic, cultural, linguistic and religious identities; 10) sustainable development - the development of society to meet the needs of the current generation, taking into account the interests of future generations; 11) objectivity - the development of all documents that determine the state regional policy on the basis of real indicators that can be achieved and can be estimated.
Priorities	1) stimulation and support of local initiatives for the effective use of the internal potential of the regions to create and maintain a full-fledged living environment, improving the quality of life of people; 2) reduction of territorial differentiation by the regional human development index; 3) the formation of regional competitiveness through the development and implementation of programs and projects to increase the competitiveness of territories; 4) stimulation of interregional integration, integration of regional economic, informational, educational spaces into a single all-Ukrainian space, overcoming interregional alienation; 5) the identification of problem areas in the regions and the implementation of government measures to solve problems; 6) the creation of an effective system of environmental protection by taking into account the environmental component in regional development strategies, assessing, leveling and reducing the technogenic and environmental load on the environment in the regions; 7) the introduction of effective instruments of state support for interregional integration, the implementation of interregional programs and

Continuation of table B.2

1	2
	projects;
	8) the formation, on the basis of documents of the Council of Europe and the European Union, of the regulatory framework necessary for the implementation of the state regional policy defined by this Law; 9) improvement of material, financial, informational, personnel and other resource support for the development of regions, assistance to the exercise of powers by local authorities; 10) the creation of effective mechanisms for representing the interests of regions at the national level and territorial communities - at the regional level.
Implementation of state regional policy	State regional policy is implemented on the basis of an appropriate strategy, which includes: 1) trends and main problems of socio-economic development of regions 2) the priorities of state regional policy for the corresponding period; 3) strategic goals and directions of regional development and interregional cooperation; 4) operational goals that will ensure the achievement of strategic goals; 5) the main tasks, stages and mechanisms for their implementation; 6) a system for monitoring and evaluating the effectiveness of the implementation of the State Strategy for the Regional Development of Ukraine. The action plan for the implementation of the State Strategy for Regional Development is determined by: an action plan for the implementation of the State Strategy for Regional Development of Ukraine is developed in accordance with the State Strategy for Regional Development of Ukraine and approved by the Cabinet of Ministers of Ukraine. The action plan for the implementation of the State Strategy for Regional Development of Ukraine is developed for a period of three years and the next four years of the period of the State Strategy for Regional Development of Ukraine; The development of the Action Plan for the implementation of the State Strategy for

Continuation of table B.2

1	2
	Regional Development of Ukraine is carried out by the central executive body, which ensures the formation of the state regional policy, together with other central executive bodies in the manner established by the Cabinet of Ministers of Ukraine; the action plan for the implementation of the State Strategy for Regional Development of Ukraine provides for tasks and activities, the volumes and sources of their financing with the identification of indicators for assessing the effectiveness of their implementation. Regional development strategies must comply with the provisions of the State Strategy for Regional Development of Ukraine and determine: 1) trends and main problems of socio-economic development of the Autonomous Republic of Crimea, regions, cities of Kiev and Sevastopol; 2) strategic goals, development priorities of the region for the corresponding period; 3) operational goals that will ensure the achievement of strategic goals; 4) the main tasks, stages and mechanisms for their implementation; 5) a system for monitoring and evaluating the effectiveness of the implementation of the regional development strategy. The development of regional development strategies is carried out taking into account the development strategies of cities, towns and villages, the priority development of depressed territories, strategic development priorities of the regions of the corresponding region. The Council of Ministers of the Autonomous Republic of Crimea, regional, Kiev and Sevastopol city state administrations: 1) report through the media about the start of work on the draft regional development strategy and determine the period and form for submitting proposals for regional development entities; 2) conduct (if necessary) consultations with regional development entities to coordinate positions; 3) publish a report on the results of consideration of proposals of regional development entities in the draft regional

Continuation of table B.2

1	2
	development strategy. The implementation of regional development strategies is carried out through the development and implementation of action plans for the implementation of regional development strategies, which are specified in the programs of economic and social development of the Autonomous Republic of Crimea, regions, regions, cities. The development of action plans for the implementation of regional development strategies is carried out by the Council of Ministers of the Autonomous Republic of Crimea, regional, Kiev and Sevastopol city state administrations to implement regional development strategies in the manner determined by the Cabinet of Ministers of Ukraine. Action plans for the implementation of regional development strategies are developed for a period of three years and the next four years of the regional development strategies. The action plans for the implementation of regional development strategies are approved respectively by the Verkhovna Rada of the Autonomous Republic of Crimea, regional, Kiev and Sevastopol city councils. The action plan for the implementation of the regional development strategy provides for measures, volumes and sources of financing with identification of performance indicators for their implementation and is the basis for the development of investment programs (projects) aimed at the development of regions. The mechanisms for financing state regional policy are: inter-budget transfers from the state budget to local budgets; combining on a contractual basis the financial resources of regional policy entities, public and private partners on the principles of public-private partnerships, international organizations; capital expenditures of the state budget; state targeted programs, including programs for overcoming depressive territories; regional development agreements; programs and activities, including investment programs (projects), implemented at the

Continuation of table B.2

1	2
	expense of the state fund for regional development. Sources of financing state regional policy are: 1) funds of the State budget of Ukraine, in particular the state fund for regional development; 2) funds of local budgets; 3) charitable contributions; 4) funds of international organizations; 5) funds from other sources not prohibited by law.

Table B.3

Description of the main provisions of the Law of Ukraine «On the voluntary association of territorial communities» [302]

The main sections of the Law of Ukraine	Characteristic
1	2
Principles of voluntary association of territorial communities	Voluntary association of territorial communities of villages, towns, cities is carried out in compliance with the following principles: 1) constitutionality and legality; 2) voluntariness; 3) economic efficiency; 4) state support; 5) the ubiquity of local government; 6) transparency and openness; 7) responsibility.
Subjects of voluntary association of territorial communities	The subjects of voluntary association of territorial communities are adjacent territorial communities of villages, towns, cities. The united territorial community, the administrative center of which is defined by the city, is the urban territorial community, the center of which is defined as a village, the center of which is defined as a rural village.
Basic conditions for voluntary association of territorial communities	Voluntary association of territorial communities of villages, towns, cities is carried out subject to the following conditions: 1) another territorial community cannot exist in the united territorial community, has its own representative body of local self-government; 2) the territory of the united territorial community must be inextricable, the boundaries of the united territorial community are determined by the external borders of the jurisdiction of the councils of territorial communities, united; 3) the united territorial community should be located within the territory of the Autonomous Republic of Crimea, one region; 4) when making decisions on voluntary unification of territorial communities, historical, natural, ethnic, cultural and other factors affecting the socio-economic development of the united territorial community are taken into account; 5) the quality and accessibility of public services in the united territorial community cannot be lower than to the association. The administrative center of the united territorial community is determined

Continuation of table B.3

1	2
	by the settlement (village, town, city), which has a developed infrastructure and, as a rule, is located closer to the geographical center of the territory of the united territorial community. Voluntary association of territorial communities does not lead to a change in the status of settlements as rural or urban areas. The name of the united territorial community, as a rule, is derived from the name of the settlement (village, town, city) defined by its administrative center
The procedure for voluntary association of territorial communities	includes stages: initiating voluntary association of territorial communities; determining the procedure for preparing draft decisions on the voluntary association of territorial communities; preparation of decisions on voluntary association of territorial communities, which consists of: 1) a list of territorial communities, are combined, indicating the relevant settlements; 2) determination of the administrative center of the united territorial community and its name; 3) an organizational plan for the voluntary association of territorial communities; rural, township, city mayors provide for 60 days of mandatory public discussion (public hearings, meetings of citizens, other forms of public consultations) of draft decisions prepared by a joint working group on voluntary association of territorial communities, as a result of which rural, township, mayors introduce a question about its approval for consideration of village, town, city councils; the issue of approving a draft decision on the voluntary association of territorial communities is considered by village, town, city councils within 30 days from the date of its submission for consideration and taking into account the results of public discussion; draft decisions on the voluntary association of territorial communities were approved by the village, town, city councils within five days and sent to the Council of Ministers of the Autonomous Republic of Crimea, the regional state administration to give an opinion on the conformity of this draft with the Constitution and laws of Ukraine; the Council of Ministers of the Autonomous Republic of Crimea, the regional state administration, within 10 working days from the date of receipt of the draft decision on the voluntary association of territorial communities, prepares an appropriate conclusion, which is approved by the decision of the Council of Ministers of the Autonomous Republic of Crimea, by order of the chairman of the regional state administration if the draft decision on the voluntary association of territorial communities is consistent with the Constitution and laws of Ukraine, village, village, city councils decide on the voluntary association of territorial communities or on a local referendum to support the association of territorial communities; the Council of Ministers of the Autonomous Republic of Crimea, the

Continuation of table B.3

1	2
	regional state administration, within 10 working days from the date of receipt of decisions on the voluntary association of territorial communities, if they comply with the conclusion, calls on the Central Election Commission to decide on the first election of deputies of the village, town, city council and relevant rural, township, mayor in the manner prescribed by law; if the territorial community (territorial communities) located on the territory of an adjacent district is included in the united territorial community, the boundaries of the district on whose territory the administrative center of the formed united territorial community is located shall be expanded. In this case, the land management project to establish (change) the boundaries of the district is developed in accordance with the decision of the Council of Ministers of the Autonomous Republic of Crimea, the order of the chairman of the regional state administration the formation of the united territorial community, which included the territorial community of the city of the Republican Autonomous Republic of Crimea and regional significance and the territorial community (territorial communities) of the village, town, other city of the adjacent region, does not need to change the boundaries of the regions; 4) the formation of a united territorial community and the reorganization of local governments.
The procedure for voluntary accession to the united territorial communities	characterized by: initiating voluntary accession to the united territorial communities; the procedure for preparing a draft decision on voluntary accession to the united territorial community; features of the termination of powers of the village, village council, village, village chairman of the territorial community, joined the united territorial community.
Forms of state support for voluntary association of territorial communities and joining the united territorial communities	The state provides informational, educational, organizational, methodological and financial support for the voluntary association of territorial communities and joins the united territorial communities. Organizational support and outreach to the voluntary unification of territorial communities and joining the united territorial communities is provided by the Council of Ministers of the Autonomous Republic of Crimea, local state administrations. Methodological support for the voluntary association of territorial communities and joining the united territorial communities, the determination of the scope and form of support is carried out by the central executive body, which ensures the formation and implements state policy in the field of territorial organization of power, administrative-territorial structure, and development of local self-government. The Cabinet of Ministers of Ukraine may recognize the united territorial community in the condition, provided that it is formed in the manner specified in Section II of this Law, around the locality defined by the long-term plan for the formation of the communal territories of the Autonomous Republic of Crimea, the region as the administrative center of the united territorial community, and also if the population a united territorial

Continuation of table B.3

1	2
	community is at least half the population of territorial communities, should have been included in such a united oh territorial obschest hells according to the long-term plan of formation of the Autonomous Republic of Crimea communities area. If the council of the united territorial community has decided not to grant consent for the voluntary joining of another territorial community on its initiative, the Cabinet of Ministers of Ukraine may cancel the decision to recognize such a united territorial community as capable.
Financial support by the state for voluntary association of territorial communities of villages, towns, cities and joining the united territorial communities	The state provides financial support for the voluntary association of territorial communities of villages, towns, cities and joining the united territorial communities by providing the united territorial community with funds in the form of subventions for the formation of appropriate infrastructure in accordance with the plan for the socio-economic development of such a territorial community. Proposals for the provision of financial support to the united territorial community are made by the Council of Ministers of the Autonomous Republic of Crimea, the relevant regional state administration on the proposal of the village, settlement, city council of the united territorial community of the Cabinet of Ministers of Ukraine no later than July 15 of the year preceding the budget period in which such financial support is provided. The total amount of financial support is distributed between the budgets of the united territorial communities in proportion to the area of the united territorial community and the number of rural population in such a territorial community with an equal weight of both of these factors. The total amount of subventions for the formation of the appropriate infrastructure of the united territorial communities is determined by the law on the State Budget of Ukraine. The procedure for providing subventions from the state budget to the united territorial communities is established by the Cabinet of Ministers of Ukraine.
The long-term plan for the formation of the territories of the communities of the Autonomous Republic of Crimea, the region	1. A long-term plan for the formation of the territories of the communities of the Autonomous Republic of Crimea, the region is developed by the Council of Ministers of the Autonomous Republic of Crimea, the corresponding regional state administration in accordance with the methodology for the formation of capable territorial communities and covers the entire territory of the Autonomous Republic of Crimea, the region. 2. The methodology for the formation of capable territorial communities is developed by the central executive body, which ensures the formation and implements state policy in the field of territorial organization of power, administrative-territorial structure, development of local self-government, and is approved by the Cabinet of Ministers of Ukraine. 3. The long-term plan for the formation of the territories of the communities of the Autonomous Republic of Crimea, the region is approved respectively by the Verkhovna Rada of the Autonomous Republic of Crimea, the regional council on the proposal of the Council of Ministers of the Autonomous Republic of Crimea, the corresponding regional state administration and approved by the Cabinet of Ministers of Ukraine.

Table B.4

Directions and features of the organization of cooperation of the united territorial communities [313]

Directions of the organization of cooperation	Feature and Features
1	2
Initiating collaboration	The initiators of cooperation can be the village, township, mayor, deputies of the village, town, city council, members of the territorial community in the order of local initiative. The initiator of cooperation provides preparation of a proposal to initiate cooperation; it is submitted for consideration by the village, town, city council. The proposal to initiate cooperation should contain the purpose, justification of the advisability of cooperation, information on the scope of its implementation, the form and expected financial results, as well as other conditions necessary for organizing cooperation. The decision on granting consent to the organization of cooperation is made by the village, village, city council on the basis of preliminary conclusions of its executive bodies regarding compliance with the interests and needs of the territorial community of proposals for initiating cooperation. The decision on granting consent to the organization of cooperation, adopted in the prescribed manner by the village, town, city council, is the basis for the village, town, city mayor to start negotiations between potential subjects of cooperation on its organization and the creation of a commission to prepare a draft cooperation agreement.
Negotiations on the organization of cooperation	The village, township, mayor representing the territorial community, sends a proposal to start negotiations on the organization of cooperation to the village, township, city mayors representing the respective territorial communities - potential subjects of cooperation, and ensures the formation of a commission, which includes representatives of the respective territorial communities. By decision of the village, town, city council, the village, township, city mayor provides, within 60 days from the date of receipt of the proposal to start negotiations on the organization of cooperation for its study, an assessment by the executive bodies of the village, town, city council regarding compliance with the needs of the territorial community, as well as holding a public discussion of such a proposal, after which it is submitted for consideration by the relevant council for a decision on granting consent tions on the organization of cooperation or failure and I deleguvan representative (s) to the Commission.
Commission	The commission includes in equal numbers representatives of all subjects of cooperation. The composition of the commission is approved by a joint order of rural, township, city mayors representing territorial communities - subjects of cooperation. The form of work of the commission is meetings that are held by decision of its chairman. Decisions made by the commission at its meetings are documented in a protocol signed by the chair of the meeting and the secretary. The chair of the meeting of the commission is alternately representatives of the subjects of cooperation. Organizational support for the activities of the commission is carried out

Continuation of table B.4

1	2
	by the executive bodies of rural, village, city councils - subjects of cooperation. The Commission prepares a draft agreement on cooperation within 60 days from the date of its formation. The commission shall cease its activity from the date of entry into force of the agreement on cooperation or the adoption by each village, town or city council of a decision to terminate the organization of cooperation.
Public discussion and approval of the draft cooperation agreement	Rural, township, city mayors provide for 15 days of public discussion of the draft cooperation agreement prepared by the commission, as a result of which the village, township, city mayors submit the issue of approving their draft for consideration by the relevant councils. The decision to approve the draft cooperation agreement is made by village, town, city councils within 30 days from the date of public discussion of its draft. The cooperation agreement is concluded in writing by village, town, city heads after the approval of its project by the relevant village, town, city councils.
Agreement on cooperation	Cooperation is carried out in accordance with cooperation agreements concluded in accordance with this and other laws by village, town, city mayors on behalf of the village, town, city council after the approval of their projects by village, town, city councils. In the cooperation agreement, in particular, the village, town, city council of one of the subjects of cooperation is responsible for submitting reports on the implementation of the agreement to the central executive authority, which ensures the formation of state policy in the field of development of local self-government. An approximate form of a cooperation agreement is determined by the central executive body, which ensures the formation of state policy in the field of development of local self-government. The subject of the cooperation agreement is determined in accordance with the form of cooperation chosen by the subjects of cooperation. The number of copies of the cooperation agreement should be one more than the number of subjects of cooperation. Each of the subjects of cooperation receives one copy of the cooperation agreement. One copy of the cooperation agreement is transferred for inclusion in the register of cooperation of territorial communities to the central executive body, which ensures the formation of state policy in the field of development of local self-government. The procedure for the formation and maintenance of the registry of cooperation between territorial communities is approved by the central executive body, which ensures the formation of state policy in the field of development of local self-government.The cooperation agreement comes into force 10 days from the date of its conclusion, taking into account the requirements of budget legislation, if the subjects of cooperation have not agreed on other terms, as indicated in the agreement.
Delegation of individual tasks	To ensure the fulfillment of powers in accordance with the Law of Ukraine «On Local Self-Government in Ukraine» and to increase the efficiency of the use of local budgets, local governments of the subjects of cooperation on the basis of a cooperation agreement may delegate one of the subjects of cooperation to carry out one or more tasks with the transfer of relevant resources to it. An agreement on cooperation in terms of delegating the performance of individual tasks should, in particular, contain: 1) a list of tasks delegated by the local government of the subject of

Continuation of table B.4

1	2
	cooperation;
	2) the name of the local government of the subject of cooperation to which the tasks of other bodies of local self-government of the subjects of cooperation are delegated; 3) the name of local governments of the subjects of cooperation, delegate tasks to the relevant local authority of one of the subjects of cooperation; 4) requirements for the fulfillment by the local government of one of the subjects of cooperation delegated by other subjects of cooperation; 5) the amount of local budget funds that are transferred to the local budget of the local government of the subject of cooperation for the implementation of delegated tasks; 6) the period for which tasks are delegated; 7) the form and procedure for reporting on the status of implementation and financing of delegated tasks; 8) the procedure for terminating the contract and resolving disputes during its implementation. 3. Financing the implementation of delegated tasks in accordance with the requirements of the Budget Code of Ukraine.
Implementation of joint projects	An agreement on the implementation of joint projects is being drawn up.
Establishment of a joint management body	For the joint fulfillment of the powers defined by law that are within the competence of local authorities of the subjects of cooperation, and in order to save the funds necessary for their maintenance (optimization or reduction of costs), cooperation can be carried out through the formation by the subjects of cooperation of a joint management body. A cooperation agreement is being drawn up regarding the creation of a joint governing body. The joint management body may be formed as a separate executive body of the village, town, city council of one of the subjects of cooperation or as part of the executive body of the village, town, city council of one of the subjects of cooperation (as a structural unit – department, department, management, project bureau, agency and etc.).
State stimulation of cooperation	Carried out by: 1) the provision of subventions to local budgets of the subjects of cooperation in priority areas of public policy; 2) transfer of objects of state property into the communal property of subjects of cooperation; 3) methodological, organizational and other support activities of the subjects of cooperation. The state encourages cooperation if: 1) the ability of subjects of cooperation to ensure the implementation of powers defined by law is enhanced; 2) additional resources were involved in cooperation, including financial; 3) cooperation is carried out by more than three subjects of cooperation; 4) public participation in the implementation of cooperation is ensured. The procedure for state stimulation of cooperation is determined by the Cabinet of Ministers of Ukraine.

Continuation of table B.4

1	2
Cooperation financing	carried out at the expense of: 1) local budgets of the subjects of cooperation; 2) self-imposition; 3) other sources not prohibited by law, in particular, the state budget, international technical and financial assistance, credit resources. The financing of cooperation activities starts from the next budget period. The subjects of cooperation provide open access to reports on the use of funds through their own Internet resources.
Collaboration monitoring	carries out the central executive body, which ensures the formation of state policy in the field of development of local self-government. The subject of cooperation, according to the agreement, is responsible for submitting reports on the implementation of cooperation, submits annually by the end of the first quarter of the year following the reporting one, such a report to the central executive body, which ensures the formation of state policy in the field of local self-government development. The central executive body, which ensures the formation of state policy in the field of development of local self-government: 1) based on the results of the analysis of reports on the implementation of cooperation, submits, in accordance with the established procedure, to the Cabinet of Ministers of Ukraine proposals on its state stimulation; 2) publishes best practices for cooperation; 3) initiates changes to the legislation governing the implementation of cooperation.

Table B.5

Powers in the field of land relations and environmental protection of local authorities [307]

Types of authority	Characteristics
1	2
Own (self-governing)	1) preparation and submission to the Council of proposals for the establishment of a land tax rate, fees for the use of natural resources, withdrawals (redemption), as well as provision for development and for other needs of lands owned by territorial communities; determination in accordance with the established procedure of the amounts of indemnifications by enterprises, institutions and organizations, regardless of the form of ownership for environmental pollution and other environmental losses; the establishment of payments for the use of communal and sanitary networks of the relevant settlements; 2) preparation and submission to the council for approval of draft local environmental protection

Continuation of table B.5

1	2
	programs, participation in the preparation of national and regional environmental protection programs; 3) preparation and submission to the Council of proposals for the adoption of decisions on the organization of territories and objects of the natural reserve fund of local importance and other territories subject to special protection; making proposals to the relevant state bodies on declaring natural and other objects of ecological, historical, cultural or scientific value, monuments of nature, history or culture, which are protected by law, preparing and submitting for consideration by the council proposals on making decisions on declaring in places of mass reproduction and raising offspring by wild animals of the «season of silence» with the restriction of economic activity and the extraction of objects of the animal world; 4) charging for land.
delegated authority	1) monitoring compliance with land and environmental laws, use and protection of land, natural resources of national and local significance, reproduction of forests; 2) coordination of the activities of local bodies of land resources; 3) approval of applications for a permit for the special use of natural resources of national importance; 4) the resolution of land disputes in the manner prescribed by law; 5) taking necessary measures to eliminate the consequences of emergencies in accordance with the law, informing the population about them, involving enterprises, institutions and organizations, as well as the population, in the manner prescribed by law; 6) determination of the territory for waste disposal in accordance with the law; 7) control over the activities of business entities in the field of waste management; 8) the preparation of opinions on the provision or withdrawal of land in the manner prescribed by law is carried out by executive authorities and local authorities;

Continuation of table B.5

1	2
	9) organization and implementation of land management, coordination of land management projects; 10) monitoring of the implementation of measures provided for by land management documentation; 11) the creation and operation of local environmental automated information and analytical systems, which are an integral part of the national environmental automated information and analytical system to ensure access to environmental information; 12) monitoring compliance by legal entities and individuals with requirements in the field of household and industrial waste management and consideration of cases of administrative offenses or transferring their materials to other state bodies for consideration in case of violation of waste legislation; 13) the provision of information from the State Land Cadastre in accordance with the law.

Table B.6

An integrated approach to regional development [81]

Components of the approach	Characteristics
1	2
sectoral (industry)	increasing the competitiveness of regions by optimizing and diversifying the structure of the economy, ensuring the effective specialization of regions with priority use of their own resource potential.
territorial (spatial)	achievement of uniform and balanced development of territories, development of inter-regional cooperation, prevention of deepening socio-economic imbalances by creating “growth points”, intensifying local economic initiative and strengthening the potential of rural areas, ensuring socio-economic unity and uniform development of regions in order to create equal conditions for development person.
managerial	application of unified approaches to the formation and implementation of regional development policies, the creation of a unified system of strategic planning and forecasting the development of the state and regions, optimization of the system of territorial organization of power.
instrumental	the formation of mechanisms for ensuring territorial development.

Table B.7

Description of the state, directions and types of territories [299]

Use of territories	Characteristic
1	2
State of use of territories	determined by: extremely high, economically and environmentally unreasonable level of economic (primarily agricultural) development of the territory; significant areas and low density of production areas; irrational distribution of industrial and residential areas; a small share of the territories of nature conservation, recreation, health, historical and cultural purposes; the presence of significant territories, the use of which is legally limited and requires a special protective regime of management (the territory of radiation pollution due to the accident at the Chernobyl nuclear power plant, sanitary and protective zones of industrial enterprises, transport and communications, objects of the nature reserve fund and historical and cultural destination, resorts, rivers, seas, lakes, reservoirs and other bodies of water, water intakes) territorial mismatch of the location of water-intensive industries to local water resources. The sanitary-epidemic and ecological condition of the territory of Ukraine, the level of natural and technological safety is characterized by: deformed structure of the economic complex with a predominance of industries with resource-consuming, environmentally hazardous technologies and significant depreciation of fixed assets; high levels of environmental pollution in many regions, the development of environmental infrastructure; the presence of significant areas experiencing constant exposure to dangerous geological processes. As a result, the territory of Ukraine is marked by an excessive technogenic load on the environment, a high degree of pollution and natural-technological hazard. The disadvantages of the functioning of resettlement systems include: inconsistency of the social, economic, urban planning and environmental aspects of the development of human settlements and surrounding territories; excessive concentration of population and production in big cities; slow development of most medium and small cities, towns and villages; the eccentric territorial location of most regional centers, the insufficient development in the centers of intraregional resettlement systems (especially inter-district, district) of social and cultural services for the population of adjacent territories and transport links, which does not allow for the creation of equal accessibility conditions for every citizen (regardless of their place of residence) these objects; insufficient level of development of social and engineering transport infrastructure of settlements. The main reason for these shortcomings is the lack of a scientifically based national strategy for the efficient use of the country.
Directions for the use of territories	characterized by: advantageous geopolitical location in the center of Europe, at the intersection of communication links «west – east» and «north – south»; rather favorable climatic conditions; the presence of territories with the natural state of landscapes; high-quality condition and high productivity of land; significant reserves of mineral resources;

Continuation of table B.7

1	2
	developed intellectual and scientific-technical potential; powerful diversified production base; developed network of settlements; the presence of territories with high potential for socio-economic development; developed engineering and transport infrastructure and in its density; unique historical, cultural, tourist and recreational potential; the beginning of the formation of a single territorial system of the national ecological network.
Types of territories by directions of use	1) territories with intensive, mainly industrial, urban residential and public buildings (urbanization zone), including: With a critical level of industrial and urban development (the central part of Donbass, a city with a population of more than 500 thousand people, as well as the cities of Sevastopol, Simferopol and Kherson, their suburban areas); with a high level of industrial and urban development (suburban areas of Kiev, Cherkassy, Chernihiv, Zhytomyr, Vinnitsa, Poltava, Sum and Kirovograd, the areas surrounding the central part of Donbass) with an average level of industrial and urban development (Kerch, Krasnoperekopsky industrial areas of the Autonomous Republic of Crimea, Nikopol manganese ore basin and Western Donbass; the territories adjacent to the rest of the regional centers and developed industrial centers with a population of more than 50 thousand people play the role of mainly inter-district resettlement centers); 2) the territory of predominantly agricultural production and rural development (agricultural zone); 3) territories and objects of the nature reserve fund, forests, wetlands, lands of the water fund, recreational and recreational purposes, other natural territories important for the conservation of biological and landscape diversity (zone of the national ecological network); 4) territory (zone) of radiation pollution, including alienation and unconditional (mandatory) resettlement, guaranteed voluntary resettlement, enhanced radioecological control. Territories that define: urbanization zones: with a critical level of industrial and urban development, tight regulation of urban development with the primary restructuring of the economic base and ecological improvement of the territories; with a high level of industrial and urban development - regulation of urban development with the modernization of the economic base and ecological improvement of the territories; with an average level of industrial and urban development, regulation of urban development with stimulation of the development of a modern economic base and stabilization of technogenic loads; agricultural zones - ensuring sustainable development of the agro-industrial complex and rural settlements (taking into account the nature of settlement and the regional specifics of the population), creating new jobs by organizing small enterprises for processing agricultural products, increasing the level of social and engineering infrastructure, developing

Continuation of table B.7

1	2
	the agricultural market infrastructure production, creation of integrated structures for the production, processing, storage and sale of villages agricultural products, the withdrawal from the intensive use of unproductive lands, the implementation of measures for the conservation and protection of land; zones of the national ecological network – ensuring the formation of a unified territorial system of nature protection territories and compliance with their regime, sustainable use of recreational, health and other resources; areas of radiation pollution, including: alienation and unconditional (mandatory) resettlement – a ban on all types of economic activity, ensuring compliance with a strict environmental regime and unconditional resettlement of residents; guaranteed voluntary resettlement - prohibition of the construction of new and expansion of existing enterprises, resort and recreational facilities, restrictions on agricultural production; enhanced radiological control - the prohibition of the construction of new and expansion of existing environmentally hazardous enterprises, the introduction of restrictions on the construction of recreation facilities. The boundaries of territories (zones) are specified in the process of planning territories at the regional and local levels and are determined in the manner prescribed by law.
Directions of sustainable development of territories	Directions of sustainable development of territories1) the formation and development (taking into account the administrative-territorial structure of Ukraine, as well as economic regionalization) nationwide, interregional, regional, inter-district, as well as district and intra-district settlement systems; 2) determination of the tasks of the prospective development of settlements of various types: a) for the cities of Kiev, Kharkov, Dnepropetrovsk, Donetsk, Odessa, Lviv - the effective use of the powerful socio-economic potential and advantages of a geographical location with their development as centers of economic activity, innovation and highly specialized public services; b) for other cities with a population of more than 500 thousand people (Zaporozhye, Krivoy Rog, Nikolaev), regional centers with a population of more than 300 thousand people, as well as other cities with a very difficult environmental situation - the priority is to improve the structure of the economic base and land use, environmental territory improvement, deconcentration of production, development of social infrastructure of predominantly interregional significance; c) for other regional centers with significant socio-economic potential, as well as for cities that are industrial centers with a difficult environmental situation, restructuring of the production base, decommissioning of harmful industries, optimizing the structure of land use, ecological improvement of urban areas and the development of social infrastructure regional and interdistrict significance; d) for cities with significant recreational and health potential – stimulating the development of resort functions with a ban on building new and expanding existing industrial enterprises that are not related to meeting the

Continuation of table B.7

1	2
	needs of vacationers and the local population, or those that can negatively affect natural healing factors; d) for small cities and towns adjacent to centers of resettlement systems - the location of branches and workshops of industrial enterprises removed from these centers; e) for small cities, towns and villages that have significant natural, historical and cultural potential, the development of tourism functions with the preservation and permissible economic use of cultural heritage sites, the protection of the traditional nature of the environment, and the restriction of economic activity in the territories of historical ranges of settlements; f) for small cities and towns that are the centers of agricultural areas - the development of socio-economic potential associated with servicing agricultural production and the rural population; g) for monofunctional small towns and villages – stabilization of socio-economic development with a variety of production facilities, creation of conditions for independent employment of the population; h) for villages – creating conditions for productive employment and increasing incomes of the rural population, stable functioning and development of social infrastructure, taking into account the nature of settlement and the regional specifics of the population in rural settlements, providing water, gas and energy networks, roads.
State support of territories	In order to ensure the efficient use of territories of special economic, environmental, scientific, aesthetic value, development is envisaged with state support: territories with a critical level of industrial and urban development and natural and technological hazards and a low level of provision with natural resources – Donbass, cities with a population of more than 500 thousand people (Kiev, Kharkov, Dnepropetrovsk, Odessa, Lviv, Zaporozhye, Krivoy Rog, Nikolaev), and also Sevastopol, Simferopol, Kherson, Kerch, Krasnoperekopsk, Novovolynsk, Chervonograd; territories with significant environmental, recreational, health, historical - cultural potential, a high level of industrial development and urban development and natural and technological hazards - the suburban areas of Kiev, Kharkov, Dnepropetrovsk, as well as the Crimean Black Sea coast, Transcarpathian region, floodplains of the Severskiy Donets river, resorts Berdyansk, Truskavets, estuaries of the Dnieper, Danube, Dniester, Southern Bug; territories with significant environmental, recreational, health and historical-cultural potential and a low level of development of social and engineering transport infrastructure and natural and technological hazards – Polesie, Eastern Carpathians, the coast of the Sea of Azov, the region of the Black Sea Biosphere Reserve; areas with a high level of radiation pollution – Kiev, Zhytomyr, Rivne and Chernihiv regions.
Social Infrastructure Development	In order to provide citizens with housing and social and cultural services in accordance with the state-guaranteed social standards, take measures to: increasing the volume of housing construction with an increase in its

Continuation of table B.7

1	2
	quality and the indicator of average housing provision; development of a network of institutions and institutions in the field of healthcare, education, culture, physical education and sports, trade and public catering, public utilities; the formation and development (taking into account the nature of resettlement and regional specifics) of the system of low-income socio-cultural services to the population; introduction of new forms of social and cultural services in rural areas, taking into account regional characteristics.
Development of engineering and transport infrastructure	In order to meet the needs of the population and the economy in passenger and freight transportation, in water and energy resources, ensure: effective use of the country's powerful transit potential with the integration of its transport complex into the European and world transport and communication systems; the creation of a national network of international transport corridors, to ensure communication between the main scientific, production and socio-cultural centers of Ukraine with other countries and will stimulate the development of territories adjacent to these transport corridors; the construction of new and reconstruction of existing trunk and regional transport communications to improve the ties of centers of resettlement systems with settlements in the zone of their influence, the main industrial areas – with the coast of the Black and Azov Seas; the construction of transport rounds of cities with a population of more than 500 thousand people; continuation of reconstruction and expansion of the Boryspil State International Airport, as well as the regional international airports Kharkiv, Dnepropetrovsk, Donetsk, Odessa, Lviv, Simferopol; the intensive development of high-speed modes of electric transport, the organization of high-speed movement of passenger trains with the integration of the network of railways and highways of Ukraine to the European system of highways; modernization and development of water supply and sewage systems, the introduction of rational water consumption standards, water treatment and wastewater treatment technologies, means of accounting and control over water consumption; diversification of energy sources in Ukraine with the formation of the Europe-Caucasus-Asia oil transportation corridor, the completion of the construction of the Yuzhny oil terminal, the connection of the Odessa-Brody oil pipeline to the European oil transportation network and the attraction of additional gas supply sources; modernization of existing and construction of new non-residential generating capacities, mainly in the areas where nuclear and thermal power plants are located, development of alternative energy in territories suitable for this due to natural and climatic conditions.
Formation of a national environmental infrastructure	Expanding the area of the national ecological network by: a) the creation of objects of a nature reserve fund in territories that comply with the conditions for ensuring the protection of especially valuable natural complexes and objects; b) an increase in the area of existing territories and objects of the natur

Continuation of table B.7

1	2
	reserve fund;
	c) the conservation of natural landscapes in areas of historical and cultural value; d) inclusion in the programs of ecological rehabilitation of the river basins of the Seversky Donets, Southern Bug, Dniester, Danube, Western Bug measures for the creation and arrangement of water protection zones and coastal protective strips of water bodies, the introduction of a special regime of land use in river leakage areas; d) the formation of transboundary conservation areas of international importance; e) the creation of protective forest stands and forest shelter belts, land pledged; f) conservation of degraded and polluted lands with their subsequent naturalization; f) conservation of natural landscapes on the lands of industry, transport, communications, defense; g) environmentally sound increase in forest area; the formation of a single territorial system that combines elements of the national ecological network, the establishment of a special regime for its protection and use of these territories.

Table B.8

Directions and features of land use in regions according to their categories [118]

Land categories	Directions and features of use
1	2
Agricultural land	The use of agricultural land is determined by their purpose: agricultural and non-agricultural land; directions of land privatization; land use with meliorative systems; organizational features (land plots of agricultural enterprises, farm land, land plots of personal peasant farms, land plots for gardening, land plots for gardening).
Residential and public land	The use of land for residential and public buildings is carried out in accordance with the general plan of the settlement, other urban planning documentation, a plan of land management in compliance with building codes, state standards and norms. Features of the use of land for residential and public buildings is determined by the relevant areas: 1. Land plots for the construction and maintenance of a residential building, utility buildings and garage construction: citizens of Ukraine, by decision of the executive authorities or local authorities, may be

Continuation of table B.8

1	2
	transferred free of charge to the ownership or leased land for construction and maintenance of a residential building, utility buildings and garage construction within the limits defined by this Code. In excess of the free transfer rate, citizens can acquire ownership of land for these needs under civil law contracts. 2. Land plots of housing construction (housing) and garage building cooperatives: housing construction (housing) and garage building cooperatives by decision of executive authorities or local authorities, land for housing and garage construction are transferred free of charge to the property or provided to rent in the amount established in accordance with the approved urban planning documentation. Housing construction (housing) and garage building cooperatives may acquire land in the ownership of civil law contracts. 3. Land plots of apartment buildings: land plots on which apartment buildings are located, as well as buildings, structures and adjoining territories of state or communal property related to them, are provided for permanent use to enterprises, institutions and organizations that manage these houses. The land plots on which the apartment buildings are located, as well as the buildings, constructions and adjoining territory related to them, which are jointly owned by the owners of apartments and non-residential premises in the house, are transferred free of charge to the ownership or permanent use of the co-owners of the apartment building in the manner established by the Cabinet Ministers of Ukraine. The procedure for using the land plots on which apartment buildings are located, as well as the buildings, structures and adjoining territories related to them, is determined by the co-owners. The sizes and configuration of the land plots on which apartment buildings are located, as well as the buildings, structures and adjoining territories related to them, are determined on the basis of the relevant land management documentation. In case of destruction (destruction) of an apartment building, property rights to the land plot on which such a house is located, as well

Continuation of table B.8

1	2
	as the buildings, structures and adjoining territory related to it, shall be reserved for the co-owners of the apartment building.
Lands of the nature reserve fund and other nature protection purposes	The lands of the nature reserve fund include natural territories and objects (nature reserves, national nature parks, biosphere reserves, regional landscape parks, nature reserves, natural monuments, nature reserves), as well as artificially created objects (botanical gardens, dendrological parks, zoological parks, parks-monuments of landscape gardening art). The lands of the nature reserve fund may be in state, communal and private ownership. The procedure for using the lands of the nature reserve fund is determined by law. Lands of other nature protection purposes include land plots within which there are natural objects of special scientific value. The boundaries of land for other environmental purposes are fixed on the ground with boundary or information signs. The procedure for the use of land for other environmental purposes is determined by law.
Wellness lands	Wellness lands include lands with natural healing properties that are used or can be used to prevent diseases and treat people. On recreational lands, activities that are contrary to their intended purpose or may adversely affect the natural healing properties of these lands are prohibited. In the territories of medical and recreational areas and resorts, counties and zones of sanitary (mountain sanitary) protection are established. Within the district of sanitary (mountain-sanitary) protection, the transfer of land to property and the provision for use by enterprises, institutions, organizations and citizens for activities incompatible with the protection of natural healing properties and recreation of the population of the recreational land may be in state, municipal and private property. The procedure for the use of recreational land is determined by law.
Recreational land	Land for recreational purposes include land that is used to organize public recreation, tourism and sporting events. Recreational lands include land plots of green areas and green spaces of cities and other

Continuation of table B.8

1	2
	settlements, educational-tourist and ecological paths, marked trails, land plots occupied by the territories of rest houses, boarding houses,physical culture and sports facilities, tourist camps, campsites, yachts -clubs, stationary and tent tourist-health camps, houses of fishermen and hunters, children's tourist stations, children's and sports camps, other similar objects, as well as land plots areas above for summer cottage construction and the construction of other objects of stationary recreation. Land for recreational purposes may be in state, municipal and private ownership. Common lands of a summer cottage cooperative are transferred to it free of charge upon request of the cooperative's supreme governing body to the appropriate executive body or local government on the basis of land management documentation, on which land plots or technical documentation on land management were established regarding the establishment (restoration) of land boundaries in kind (on the ground). The common lands of a summer cottage cooperative include land occupied by protective strips, roads, driveways, buildings and public facilities. On recreational lands, activities are prohibited that impede or may impede their intended use, as well as adversely affect or may affect the natural state of these lands. The procedure for using recreational land is determined by law.
Historical and cultural lands	Historical and cultural lands include lands on which cultural heritage monuments, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological territories, open-air museums, memorial estate estates are located. Lands of historical and cultural purpose may be in state, communal and private ownership. Around historical and cultural reserves, historical and cultural protected areas, open-air museums, memorial museums, estates, cultural heritage sites, their complexes (ensembles), protection zones for monuments are established with the prohibition of activities, adversely affect or may affect compliance with

Continuation of table B.8

1	2
	the use of such lands. The procedure for the use of historical and cultural lands is determined by law.
Forest land	The lands of the forest fund include lands covered by forest vegetation, as well as not covered by forest vegetation, and not forest land provided and used for the needs of forestry. The lands of the forest fund do not include lands occupied by: green spaces within settlements that are not classified as forests; individual trees and groups of trees, shrubs on agricultural land, household plots, summer cottages and garden plots. The lands of the forest fund may be in state, communal and private ownership. By decision of local governments and executive authorities, citizens and legal entities can be transferred free of charge or for a fee to closed land plots of the forest fund with a total area of up to 5 hectares as part of the land of peasant, farmer and other farms. Citizens and legal entities in the prescribed manner can acquire ownership of land plots of degraded and unproductive land for afforestation. Land plots of the forest fund by decision of executive authorities or local governments are provided for permanent use to specialized state or communal forestry enterprises, other state and communal enterprises, institutions and organizations in which specialized units are created for forestry. The procedure for the use of forest land shall be determined by law.
Water areas	The lands of the water fund include lands occupied by: seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands, forests; coastal protective strips along the seas, rivers and around water bodies, except for lands occupied by forests; hydraulic engineering, other water facilities and canals, as well as land allocated for allotment strip for them; coastal waterways artificially created land plots within the seaport waters. To create a favorable regime of water bodies

Continuation of table B.8

1	2
	along the seas, around lakes, reservoirs and other water bodies, water protection zones are established, the sizes of which are determined by land management projects.
	The lands of the water fund may be in state, communal and private ownership. By decision of executive authorities or local authorities, citizens and legal entities can be transferred free of charge closed natural reservoirs (total area up to 3 hectares) to their property. Owners on their land plots can create fisheries, anti-erosion and other artificial reservoirs in the prescribed manner. The lands of the water fund by decision of executive authorities or local governments are provided for permanent use: state water management organizations for caring for water bodies, coastal protective strips, allotment lanes, coastal waterways, hydraulic structures, as well as aquaculture management and the like; state enterprises for placement and maintenance of state port infrastructure facilities; state fisheries enterprises, institutions and organizations for aquaculture. The land plots of coastal protective strips, allotment zones and coastal stripes of waterways, lakes, reservoirs, other water bodies, marshes and islands for haying, fishery needs can be transferred to citizens and legal entities by executive authorities or local governments from the lands of the water fund on a rental basis (including fish farming (aquaculture), cultural, recreational, recreational, sports and tourism purposes, conducting research, care, accommodation and maintenance The object is the second port infrastructure and waterworks, etc., as well as artificially created land for the construction and operation of port infrastructure and other facilities of water transport. Water fund lands can be attributed to the lands of sea and river transport in the manner prescribed by law. The use of land plots of the water fund for fisheries is carried out with the consent of their owners or by agreement with land users. Along rivers, seas and around lakes, reservoirs and other bodies of water, coastal protective

Continuation of table B.8

1	2
	strips are established to protect surface water bodies from pollution and contamination and preserve their water content. Coastal shelterbelts are set along the banks of rivers and around water bodies along the water edge (for a certain period) with a width of: for small rivers, streams and streams, as well as ponds with an area of less than 3 hectares - 25 meters; for medium-sized rivers, reservoirs on them, reservoirs, as well as ponds with an area of more than 3 hectares - 50 meters; for large rivers, reservoirs on them and lakes - 100 meters. With steepness of slopes of more than three degrees, the minimum width of the coastal protective strip doubles. Along the seas and around sea bays and estuaries, a coastal protective strip is established with a width of at least two kilometers from the water edge. Coastal shelterbelts are established for individual land management projects. The limits of the established coastal protective strips and beach areas are indicated in the documentation on land management, cadastral plans for land plots, as well as in urban planning documentation. Coastal protective strips are established on land plots of all land categories, except for land transport by sea. Coastal shelterbelts are a conservation area with limited economic activity. In coastal shelterbelts along rivers, around bodies of water and on islands, the following is prohibited: plowing of land (except for soil preparation for meadows, forests), as well as gardening and horticulture; storage and use of pesticides and fertilizers; the installation of summer camps for livestock; the construction of any structures (except for hydraulic, navigational, hydrometric and linear), including recreation centers, cottages, garages and parking lots; the arrangement of garbage dumps, manure storages, liquid and solid waste storage facilities, cemeteries, cattle cemeteries, filtering fields and the like;

Continuation of table B.8

1	2
	washing and maintenance of vehicles and equipment. Objects located in the coastal protective strip may be exploited if their regime is not violated. Unsuitable for operation of the facility, as well as those that do not comply with the established management regimes, are subject to removal from coastal protective strips. The regime of economic activity on land plots of coastal protection zones along rivers, around water bodies and on islands is established by law. In coastal shelterbelts along seas, gulfs and estuaries, and on islands in inland sea waters, the following is prohibited: arrangement of household and industrial waste landfills and wastewater storage facilities; cesspools for the accumulation of domestic wastewater with a volume of more than 1 cubic meter per day arrangement of filtration fields and the creation of other facilities for the reception and disinfection of liquid waste; the use of potent pesticides. The regime of economic activity on land plots of coastal protective zones along the seas, sea bays and estuaries and on islands in inland sea waters is established by law. Within the beach area of coastal protective strips, the construction of any structures other than hydraulic, hydrometric and linear is prohibited. To ensure operation and protection from pollution, damage and destruction of the channels of irrigation and drainage systems, hydraulic and hydrometric structures, reservoirs and dams on the banks of rivers, land plots of allotment strips with a special mode of use are allocated. The size and mode of use of land plots of allotment strip are determined by land management projects, developed and approved in the prescribed manner. Land plots within the right of way are provided for the creation of water protection plantations, shore protection and anti-erosion hydraulic structures, construction of crossings, etc. On navigable waterways outside populated areas, coastal strips are established to carry out

Continuation of table B.8

1	2
	work related to shipping. The size of the coastal strip of waterways is determined by land management projects, developed and approved in the prescribed manner. The procedure for establishing and using the coastal strip of waterways is determined by the Cabinet of Ministers of Ukraine.
Lands of industry, transport, communications, energy, defense and other purposes	The lands of industry, transport, communications, energy, defense and other purposes are recognized as land plots provided in accordance with the established procedure to enterprises, institutions and organizations for the implementation of relevant activities. The procedure for using the lands of industry, transport, communications, energy, defense and other purposes is established by law. Industrial lands: Industrial lands include lands provided for the placement and operation of the main, utility and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, utility networks, office buildings, and other structures. Industrial lands may be in state, communal and private ownership. The sizes of land plots provided for these purposes are determined in accordance with state standards and design documentation approved in the established manner, and land plots are allocated taking into account the priority of their development. The provision of land for the needs associated with the use of subsoil is carried out after registration in the prescribed manner of the rights to use subsoil and land restoration in accordance with the approved work plan for land management on previously developed areas in a timely manner. *Land Industrial Parks:* The lands of industrial parks belong to the lands of industry. Industrial parks are created on land plots with an area of at least 15 hectares and not more than 700 hectares. *Land transport:* Transport lands include lands provided to enterprises, institutions and organizations of railway, automobile transport and road

Continuation of table B.8

1	2
	facilities, sea, river, aviation, pipeline transport and urban electric transport to fulfill the tasks assigned to them for the operation, repair and development of transport facilities. Land transport can be in state, municipal and private ownership. *Railway land:* The lands of railway transport include the land of the right of way of railways under the railroad track and its arrangement, stations with all buildings and structures of energy, locomotive, wagon, track, freight and passenger facilities, signaling and communications, water supply, sewage; under protective and reinforcing plantations, service, cultural and public buildings and other structures necessary to ensure the operation of railway transport. *Land of maritime transport:* The lands of sea transport include land under: a) seaports with embankments, platforms, moorings, train stations, buildings, structures, equipment, objects of general port and integrated fleet maintenance; b) hydraulic structures and means of navigation equipment, shipyards, workshops, bases, warehouses, radio centers, service and cultural buildings and other structures serving sea transport. On the approaches to the ports (channels), bridges, cable and air passages, water intake and other facilities, in accordance with the law, restrictions on the use of land may be established. *Land of river transport:* Lands of river transport include lands under: a) ports, specialized berths, marinas and overflows with all technical facilities and equipment serving river transport; b) passenger stations, pavilions and moorings; c) shipping channels, shipping, energy and hydraulic structures, office buildings; d) shore protection structures and plantations; d) communication centers, radio centers and radio stations; e) constructions, coastal navigation signs and other structures for servicing waterways, shipyards, repair and maintenance facilities, workshops, shipyards, settling and repair

Continuation of table B.8

1	2
	stations, warehouses, material and technical bases, utilities, office and cultural buildings, and others facilities providing river transport. *The lands of automobile transport and road facilities:* Land for automobile transport includes land under structures and equipment of energy, garage and fuel distribution facilities, Bus stations, bus stations, linear production facilities, service and technical buildings, service stations, gas stations, motor transport, freight forwarding enterprises, car repair plant, bases, freight courtyards, container and for platforms, service and cultural buildings and other facilities The work of automobile transport. Lands of road facilities include land under the carriageway, roadside, roadbed, decorative landscaping, reserves, ditches, bridges, tunnels, road junctions, culverts, retaining walls and other road structures and equipment located within the right of way, as well as land, located outside the right-of-way, if they have facilities for the operation of roads, namely: a) parallel bypass roads, ferry crossings, snow protection structures and stands, avalanche and anti-mudflow structures, catching ramps; b) sites for parking of transport and recreation, enterprises and objects of road service; c) houses (including residential) and structures of the road service with production bases; d) protective plantings. Land of air transport: The lands of air transport include land under: a) airports, airfields, separate structures (objects of air traffic control, radio navigation and landing, treatment and other structures), service and technical areas with buildings and structures that provide air transport; b) helicopter stations, including heliports, service areas with all buildings and structures; c) repair plants of civil aviation, aerodromes, helicopter aerodromes, hydroaerodromes and other platforms for the operation of aircraft; d) service facilities that ensure the operation of air transport. In the near-aerodrome territory, in accordance with the law, a special regime of land use is introduced.

Continuation of table B.8

1	2
	Land pipeline transport: The lands of pipeline transport include land plots provided for above-ground and above-ground pipelines and their structures, as well as under-ground structures of underground pipelines. Along the aboveground, aboveground and underground pipelines, security zones are established. *Lands of urban electric transport:* The lands of urban electric transport include land under separate tram tracks and their arrangement, metro, tracks and cable cars, cable cars, escalators, tram and trolleybus depots, car repair plant, energy and track facilities, signaling and communications, office buildings and cultural facilities other facilities necessary to ensure the operation of urban electric vehicles. Communication land; Communication lands include land plots provided for overhead and cable telephone and telegraph lines and satellite communications. Communication lands may be in state, communal and private ownership. Security zones are established along overhead and underground cable lines running outside settlements, as well as around radiating structures of television and radio stations and radio relay lines. *Earth energy system:* The lands of the energy system are recognized as lands provided for electricity generating facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation facilities to the user. The lands of the energy system may be in state, communal and private ownership. Security zones are established along overhead and underground cable power lines. *Defense lands:* Defense lands are the lands granted for deployment and permanent activities of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military units formed in accordance with the legislation of Ukraine.

Continuation of table B.8

1	2
	Defense lands can only be in state ownership. Around the military and other defense facilities, if necessary, protective, security and other zones are created with special conditions of use. The procedure for using defense lands is established by law. Features of the alienation of land plots on which objects of real estate military property to be sold, and land plots that are released during the reform of the Armed Forces of Ukraine, the State Special Transport Service, are established by law. Funds received from the alienation of such land plots are credited to the State Budget of Ukraine and are used exclusively for defense needs according to the estimates of the Ministry of Defense of Ukraine in the manner determined by the Budget Code of Ukraine.

Table B.9

Land use in regions in the land management system [305]

Directions and features of land use in the land management system	Characteristic
1	2
Organization and planning of land management	The organization and planning of land management at the national and local levels is carried out by the Verkhovna Rada of Ukraine, the Cabinet of Ministers of Ukraine, executive authorities and local authorities in accordance with the powers established by the Constitution of Ukraine, the Land Code of Ukraine, this Law and other laws of Ukraine.
land management	Land management is carried out on the basis of: a) decisions of executive authorities and local authorities on land management; b) concluded agreements between legal entities or individuals (landowners and land users) and developers of land management documentation; c) court decisions. The decision of the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea, executive authorities or local authorities on granting permission to develop documentation on land management is taken only on time and only in cases provided for by this Law and the Land Code of Ukraine. The specified decision is provided free of charge and has an unlimited duration.

Continuation of table B.9

1	2
Land Management Documentation	Types of land management documentation: a) land management schemes and feasibility studies for the use and protection of land of administrative-territorial units; b) land management projects to establish (change) the boundaries of administrative-territorial units; c) land management projects for the organization and establishment of the boundaries of the territories of the nature reserve fund and other nature protection purposes, recreational, recreational, historical and cultural, forestry purposes, lands of the water fund and water protection zones, restrictions on the use of lands and their regime of authorizing objects; d) land management projects for the privatization of lands of state and communal agricultural enterprises, institutions and organizations; d) land management projects for the allocation of land; e) land management projects regarding the improvement of the territory for urban development needs; f) land management projects providing environmental and economic justification of crop rotation and land management; f) land management projects regarding the improvement of the territory of settlements; g) land management projects for the organization of the territory of land shares (shares) h) land management work projects; i) technical documentation on land management regarding the definition and establishment in kind (on the ground) of the state border of Ukraine; i) technical documentation for land management regarding the establishment (restoration) of the boundaries of the land in kind (on the ground); i) technical documentation on land management regarding the establishment of the boundaries of the part of the land plot, which is covered by the rights of sublease, easement; i) technical documentation for land management regarding the division and association of land plots; j) land management technical documentation regarding land inventory.
Topographic, geodetic and cartographic work in the implementation of land management	Topographic, geodesic and cartographic works are carried out with the aim of creating and timely updating the planning and cartographic basis for land management in the manner determined by the Law of Ukraine “On Topographic, Geodesic and Cartographic Activities”. The information content and scale of topographic-geodetic and cartographic materials are determined taking into account the use of materials, the design details, surveys and surveys in accordance with the law.
Land inventory in the	Land inventory is carried out in order to establish the

Continuation of table B.9

1	2
implementation of land management	location of land management objects, their boundaries, sizes, legal status, identify lands that are not used, are used irrationally or for other purposes, to identify and conserve degraded agricultural land and contaminated lands, to establish quantitative and qualitative characteristics of lands, necessary for maintaining the state land cadastre, state control over the use and protection of land and adoption of land newer than other decisions by executive authorities and local governments. In case of identification of lands that are not assigned to a particular category during the inventory of lands of state and communal ownership, such lands are assigned to the corresponding category by authoritiesexecutive authorities or local governments on the basis of relevant land management documentation, agreed and approved in accordance with the law.
Soil, geobotanical and other land surveys during land management	Soil, geobotanical and other land surveys during land management are carried out in order to obtain information about the quality of land, as well as to identify lands that are exposed to water and wind erosion, flooding, radioactive and chemical pollution, and other negative phenomena. The information obtained during the surveys is used to: a) conducting agroecological assessment of land; b) development of forecasts and programs for the use and protection of land, schemes and projects for land management; c) maintaining records on the quality of land; d) land monitoring; d) adoption of decisions by the executive authorities and local governments on land reclamation and conservation, introduction of restrictions on land use, restoration, conservation and improvement of soil fertility, improvement of natural landscapes and the like; e) development of land management measures for the organization of rational use and protection of land; e) the rationale for business plans and land management projects.
Soil appraisal during land management	Soil appraisal is carried out in order to obtain indicators for comparing soil quality assessments by their basic natural properties. The criterion for valuation is the quality indicators of soils obtained during soil surveys, which are permanent and significantly affect the productivity of crops grown in specific climatic conditions and most fully reflect soil fertility. Soil appraisal data are used in the implementation of land management with the aim of developing a set of measures for land management regarding the use and protection of land, the conservation and improvement of soil fertility.

Continuation of table B.9

1	2
Land assessment work in the implementation of land management	Land appraisal work during the implementation of land management is carried out in order to determine the qualitative characteristics, economic value and value of land in the manner prescribed by law. Land valuation is carried out for a comparative analysis and forecasting the efficiency of land use as a natural resource and a main means of production, as well as in civil transactions, to determine the amount of land tax, lossesagricultural and forestry production, collection of state duties and in other cases specified by law. Depending on the purpose of land valuation, economic and monetary land valuation is carried out according to the methods approved by the Cabinet of Ministers of Ukraine.
Natural-agricultural zoning of land during land management	Natural-agricultural zoning of lands during land management is carried out with the aim of taking into account and reflecting the situation of lands, taking into account the natural conditions and agrobiological requirements of crops in a single classification system. Natural-agricultural zoning of lands during land management is the basis for land valuation, development of land management schemes and a feasibility study for the use and protection of land in administrative-territorial units and land management work projects.
Technical and technological support for land management	The technical support of land management is based on the use of computer and information technology, technical means for performing geodetic and other works. Technological support for land management is based on the use of modern information technologies and systems for collecting, maintaining, monitoring, accumulating, storing, updating, searching, converting, processing, displaying, issuing and transmitting data. The basis of information support for land management are automated systems designed for processing land cadastral, topographic, geodetic and other surveys and remote sensing, maintaining land statistics, forecasting, planning, design, mapping, organizational management. Requirements for the technical and technological support for land management performers are established by the central executive body, which ensures the formation of state policy in the field of land relations.
Providing Land Management Consulting Services	Land management consulting services include: a) advising land owners and land users on the rational use and protection of land; b) providing information on the results of studies on the use and protection of land, the introduction and implementation of environmental measures; c) the provision of information services on land legislation, civil law appraisals, land appraisal, subscription, rent and maintenance of land plots;

Continuation of table B.9

1	2
	d) providing agricultural producers and citizens with practical assistance in the preparation of business plans. Consulting services to landowners and land users are provided by legal entities regardless of their organizational and legal form of management and ownership and individuals engaged in economic activities in the field of land management.
Land management schemes and feasibility studies for the use and protection of land of administrative-territorial units	Land management schemes and feasibility studies for the use and protection of land of administrative-territorial units are developed in order to determine the prospects for the use and protection of land, to prepare informed proposals in the field of land relations, the organization of rational use and protection of land, redistribution of land, taking into account the needs of rural, forest and water management, development of villages, towns, cities, territories of recreational, recreational, historical and cultural purposes, probate fund and other environmental purposes and the like. Land management schemes and feasibility studies for the use and protection of land of administrative-territorial units are developed on the territory of the corresponding district, village, village, city. Land management schemes and feasibility studies for the use and protection of land in the district are developed by decision of the district council. Land management schemes and feasibility studies for the use and protection of land in a village, township, city are developed by decision of the relevant village, town, city council. The land management plan and feasibility studies for the use and protection of land of the respective administrative-territorial unit include: a) the task of drawing up a land management scheme and a feasibility study of the use and protection of land of an administrative-territorial unit; b) an explanatory note; c) a decision of the relevant local government on the development of a land management scheme and a feasibility study for the use and protection of land of an administrative-territorial unit; d) a description of the natural conditions of the administrative-territorial unit; e) information on the current state of the use and protection of land within an administrative-territorial unit (including restrictions on the use of land); f) a cartogram of land categories by land within the relevant territory; g) a cartogram of agro-industrial groups of soils and the steepness of the slopes; h) environmental and economic rationale for the use and

Continuation of table B.9

1	2
	protection of land; i) technical and economic indicators of land management schemes; j) materials of geodetic surveys and land planning; k) information on the prospective state of the use and protection of land within the administrative-territorial unit; l) a plan of planned measures for the rational use and protection of land; m) materials for agreeing on a land management scheme and a feasibility study for the use and protection of land of an administrative-territorial unit.
Land management projects to establish (change) the boundaries of administrative-territorial entities	To establish or change the boundaries of administrative-territorial formations, land management projects are developed to establish (change) the boundaries of the respective administrative-territorial formations. Land management projects to establish (change) the boundaries of administrative-territorial formations are developed to create a full-fledged living environment and create favorable conditions for their territorial development, ensure the effective use of the potential of the territories while preserving their natural landscapes and historical and cultural values, taking into account the interests of land owners, land users , including tenants, and approved urban planning documentation. The land management project to establish (change) the boundaries of the administrative-territorial units includes: a) an explanatory note; b) task for the performance of work; c) a decision on the development of a land management project to establish or change the boundaries of administrative-territorial units; d) copies of the master plan of the settlement certified in the established manner, decisions on its approval (in case of changes in the boundaries of the settlement) d) copies from the land management plan and a feasibility study of the use and protection of land of the administrative-territorial unit (education), and in the absence of it - copies from the project for the formation of the territories of rural and village councils; e) copies from cadastral maps (plans) with a display of existing (if any) and design boundaries of the administrative-territorial unit; f) the explication of land in the existing (if any) and design limits of the administrative-territorial unit; g) a description of the boundaries of the administrative-territorial units; h) project approval materials; i) materials for the removal of the boundaries of administrative-territorial units in kind (in the area) with a

Continuation of table B.9

1	2
	catalog of coordinates of their turning points. A land management project to establish (change) the boundaries of an administrative-territorial unit is subject to approval by village, township, city, district councils, district state administrations, through whose territory it is planned to expand its borders. In the case of expanding theboundaries of the settlement at the expense of the territory that is not part of the corresponding region or if the district council is not formed, the project is coordinated with the Council of Ministers of the Autonomous Republic of Crimea, the regional state administration. Information on the establishment (change) of the boundaries of administrative-territorial units shall be entered into the State Land Cadastre. Information on the established (changed) boundaries of the administrative-territorial units is indicated in the extract from the State Land Cadastre, which is issued free of charge to the corresponding village, town, city, district, regional council. An integral part of the land management project to establish and change the boundaries of a settlement is a list of state-owned land plots (indicating their cadastral numbers, location, area and purpose), which are transferred to the communal property of the respective territorial community. Land management projects for the organization and establishment of the boundaries of the territories of the nature reserve fund and other nature protection purposes, recreational, recreational, historical and cultural, forestry purposes, lands of the water fund and water protection zones, restrictions on the use of lands and their regime of authoritative objects. Land management projects for the organization and establishment of the boundaries of the territories of the nature reserve fund and other nature protection purposes, recreational, recreational, historical and cultural, forestry purposes, lands of the water fund and water protection zones, restrictions on the use of lands and their regime-establishing objects are developed in order to: a) preservation of the natural diversity of landscapes, environmental protection, maintaining the ecological balance; b) the creation of places for organized treatment and rehabilitation of people, mass recreation and tourism; c) the creation of suburban green areas, the conservation and use of cultural heritage sites; d) conducting research work; d) the establishment of the boundaries of water protection zones and coastal protection zones; e) determining in kind (on the ground) the boundaries of protected zones and other restrictions on land use

Continuation of table B.9

1	2
	established by laws and regulatory legal acts adopted in accordance with them, as well as informing landowners, land users, other individuals and legal entities about such restrictions.

Table B.10

The main directions of land valuation [310]

Assessment Directions	Characteristic
1	2
Soil appraisal	Soil appraisal data is an integral part of the state land cadastre and is the basis for the economic assessment of agricultural land and is taken into account when determining the environmental suitability of soils for growing crops, as well as losses of agricultural and forestry production. Soil appraisal is carried out in accordance with state standards, norms and rules, as well as other regulatory legal acts on agricultural lands and forest resources. Soil appraisal on agricultural lands is carried out at least once every 7 years. Soil appraisal is carried out by legal entities that are developers of land management documentation in accordance with the Law of Ukraine «On Land Management».
Economic valuation of land	Data on the economic valuation of land is the basis for carrying out a normative monetary valuation of land plots, analyzing the efficiency of land use compared to other natural resources and determining the economic suitability of agricultural land for growing crops. Economic valuation of land is carried out in accordance with state standards, norms and rules, as well as other regulatory legal acts on agricultural land, regardless of ownership. Economic valuation of agricultural land is carried out at least once every 5-7 years. Economic valuation of land is carried out by legal entities that are developers of land management documentation in accordance with the Law of Ukraine «On Land Management».
Monetary valuation of land	Monetary valuation of land depending on the purpose and procedure can be normative and expert. The normative monetary valuation of land plots is used to determine the amount of land tax, state duty for exchange, inheritance (except for cases of inheritance by the heirs of the first and second priority according to the law (both cases of inheritance by law and inheritance by will) and by right of representation, as well as cases of inheritance of property, the value of which is taxed at a zero rate) and donation of land in accordance with the law, rent for state and communal land plots Noah owner ship, loss of agricultural and forestry production, the cost of the land area of over 50 hectares to

Continuation of table B.10

1	2
	accommodate outdoor sports and health and fitness facilities, as well as the development of indicators and mechanisms of economic encourage the sustainable use and protection of land. Regulatory monetary valuation of land is carried out in case of: determining the amount of land tax; determining the amount of rent for land plots of state and municipal property;determining the size of the state fee for exchange, inheritance (except for cases of inheritance by the heirs of the first and second priority according to the law (both cases of inheritance by the law and cases of inheritance by will) and by right of representation, as well as cases of inheritance of property, the value of which is taxable at zero rate) and donation of land in accordance with the law; determination of losses of agricultural and forestry production; development of indicators and mechanisms for economic incentives for the rational use and protection of land; alienation of land plots with an area of more than 50 hectares that belong to state or communal ownership, for the placement of open sports and fitness facilities. Regulatory monetary valuation of land is carried out in accordance with state standards, norms, rules, as well as other regulatory legal acts on lands of all categories and forms of ownership. Normative monetary valuation of land is carried out: located within settlements regardless of their intended purpose – at least once every 5–7 years agricultural land located outside populated areas – at least once every 5–7 years, and non-agricultural land – at least once every 7–10 years. The normative monetary valuation of land is carried out by legal entities that are developers of land management documentation in accordance with the Law of Ukraine «On Land Management». Expert monetary valuation of land plots and rights to them is carried out in order to determine the value of the valuation object. An expert monetary valuation of land plots is used in the implementation of civil law agreements regarding land plots and rights to them, except as otherwise provided by this Law, as well as other laws. Expert monetary valuation of land is carried out in the case of: alienation and insurance of land belonging to state or communal property; pledge of land in accordance with the law; determination of the investment contribution to the implementation of the investment project for land improvements; determination of the value of land plots related to state or communal ownership, if they are included in the authorized capital of a business company; determination of the value of land during the reorganization, bankruptcy or liquidation of a business company (enterprise) with a state share or a share of communal property that is the owner of the land; the allocation or determination of the share of the state or territorial

Continuation of table B.10

1	2
	community in the composition of land in common ownership; displaying the value of land and the right to use land in accounting in accordance with the legislation of Ukraine; determination of losses to owners or land users in cases established by law or contract; court decisions. In all other cases, a monetary valuation of land may be carried out by agreement of the parties and in cases specified by this and other laws of Ukraine. Expert monetary valuation of land is carried out on the basis of such methodological approaches: capitalization of net operating or rental income from the use of land; comparison of selling prices of similar land plots; accounting for land improvement costs. Expert monetary valuation of land free from buildings and structures for agricultural commodity production, personal peasant farming, is carried out in connection with the redemption of these land plots for public needs or their forced alienation based on social need, based on a methodological approach to the capitalization of net operating or rental income from the use of land, taking into account their use for their intended purpose (use), established on the day of the decision on the redemption of such land for public use. Expert monetary valuation of land plots is carried out by the subjects of land valuation in accordance with the requirements of this Law, the Law of Ukraine «On Valuation of Property, Property Rights and Professional Valuation Activities in Ukraine», as well as other regulatory legal acts and state standards, norms and rules.

Table B.11

The definition of urban factors affecting the directions and features of the territorial development of land use in regions [73, 74, 95, 312]

Name of factors	Characteristic
1	2
Zonal	formation of decisions on the planning and development of the territory; allocation of zones of limited urban development; display of the existing development of territories, engineering and transport infrastructure, as well as the basic elements of the planning structure of the territories; taking local conditions into account when determining functional zones establishing for each zone the permitted and permissible types of use of territories for urban development needs, conditions and restrictions of their development; coordination of the boundaries of zones with the boundaries of territories of natural complexes, strips of

Continuation of table B.11

1	2
	sanitary-protective, sanitary, security and other zones of limited use of land, with red lines; mapping the boundaries of coastal protection strips and beach areas of water bodies. Types of zones: public areas (business areas – designed to accommodate administrative, scientific, business, financial, related transport infrastructure elements (parking lots, parking lots). Residential buildings can also be located in public areas; training zones – designed to accommodate institutions of secondary specialized and higher education. Zones of higher and secondary special educational institutions are established with the aim of concentrating educational and related functions: educational, informational, cultural, recreational, leisure; cultural and sports zones – designed for the location of large cultural and sports and entertainment complexes, concert halls, theaters, cinemas, etc. treatment zones – designed to accommodate hospitals, clinics, dispensaries, pharmacies. Shopping areas – designed to accommodate shops, shopping centers, markets) residential areas (homestead development – the location of single-family residential buildings with floors with land plots and semi-detached single-family residential buildings on neighboring land plots. It is allowed to place facilities for servicing this zone, garages for storing cars, engineering and technical facilities; blocked low-rise buildings – the location of blocked residential buildings with access from each apartment to a land plot with a storey of up to 3 floors. It is allowed to place facilities for servicing this zone, garages for car storage, and engineering and technical support facilities; mixed residential development of medium floors and public buildings - the location of multi-apartment residential buildings, associated objects of daily maintenance, non-commercial communal facilities, as well as individual objects of citywide significance; mixed multi-storey residential development and public development – the location of multi-storey residential buildings with a storey above 5 floors, accompanying objects of daily public services, utilities, individual objects of citywide significance); recreational zones (recreational zones of natural landscapes, to ensure the preservation of unique natural landscapes - objects. The purpose of the organization of the zone is to preserve valuable natural features and landscapes; planning town-planning measures should be carried out with minimal impact on vulnerable elements of the natural environment; recreational zones of active recreation are appointed to perform active

Continuation of table B.11

1	2
	recreational functions, which include urban areas of common use with the corresponding facilities for I have an active recreation of the population and community centers. These territories should be provided with a high level of improvement, a proper list of permanent structures for outdoor activities, temporary structures and other objects of related activities, recreation areas of green areas of general use are intended for everyday recreation of the population and include parks, squares, gardens, boulevards, urban forests, ponds; recreational areas of cottages and collective gardens).
Define urban development activities of the lands of regions	principles of spatial planning organization of development; red lines and building regulation lines; functional purpose, mode and parameters of the development of one or more land plots, the distribution of territories in accordance with building codes, state standards and rules; urban planning conditions and restrictions (in the absence of a zoning plan for the territory) or clarification of urban planning conditions and restrictions in accordance with the zoning plan of the territory; the need for enterprises and public services, their location; expediency, volumes, sequence of reconstruction of buildings; sequence and volumes of engineering preparation of the territory; engineering network system; the organization of transport and pedestrian traffic; the procedure for comprehensive improvement and landscaping, the need for the formation of an ecological network; boundaries of coastal protective strips and beach areas of water bodies (in the absence of a zoning plan for the territory).
Functional planning, which determine urban development in the settlements in regions	volumes of housing construction; characterization of territories (plots) for new housing construction in free territories, within and outside the settlement, as well as in reconstruction areas by capacity, number of floors and building density with the allocation of territories for the formation of land for the construction of social and affordable housing; summary data on the need for territories for all types of construction; ecological and urban planning characteristics of the planned urban development with the definition of planning measures to improve the environment; ecological and town-planning characteristic of the planned territorial development of a settlement, taking into account the value of land or property complexes in adjacent

Continuation of table B.11

1	2
	territories, compensation and other expenses associated with a change in functional use or inclusion in a city line; the formation of architectural and spatial composition; areas of green areas of common use, general greening of the territory of a settlement; classification of main streets, roads and their intersections, determination of the directions of construction (reconstruction) of main streets, the use of underground space, the construction of bridges, tunnels, traffic intersections, bicycle paths and pedestrian zones, the density of the street network (with the allocation of this indicator for each category of main streets separately); characteristics of engineering equipment by type (water supply, drainage, gas, electricity, heat supply) and the principles of their development, taking into account the outstripping pace of construction in relation to residential development; engineering measures for the development of the territory, including suburban, for development or other uses; limits of the territory of priority development and placement of construction projects for the forecasted stage of 7–10 years design, organizational and engineering measures to improve the environmental condition of territories (including suburban), their preparation for development; proposals for the placement of construction projects, ensuring urban development for the forecast stage of 7–10 years.
Structural planning	residential areas (manor, low-rise, low-rise, high-rise, multifunctional, public housing): community centers and the main objects of city and regional significance, public and business development, existing buildings, indicated on a cartographic basis; main and residential streets and squares; green areas for general use, landscaped areas for special purposes (landscaped sanitary protection zones, coastal protection zones, nurseries and greengrocery farms) industrial, communal and storage areas; resort areas; landscape and recreational territories, including: the territory of horticultural partnerships, summer cottages, recreational facilities and leisure, resort hotels; forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of the nature reserve fund; territory of agricultural enterprises; agricultural areas; facilities for engineering protection of the territory; main engineering infrastructure facilities; monuments of history and culture of national and local

Continuation of table B.11

1	2
	significance; city limit (existing) the main designed objects, land allotments.
Planning and restrictive	seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes; zones of gas contamination, excess noise, electromagnetic radiation, radiation pollution; mineral deposits; sanitary protection zones of industrial enterprises, cemeteries and other communal facilities; building restriction zones in airport areas from flight safety conditions; districts and zones of sanitary protection of the resort; sanitary protection zones of water supply sources, water treatment facilities; protective zones of quarries, dumps, pipelines and other objects; water protection zones and coastal protective strips of water bodies and streams; territories and protection zones of nature reserves, natural monuments, architecture, history and culture and regulation zones of buildings, landscapes, protected; valuable productive land.
Engineering training and equipment of territories	zoning of industrial and communal areas according to the sanitary classification of production; planned sanitary protection and security zones; sites of the territory that require a significant amount of backfilling or cutting of soil, drainage, vitrofuvannya; urban hydraulic structures; sections of riverbeds and other bodies of water that are subject to regulation, treatment, bottom sagging, confinement in pipes; water protection zones and coastal protective strips of water bodies; remediation measures for disturbed areas; engineering structures and sources; trunk networks of water, heat, electricity, gas; storm sewage and sewage treatment plants; places of release of treated wastewater; high voltage power lines; main communication objects; electronic and low-current devices.
Transport support	classification of the road network; main objects and lines of urban and external transport; routes and facilities of non-street rail public transport; placement of a metro depot, tram, bus and trolleybus parks, garages and parking lots of cars and trucks; measures to improve the road network and passenger transport system; basic designed objects; volumes of car and passenger flows depending on the complexity of the flows.
Historical and architectural	monuments of national and local significance of all types and types according to the classification of cultural heritage objects; identified objects of cultural heritage of all types and types according to the classification of cultural heritage objects; historical buildings (significant and ordinary historical buildings: public, including religious; residential and household, industrial and

Continuation of table B.11

1	2
	fortifications) territories that have the status of lands of historical and cultural purpose; places of lost buildings, structures, fortifications, had important historical or urban significance; buildings and structures are disharmonious; natural monuments, nature reserves, valuable natural landscapes; borders of historical areas of populated areas; the boundaries of the zones of protection of cultural heritage monuments that are valid at the time of the preparation of the historical and architectural reference plan (if there are protection zones approved in the past) lists of cultural heritage objects reflected on the historical and architectural reference plan; the boundaries of the settlement at each stage of development, the most important historical routes, streets, squares, historical buildings, structures and complexes, traces of preserved and lost lines of fortifications; main natural axes and nodes; watersheds, thalwegs, facets of slopes, mountains, rocks, floodplains, rivers, streams, lakes, ponds, forests, squares, gardens, parks, meadows, fields; characteristic areas of the natural landscape; monuments of landscape gardening art, natural monuments, nature reserves, nature reserves, etc.; the limits of the historical city center (in the presence of defensive ramparts or walls along these defensive structures), a suburb, and the like; historical and modern urban dominants, architectural accents, architectural ensembles and complexes, main and subordinate planning and compositional axes and nodes, characteristic types of urban spaces (closed, open, disharmonious), facets of slopes, water surfaces; areas of review of architectural monuments are architectural dominants and accents; survey points, axes, fronts; formation zones of species; characteristic distances (qualitative thresholds) of the species disclosure of architectural monuments; natural slopes dominants, water surfaces, green spaces; located outside the village and the objects of cultural heritage historically connected with it, the main directions for exploring its historical center from the entrances to it, valuable landscapes.

Table B.12

The order and features of waste management [298]

Directions and features of waste management	Characteristic
1	2
Waste Management Areas	ensuring the complete collection and timely disposal and disposal of waste, as well as compliance with

Continuation of table B.12

1	2
	environmental safety rules when handling them; minimization of waste generation and reduction of its hazard; ensuring the integrated use of material resources; facilitating the maximum possible disposal of waste through direct reuse or alternative use of resource-valuable waste; ensuring safe disposal of non-recyclable waste by developing appropriate technologies, environmentally friendly methods and means of waste management; organization of control over places or objects of waste disposal to prevent their harmful effects on the environment and human health; the implementation of a range of scientific, technical and marketing research to identify and determine the resource value of waste with a view to their effective use; assistance in the creation of waste managementfacilities; ensuring social protection of workers involved in waste management; obligatory accounting of wastes based on their classification and certification; creation of conditions for the implementation of separate collection of household waste by introducing socio-economic mechanisms aimed at encouraging educators to waste their separate collection; assistance in attracting non-state investments and other extrabudgetary sources of financing in the sphere of waste management.
Standardization in the field of waste management	In the field of waste management, the following standards are established: limit indicators of waste generation in technological processes; specific indicators of waste generation, use and loss of raw materials in technological processes; other standards provided by law. Standards in the field of waste management are developed by the relevant ministries, other central executive bodies, enterprises, institutions and organizations in coordination with the authorized executive bodies for environmental protection.
State accounting and certification of waste	All waste generated on the territory of Ukraine is subject to state registration and certification. State accounting and certification of waste is carried out in the manner established by the Cabinet of Ministers of Ukraine. The system and forms of reporting, the procedure for the provision and use of relevant information on waste, as well as the procedure for reviewing their nomenclature are developed on the basis of the state waste classifier and are approved by the central executive authority, which ensures the formation of state policy in the field of statistics, on the proposal of

Continuation of table B.12

1	2
	the central executive authority, ensures the formation public policy in the field of environmental protection and other interested centers ial enforcement authorities.
Maintaining a register of waste generation, processing and disposal facilities	In order to ensure the collection, processing, storage and analysis of information on waste generation, processing and disposal facilities, a register is maintained which defines the nomenclature, generation volumes, quantitative and qualitative characteristics of the waste, information on its treatment and measures to reduce waste generation and degree of danger. The register of waste generation, processing and disposal facilities is maintained on the basis of reporting data from waste producers, information from authorized executive authorities in the field of waste management.
Maintain a register of waste disposal sites	In order to fully account for and describe functioning, closed and mothballed waste disposal sites, their qualitative and quantitative composition, as well as to monitor the impact of waste on the environment and human health, a register of waste disposal sites is maintained. The register of waste disposal sites is maintained on the basis of relevant passports, reporting data from waste producers, and information from authorized executive authorities in the field of waste management. The registry data is subject to annual updating.
Monitoring of places of formation, storage and waste removal	In order to determine and predict the impact of waste on the environment, timely identification of negative consequences, their prevention and elimination of waste producers, their owners, as well as the central executive body implementing state policy in the field of environmental protection, regional, Kiev and Sevastopol city state administrations, and on the territory of the Autonomous Republic of Crimea - the executive authority of the Autonomous Republic of Crimea on environmental protection Naturally in the environment they monitor the places of formation, storage and disposal of waste. Monitoring of places of formation, storage and disposal of waste is part of a unified system of state monitoring of the environment.
Functional factors to reduce or prevent waste generation	development and implementation of scientifically based standards for waste generation per unit of output (raw materials and energy), the performance of work and the provision of services that regulate their quantitative and qualitative composition, in accordance with advanced technological achievements; periodic review of established standards for waste generation, aimed at reducing their volumes, taking into account the best domestic and foreign experience and

Continuation of table B.12

1	2
	economic opportunities; development and implementation of a system for handling packaging materials and containers; the formation of a system for the collection, removal, disposal and disposal of waste oils (oils) the formation of a system for the collection, preparation and disposal of used tires, rubber products and waste rubber products; the formation of a system for the procurement and disposal of unusable vehicles; the formation of a system for the collection and disposal of electrical and electronic equipment; the formation of a system for the collection, disposal, disposal, disposal of waste generated in the process of medical care, veterinary practice, related work; development of general requirements for the management of household waste; development of a system of informational, scientific and methodological support for waste producers with information on technological and other possibilities for reducing the volume of education and disposal waste; carry out any economic activity related to waste generation without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements of the Law; use the results of scientific research, introduce inventions into practice, apply new equipment, imported equipment, technologies and systems if they do not provide for the prevention or minimization of waste generation at all stages of the technological process, their disposal and safe disposal; determine the location of enterprises, installations, landfills, complexes, storages and other waste management facilities, design and build regional and interregional complexes for the treatment, disposal, disposal and disposal of waste, if they do not meet environmental and sanitary - hygienic requirements; make a decision on the location and development of cities and other settlements without determining technical and other measures to create conditions for the disposal or disposal of household waste; put into operation new and reconstructed enterprises and other facilities that are not equipped with equipment and technologies for the safe management of waste, and in the absence of data necessary to assess their impact on the environment and human health, in accordance with the established procedure; transfer or sell hazardous waste to citizens, enterprises,

Continuation of table B.12

1	2
	institutions and organizations if they do not ensure the disposal or disposal of this waste in an environmentally friendly way; involve children and adolescents in the organized collection of waste (as secondary raw materials) that are hazardous to health;to violate the terms of processing of waste imported into Ukraine in accordance with the established quotas of conditions; violate the established quotas for the import into Ukraine of waste as secondary raw materials; import into Ukraine, with the exception of transit transportation, of any waste for the purpose of storage or disposal; waste storage and disposal are carried out in accordance with environmental safety requirements and methods that ensure maximum use of waste or transfer it to other consumers a special passport is compiled for each place or object of storage or disposal of waste, which indicates the name and code of the waste (according to the state classifier of waste), their quantitative and qualitative composition, origin, as well as technical characteristics of places or objects of storage or disposal and information on control methods and the safe operation of these places or facilities; waste disposal is carried out in accordance with environmental safety requirements established by law with the obligatory provision for the possibility of disposal or disposal of residual products in agreement with the central executive authority that implements the state policy in the field of sanitary and epidemic welfare of the population; waste storage and disposal are carried out in places determined by local authorities taking into account the requirements of land andenvironment al legislation, if there is a permit for operations in the field of waste management, which defines the type and amount of waste, general technical requirements, safety measures, information about the creation purpose, methods of waste treatment in accordance with the established conditions for their storage; designated places for storage and disposal of waste or facilities should only be used for waste declared for permission to conduct operations in the field of handling waste; mixing or burial of waste for the disposal of which in Ukraine there is an appropriate technology is prohibited; mixing or burial of waste for the disposal of which in Ukraine there is an appropriate technology is prohibited; unauthorized dumping and disposal of waste, including household waste, in underground horizons, on the

Continuation of table B.12

1	2
	territory of cities and other settlements, on the territories of the nature reserve fund, on the lands of nature conservation, health, recreation and historical and purposes, is prohibited within water protection zones and zones sanitary protection of water bodies, in other places, can create a danger to the environment and human health; landfill in the bowels is allowed in exceptional cases according to the results of special studies in compliance with the standards, norms and rules stipulated by the legislation of Ukraine; ensuring the prevention of environmental pollution by them, and in the event of such pollution – eliminate pollution and its consequences for the environment and human health; adoption of measures aimed at preventing accidents, limiting and eliminating their consequences and protecting people and the environment from their effects; informing about the accident that occurred at the specified facility, and about measures taken to eliminate its consequences, executive authorities, local authorities and the public; ensuring the operation of these facilities and the transport of hazardous waste in compliance with environmental requirements legislation; licensing for operations in the field of handling hazardous waste (not subject to licensing storage (accumulation) by the business entity of hazardous waste generated by them, if hazardous waste is transferred to business entities that are licensed to conduct operations in the field of handling hazardous waste within one year from the date of formation) identification of hazardous waste management facilities in accordance with the Law of Ukraine «On hazardous facilities»; planning for localization and liquidation of an accident at the facility formation of security measures; setting environmental tax rates for waste disposal, with differentiation depending on the level of hazard of the waste and the value of the territory; providing business entities that utilize, reduce waste generation and introduce low-waste technologies into production, in accordance with the legislation of tax, credit and other benefits; the provision in the manner prescribed by law of tax, credit and other benefits to business entities that give waste as secondary raw materials and are engaged in the collection and preparation of such waste; prioritization of financing under the state contract of enterprises implementing low-waste technologies, process and utilize waste;

Continuation of table B.12

1	2
	revision of the list of wastes for which, taking into account state interests, a special regime should be established to stimulate their collection, storage and use; targeted funding for research on specific problems of waste management and reduction of their generation; creation of funds for targeted financing of waste management activities through voluntary contributions from waste producers, their owners, domestic and foreign business entities, individual citizens, environmental insurance and the like; Formation of a state data bank on waste management technologies introduced in Ukraine.

Table B.13

Emergency measures in the system of territorial development of land use in regions to ensure the implementation of environmental trends [140]

Activities	Characteristic
1	2
Threat or Emergency Alerts	provided by: the functioning of national, territorial, local automated systems for centralized notification of threats or emergencies, special, local and object warning systems; the centralized use of public telecommunication networks, including mobile (mobile) communications, departmental telecommunication networks and telecommunication networks of business entities in the manner established by the Cabinet of Ministers of Ukraine, as well as networks of national, regional and local broadcasting and television and other technical means of transmission (display) information; automation of the process of transmitting signals and messages about a threat or emergency; functioning at high-risk facilities of automated systems for early detection of emergency situations and alerts; organizational and technical integration of various systems of centralized warning about the threat or occurrence of emergency situations and automated systems for early detection of emergency situations and warning; functioning in populated areas, as well as places of mass presence of people, signal-loud-speaking devices and electronic information boards for transmitting information on civil protection issues.
Emergency information and warning	information on civil protection issues is compiled by information on emergencies that are predicted or arising with a definition of their classification, distribution

Continuation of table B.13

1	2
	boundaries and consequences, as well as methods and methods of protection against them; civil protection management bodies are obliged to provide the population through the media with timely and reliable information specified in the first part of this article, as well as about their activities on civil protection issues, including in a form accessible to people with visual and hearing impairments; the information should contain information about the entity that provides it, and the scope of its activity, about the nature of the possible risk of accidents, including exposure to people and the environment, about how to inform the public in case of a threat or occurrence of an accident and the behavior that should be observed; Disclosure of information on the consequences of an emergency is carried out in accordance with information legislation.
Shelter of the population in protective structures of civil protection	implementation of measures to create protective structures; design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the standards; requirements for the maintenance and operation of protective structures are determined by the central executive body, which ensures the formation and implements state policy in the field of civil protection; maintenance of civil defense protective structures in readiness for intended use is carried out by the business entities on whose balance they are (including structures not included in their authorized capital during privatization (corporatization), at their own expense control over the readiness of civil protection protective structures for intended use is provided by the central executive body, which exercises state supervision in the field of technological and fire safety, together with the relevant bodies and civil protection units, local state administrations.
Evacuation Activities	evacuation directions: the formation of regional, local and facility authorities for evacuation and evacuation planning; identification of safe areas suitable for accommodating the evacuated population and property; organizing alerts to managers of business entities and the population about the start of evacuation; evacuation management organizations; life support of the evacuated population in places of their safe location; training the population in evacuation activities.
Engineering protection of territories	includes:

Continuation of table B.13

1	2
	zoning of territories based on the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergency situations associated with them; classifying cities as relevant civil protection groups and classifying business entities as appropriate categories of civil protection; development and inclusion of requirements of engineering and technical measures of civil protection for the relevant types of urban planning and design documentation and their implementation during construction and operation; taking into account possible manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and the negative consequences of accidents in the development of master plans for settlements and urban planning; placement of hazardous facilities taking into account the consequences of accidents that may occur at such facilities; development and implementation of measures for the trouble-free operation of high-risk facilities; construction of structures, buildings, engineering networks and transport communications with specified levels of safety and reliability; construction of landslide, flood, anti-mudflow, avalanche, erosion and other engineering structures for special purposes, their maintenance in a functional state; inspection of buildings, structures, engineering networks and transport communications, development and implementation of measures for their safe operation; other measures of engineering protection of territories depending on the current situation.
Radiation and chemical protection of the population and territories	include: identification and assessment of radiation and chemical conditions; organization and implementation of dosimetric and chemical control; development and implementation of standard radiation protection modes; use of collective protective equipment; the use of personal protective equipment, radiation and chemical reconnaissance devices, dosimetric and chemical control by emergency services, units and specialized civil protection services involved in emergency and rescue and other emergency operations, fighting fires in foci of damage to radiation and chemically hazardous objects and the public living in

Continuation of table B.13

1	2
	areas of dangerous pollution; conducting iodine prophylaxis for rescuers involved in the liquidation of a radiation accident, personnel of radiation hazardous facilities and the population living in areas of possible contamination with radioactive iodine isotopes in order to prevent thyroid irradiation; providing the public with the opportunity to purchase for personal use personal protective equipment, dosimetric and chemical control devices; carrying out sanitary treatment of the population and special treatment of clothing, property and vehicles; development of general criteria, methods and observation techniques for assessing radiation and chemical conditions; other radiation and chemical protection measures, depending on the current situation.
Medical protection, ensuring sanitary and epidemic welfare of the population	include: providing medical assistance to victims of emergency situations, rescuers and other persons, were involved in emergency rescue and other emergency operations, fighting fires, and conducting their medical and psychological rehabilitation. Medical assistance to the population is provided by the disaster medicine service, the management of which is carried out by the central executive authority, which ensures the formation and implementation of state health policy;planning and use of the forces and means of healthcare institutions regardless of ownership; timely use of preventive medicines and timely implementation of sanitary and anti-epidemic measures; quality and safety control of food products and food raw materials, drinking water and water supply sources; early creation and training of special medical units; education in emergency situations the necessary number of additional temporary mobile medical units or the involvement of additional health facilities; accumulation of medical and special property and equipment; training and retraining of medical workers in the provision of emergency medical care; training the population in ways of providing medical care and personal hygiene; implementation of measures to prevent the negative impact on the health of the population of harmful environmental factors and the consequences of emergency situations, as well as conditions for the occurrence and spread of infectious diseases; monitoring of the state of the environment, sanitary-hygienic and epidemic situation; sanitary protection of territories and business entities in the emergency zone; the implementation of other activities related to the medical protection of the population, depending on the situation.

Continuation of table B.13

1	2
Biological protection of the population, animals and plants	includes: timely identification of factors and organization of biological infection, its localization and elimination; predicting the extent and consequences of biological contamination, the development and implementation of timely antiepidemic, preventive, antiepizootic, antipyphotic and therapeutic measures; carrying out emergency non-specific and specific prevention of biological infection of the population; timely use of personal and collective protective equipment; the introduction of restrictive anti-epidemic measures, surveillance and quarantine; implementation of disinfection measures in the source of infection, disinfection of business entities, animals and sanitary treatment of the population; emergency medical care for affected biological pathogens; other biological protection measures as appropriate; biological protection of the population, animals and plants additionally includes the establishment of antiepidemic, antiepizootic and antipyphotic regimes and their observance by business entities, healthcare institutions and the public.
Psychological protection of the population	includes: planning activities related to psychological defense; timely use of licensed and approved for use in Ukraine information, psycho-prophylactic and psychocorrectional methods of influencing a person; the identification using psychological methods of factors contributing to the emergence of socio-psychological tension; the use of modern psychological technologies to neutralize the negative impact of emergency factors on the population; the implementation of other psychological defense measures, depending on the situation.
Fire safety	includes: ensuring fire safety in Ukraine, regulating relations in this sphere of state authorities, local governments and business entities and citizens are carried out in accordance with this Code, laws and other regulatory legal acts. Activities to ensure fire safety is a component of production and other activities of officials and employees of enterprises, institutions and organizations. The specified requirement is reflected in labor contracts (contracts), charters and regulations; ensuring fire safety of the enterprise is assigned to the

Continuation of table B.13

1	2
	owners and heads of such business entities; powers in the field of fire safety of associations, corporations, concerns, other business associations are determined by their charters or agreements between business entities that formed the association. To perform the functions delegated to the association, a fire safety service is created in his device. the responsibility for ensuring fire safety in the design and development of settlements, the construction of buildings and structures rests with architecture authorities, customers, developers, design and construction organizations; the obligation to ensure fire safety in the premises of the state, communal, public housing fund, housing cooperatives fund rests with tenants and apartment owners, and in residential premises of a private housing fund and other structures, private estates, summer cottages and garden houses with household structures and buildings - to their owners or tenants, if this is due to a contract of employment.

Annex C

Description of regional programs for the development of land relations in Ukraine

Table C.1

Description of regional programs for the development of land relations in Ukraine

Land Development Programs	Characteristic
1	2
In the Kherson region	1. Justification of ways and means of solving the problem: phased restoration of an ecologically balanced ratio of land in zonal land use systems; decrease in plowing of the land fund of the region; compliance with environmental requirements for the protection of land during land management; increasing soil fertility due to fertilizer application in optimal norms and ratios, chemical soil reclamation, introduction of scientifically based crop rotation; prevention of degrading soil cover processes, including on agricultural lands, through the introduction of soil protection technologies and other measures for the conservation and reproduction of soil fertility, conservation of degraded, unproductive lands; adoption of soil protection measures, taking into account the land management schemes that determine the optimal structure of land on the basis of the agro-resource potential of soils or lands; development and implementation of environmentally balanced land use systems that can ensure the stability of soil-biological ecosystems, restore soil fertility, and constantly increase agricultural productivity based on resource conservation; restrictions on the withdrawal (redemption) of especially valuable agricultural land for non-agricultural needs; completion of a complete inventory of the land fund, its quantitative and qualitative assessment, delimitation of the land fund by levels of land ownership; zoning of the territory with the definition of the boundaries of zones with a special regime for the use of land for environmental, recreational, recreational and historical-cultural purposes; establishing the boundaries of administrative-territorial units; efficient and rational use of state property lands; mapping land; conducting soil surveys, adjusting materials from previously conducted surveys; compilation of cadastral plans for restrictions and encumbrances on land use; updating the monetary value of the land of settlements and the implementation of the monetary value of agricultural land within the time period established by applicable law.

Continuation of table C.1

1	2
	2. Objectives of the program: analysis of the use and protection of land; updating of planning and cartographic materials on agricultural land; implementation of a set of works on the examination of soils and agricultural lands for pollution with heavy metals, nitrates, pesticides; stopping land degradation processes and reducing soil fertility; development of projects and work on the conservation of unproductive, degraded and unsuitable for agricultural use lands with their subsequent transfer to natural lands or afforestation; reclamation of disturbed lands; introducing a modern state land cadastre as the basic basis for maintaining a European-style registration system, which will include the registration of not only land plots, but also real estate, they are placed on them, including restrictions and encumbrances on them; the introduction of effective mechanisms of the land market, including tendering, auctions, mortgages of land plots, etc., while strengthening the protection of citizens – land owners from unpredictable taxes; conducting an inventory of lands of all forms of ownership in order to establish the boundaries of administrative-territorial units, providing planning and cartographic material and index maps, introducing an innovative mechanism for managing state and communal property lands; the territorial organization of agrolandscapes through land management of the territories of new agroformations, ensuring their self-regulation with minimal energy costs, increasing security from destructive processes; carrying out work on the preparation of projects for the organization of territories of newly created agricultural enterprises; creation of digital maps; development of land management projects that provide environmental and economic justification of crop rotation and land management; development of land management schemes and feasibility studies for the use and protection of land. 3. The main directions of development of land relations: development of national and regional land use and conservation programs; development of land management schemes and feasibility studies for the use and protection of land of administrative-territorial units; improving the system of land taxation and monetary valuation of land plots, state support of land owners and land users, state and self-governing control over land use; scientific justification of the distribution of land for its intended purpose, taking into account state, public and private interests; creating a database for economic, legal, environmental and urban planning mechanisms for regulating land relations; creation of an appropriate infrastructure for the effective functioning

Continuation of table C.1

1	2
	of land relations (land banks, stock exchanges, mortgage lending systems, issues, etc.) [322].
In the Rivne region	1. Justification of ways and means of solving the problem: land inventory work and development of land management projects to establish (change) the boundaries of administrative-territorial entities; development of land management projects regarding the improvement of the territory of settlements; development of land management projects for the privatization of lands of state and municipal agricultural enterprises, institutions and organizations; adjustments and updates of materials of soil surveys of agricultural lands and implementation of land conservation measures (improvement, conservation and land reclamation) development of land management projects to organize and establish the boundaries of the territories of the nature reserve fund and other nature protection purposes, recreational, recreational and historical-cultural purposes, lands of the water fund and water protection zones; preparation of land management schemes and a feasibility study for the use and protection of land of administrative-territorial entities; formation of a database of the State Land Cadastre monetary valuation and land market; improving the efficiency and environmental safety of the use of land by society; rationalization (optimization) of land use and create an attractive and sustainable investment in land use; an increase in revenues from land payments to budgets of all levels; providing favorable conditions for the planned and sustainable development of all territories of the region and efficient land management creation of an effective system of protection of land ownership rights; improving the use and protection of land resources; the introduction of an effective system of informing the population and raising the level of public awareness on the use and protection of land, the functioning of the land market; improving the environmental situation in the region; land structure optimization; implementation of conservation of degraded and unproductive lands; reclamation of disturbed lands with their involvement in economic circulation and the like; ensuring the development of land management schemes and feasibility studies on the use and protection of land to ensure the organization of rational use and protection of land; land inventory, formation of objects and establishment of the boundaries of the water, nature reserve, recreational and historical and cultural funds of lands, house territories, lands within the security, sanitary protection zones and zones of special land use regimes; thickening the grid of geodetic points;

Continuation of table C.1

1	2
	preparation of a district planning scheme and topographic plans; updating the boundaries of settlements in accordance with urban planning documentation, establishing coastal protective zones, which will finally determine the competence of local councils and executive authorities in terms of land management, promoting the proper taxation of territories and additional budget revenues, as well as ensuring further landscaping with determining development prospects territorial communities; further development of the land market infrastructure, improvement of the economic mechanism of functioning and regulation of the land market; implementation and timely updating of the monetary valuation, which will increase the budget revenues from land payments by 4-7 times, and for local councils this will guarantee the stable filling of local budgets from land payments for the next seven years development of digital cartographic data and remote sensing materials, which can improve the quality of visual analysis of the territory and contribute to the adoption of balanced more effective decisions; completion of work to establish the boundaries of coastal protective strips of water bodies in order to improve their environmental status, conditions for the use of lands of the water fund, creating a favorable regime for their conservation. 2. Objectives of the program: analysis of the use and protection of land and stopping land degradation processes and reducing soil fertility; development of projects and work on the conservation of unproductive, degraded and unsuitable for agricultural use lands with their subsequent transfer to natural lands or afforestation; reclamation of disturbed lands and the introduction of a modern State Land Cadastre as the basic basis for maintaining a European-style registration system, which will include registration of not only land plots, but also real estate, they are placed on them, including restrictions and encumbrances on them; updating planning and cartographic materials; thickening of the grid of geodetic points; production of topographic, geodetic and cartographic materials; the introduction of effective mechanisms of the land market, including holding land tenders (auctions), mortgages of land plots, and the like; conducting an inventory of lands of all forms of ownership, providing planning and cartographic material and index cards, introducing an innovative mechanism for managing state and communal property lands, certifying land rights by state and municipal enterprises, institutions, organizations; the territorial organization of agrolandscapes through land management of the territories of new agroformations, ensuring their self-regulation with minimal energy costs, increasing security from destructive processes;

Continuation of table C.1

1	2
	creation of digital maps; development of land management schemes and feasibility studies for the use and protection of land. 3. The main directions of development of land relations: ensuring sustainable environmental and economic use of land; completion of the reform of land relations in the agricultural sector; improving land monitoring and the procedure for maintaining the State Land Cadastre and cadastral valuation of land; creating an environmentally friendly and cost-effective land use system; ensuring the further development of the land market (in terms of enhancing land tendering) the range of measures includes regulatory, organizational, economic and land management, as well as the introduction of mechanisms and methods for improving land relations, state policy in this area, the development of sustainable land use in urban and rural areas, land management, maintaining the State Land Cadastre, market development land and its protection [320].
In the Dnipropetrovsk region	1. Justification of ways and means of solving the problem: organization of work to increase soil fertility through land reclamation measures (building and restoring the irrigation system, increasing soil fertility by means of plastering) development of land relations and land protection (establishing the boundaries of settlements, conducting an inventory of lands of settlements, making an inventory of lands outside settlements, implementing and updating the normative monetary valuation of lands outside settlements, conducting a normative monetary valuation of lands outside settlements, developing land management projects for allotment of land to combatants who defended independence, sovereignty and territorial integrity Ukraine and took a direct part in the antiterrorist operation, ensuring its implementation, and to members of the families of the deceased combatants). 2. The objectives of the program: pursuing state policy aimed at balanced meeting the needs of the population and economic sectors in land resources, rational use and protection of lands, protecting them from depletion, degradation, pollution, increasing yields of environmentally friendly products and ensuring food security of the state, preserving landscape and biological diversity, creating environmentally friendly living conditions for the population and conducting economic activities, stabilization and building up production volumes in roslinnits ve, increase soil fertility (water regulation, gypsum soils), to ensure the viability of agriculture and its competitiveness in the domestic and foreign markets. 3. The main directions of development of land relations: construction and reconstruction of the irrigation system; soil improvement by gypsum; establishing borders of settlements;

Continuation of table C.1

1	2
	implementation of an inventory of land outside settlements; land inventory in settlements; implementation and updating of the normative monetary valuation of the lands of settlements; conducting a normative monetary valuation of lands outside populated areas; the development of land management projects for the allocation of land to combatants who defended the independence, sovereignty and territorial integrity of Ukraine and were directly involved in the anti-terrorist operation, ensuring its implementation, and to members of the families of the dead combatants [340].
In the Transcarpathian region	1. Objectives of the program: assistance in the development of land relations in the region, the creation of such legal, organizational and economic conditions that would stimulate the desire of each owner or user of a land plot in its legal and effective use, increase responsibility for land protection, encourage citizens to certify ownership of land, and thereby contributed to the development of market relations. Ultimately, this should increase the welfare of citizens and form a powerful social layer of owners. 2. The main directions of development of land relations: establishment and change of borders of administrative-territorial units; drawing up plans for the land and economic structure of the territory of settlements; an inventory of land plots of state enterprises and state authorities in the use of which there are land plots, but the rights to them are registered in the manner prescribed by law; land inventory of settlements; normative monetary valuation of lands of settlements; updating the planning and cartographic materials of settlements on a scale of 1: 2000 and 1: 5000 in accordance with the Land Code of Ukraine [319].
In the Kirovograd region	1. Objectives of the program: ensuring the formation and implementation of a set of interrelated legal, organizational, financial, scientific, technical and other measures that should ensure acceleration of completion in the field of land reform, as well as ensuring the efficient use and appreciation of land resources, creating optimal conditions for a significant increase in social, investment and production potentials of the earth, turning it into an independent factor of economic growth. 2. The main directions of development of land relations: conducting survey work, the construction of anti-erosion facilities and the restoration of disturbed lands; pledged degraded arable land; the preparation of state acts on the right of private ownership of land; development of land management schemes and feasibility studies; use and protection of lands of administrative-territorial units; development of land management projects that provide environmental and economic justification of crop rotation and land management; establishing boundaries of water protection zones;

Continuation of table C.1

1	2
	updating the planning and cartographic material of filming of previous years acquisition of orthophotomaps of satellite images; development of projects for the formation and organization of territories of new land tenure; development of land demarcation projects for communal and state property; establishing borders of settlements; monetary valuation of lands of settlements; monetary valuation of non-agricultural land outside settlements; inventory of land [10].
In Odessa region	1. Justification of ways and means of solving the problem: land inventory is a prerequisite for creating an information base for maintaining the state land cadastre, effective regulation of land relations, rational use of land resources protection, taxation, filling budgets of all levels from the sale of lease rights to land plots, registration of land title documents by state and municipal enterprises and institutions; the development of land management projects to establish (change) the boundaries of administrative-territorial entities will ensure the creation of territorial conditions for the implementation of local self-government in accordance with the administrative-territorial structure and the effective use of the potential of the territories; carrying out a normative monetary valuation of land will ensure the implementation of legal relations arising from the alienation of land plots, including their inheritance, exchange, donation, purchase and sale of land and rights to them, is a means established by law for determining land tax rates and rent, pricing, determination of losses of agricultural and forestry production, development of indicators and mechanisms of economic incentives for rational Nia used and protection of lands; the development of land management projects for the organization and establishment of the boundaries of the lands of the water fund and water protection zones will create and streamline coastal protective strips of water bodies, ensure the environmental safety of water bodies, and improve the regime for the use of land plots assigned to coastal protective strips and water protection zones. 2. The objectives of the program: rational use and protection of land resources aimed at implementing the state policy of Ukraine to ensure sustainable development of land use, equal ownership of land of territorial communities and the state, protection of the rights of owners and users of land, as well as the creation of more favorable conditions for attracting investments in priority sectors of the economy area. 3. The main directions of development of land relations: land inventory work; development of land management projects to establish (change) the boundaries of administrative-territorial entities; carrying out work on the normative monetary valuation of land;

Continuation of table C.1

1	2
	development of land management projects for the organization and establishment of land boundaries of the water fund and water protection zones [336].
In the Vinnitsa region	1. Justification of ways and means of solving the problem: the need for a significant reduction in the area of arable land and production areas (especially under open cast mining, opencast mines, associated facilities for industry, transport and communications) with the transfer of liberated land for other uses and an increase in the land area of nature reserves and other nature conservation, recreational, health and historical-cultural destination, as well as residential and public buildings with increased efficiency of land use within settlements; implementation of measures to increase the soil fertility of agricultural lands, in particular, increase the level of fertilizer application in optimal norms and ratios, conduct chemical soil reclamation in scientifically sound volumes, terms and doses, introduce scientifically based crop rotation, elements of agricultural biologization, resource and energy-saving technologies reproduction of soil fertility and farming; optimization of the proportion between the production and environmental sectors on the basis of a regional intersectoral balance with the environmental block, which characterizes the influence of industries on various components of nature. the formation of an ecological network as a single spatial system of key, connected, buffer and renewable territories; to expand the territory of natural and cultivated landscapes with the goal of promising recreational and therapeutic development of the most populated regions; the need to increase afforestation land inventory is the basic basis for conducting a monetary valuation, maintaining the state land cadastre land inventory; Considering the intensive movement of land plots in recent years (changes in landowners or land users, patterns of ownership, purpose, etc.), it is imperative to complete the land inventory, as well as update the inventory data of previous years information on determining the location of land use objects, their borders, sizes, legal status, identifying lands that are not used or used irrationally, for other purposes, which is the result of land inventory, will increase revenue to budgets of various levels and serve as a solid basis for maintaining the state land cadastre according to the results of the inventory, an information base will be created for maintaining the state land cadastre, regulating land relations, rational use and protection of land resources, taxation of land, delimitation, there will be a dramatic improvement in the quality and cost reduction of these works; in the formation of regional and local budgets, special attention is paid to finding additional sources of their filling and to avoid budget losses from the use of the most stable sources of income, among which a special place is paid by the payment for the use of our main

Continuation of table C.1

1	2
	national wealth – land. The normative monetary valuation of land plots is used to determine the amount of land tax, state duty for exchange, inheritance and donation of land in accordance with the law, rent for land plots of state and communal property, losses of agricultural and forestry production, as well as in the development of indicators and mechanisms of economic incentives rational use and protection of land; in recent years, measures have been taken for the mandatory conduct of a normative monetary valuation of non-agricultural land outside populated areas when they are leased; in the future, the territorial bodies of Derzhgeokadastru in the region plan to continue to ensure the mandatory conduct of a normative monetary valuation of non-agricultural land outside settlements when providing them for rent; land management schemes and feasibility studies for the use and protection of land of administrative-territorial entities are developed with the aim of determining prospects for the use and protection of land, to prepare informed proposals in the field of land relations, the organization of rational use and protection of land, redistribution of land, taking into account the needs of rural, forest and water management, development of villages, towns, cities, territories of recreational, recreational, historical and cultural purpose niya, cause natural-visible Fund and other environmental purposes and the like. 1. Objectives of the program: consists in pursuing a state policy aimed at a balanced provision of the needs of the population and sectors of the economy in land resources; rational use and protection of lands, protecting them from depletion, degradation, pollution; increase crop yields; increasing the production of high-quality and environmentally friendly products and ensuring food security of the state; conservation of landscape and biological diversity and the creation of environmentally friendly living conditions for the population and economic activities. The main strategic goals of the Program are to ensure the priority of environmental safety requirements in the process of land use, rational allocation and optimal provision of land with production resources, a harmonious combination of economic activity with environmental protection, improving soil fertility on agricultural lands, protecting soil from erosion and creating on this basis growing agricultural production to strengthen food security STI country. The program defines a system of legal, organizational, economic and other measures aimed at ensuring the conservation, rational use and reproduction of the productive potential of lands implemented at the regional level. The main goal of the Program is to promote the development of land relations in the region, the creation of such legal, organizational and economic conditions that would stimulate the desire of each owner or user of a land plot in its legal and effective use, increase responsibility for land conservation, and stimulate citizens activity to certify

Continuation of table C.1

1	2
	ownership to land and thereby contributed to the development of market relations. The main objectives of the program are: analysis of the state of use and protection of land, taking into account the use of biosphere resources, which ensures its reproduction, functional balance and evolution, as a basis for socio-economic development of society; identifying land reserves suitable for intended use in various sectors of the economy; a comparative analysis of the intentions and needs of land use, defined in national and regional programs of economic, scientific, technical, social, national and cultural development, environmental protection, other programs, schemes for the development of sectors of the economy, with the identification of possible ways and optimal solutions to problem issues ; redistribution of land of the region between sectors of the economy based on the suitability of land for its intended use, justification and accounting for all components of degradation processes and phenomena on lands of all categories and forms of ownership; suspension of land degradation processes and decline in soil fertility; the creation of modern soil conservation farming systems; chemical soil reclamation and the use of fertilizers in scientifically sound amounts; introduction of measures for the reproduction of soil fertility on technologically contaminated agricultural lands; the formation of regional and local databanks on the quality of soils and the functioning of the information-analytical system to prevent negative processes and eliminate their consequences, planning soil protection and other measures. The program is aimed at ensuring priority of environmental safety requirements in the process of land use, rational allocation and optimal provision of land with production resources, a harmonious combination of economic activity with environmental protection, protection of soils from erosion and the creation on this basis of growth conditions for agricultural production to ensure food security area by: prevention of degradation processes of soil cover and minimization of their consequences, in particular on agricultural lands through the introduction of soil protection technologies and other measures to protect soil fertility; phased restoration of an ecologically balanced ratio of land in zonal land use systems, including reducing plowing of land and increasing the forest cover of the region; implementation of conservation of degraded, unproductive and technologically polluted lands; reservation of land for nature conservation and other environmental, recreational, recreational and historical-cultural use; priority environmental safety and compliance with environmental requirements for the protection of land in the process of land

Continuation of table C.1

1	2
	management; restrictions on the withdrawal (redemption) of especially valuable lands, in particular agricultural purposes, for non-agricultural needs; the priority of the implementation of preventive measures in relation to lands that have not yet been degraded or have been slightly affected. 3. The main directions of development of land relations: to ensure the redistribution of the land fund between sectors of the economy based on the suitability of land for use as part of different categories of land categories; optimize the structure of land; to carry out conservation of degraded, unproductive and technologically polluted lands; increase the area of land with natural landscapes to a level sufficient to preserve landscape and biological diversity; create a unified system of forest reclamation plantations in river valleys; create and organize water protection zones and coastal protective strips of water bodies; ensure the conservation of natural landscapes on the lands of industry, transport, communications, defense and other purposes; to develop models of sustainable land use for individual regions of the region; increase crop yields, ensure stable profit for agricultural enterprises, strengthen their financial and economic situation, increase the well-being of the rural population; to suspend soil degradation processes, in particular, a decrease in the content of humus and achieve its deficit-free balance; enrich the soil with nutrients and normalize their balance; based on the results of the normative monetary assessment, increase revenues from land payments and support local budgets for the period of the economic crisis; based on the results of the inventory, create an information base for maintaining the state land cadastre, regulating land relations, rational use and protection of land resources, taxation; thanks to land conservation, introduce organizational, economic, agrotechnical, land management, hydrotechnical and forestry-reclamation measures that contribute to slowing down erosion processes and restoring the natural condition of lands; during the reclamation of disturbed lands, implement a set of organizational, technical and biotechnological measures aimed at restoring the soil cover, improving the condition and productivity of the disturbed lands. Provided by: in the economic sphere – increasing the efficiency of social production due to a more rational use of the natural resource potential of lands, natural, economic and other types of resources, in particular, the problem of increasing the efficiency of agricultural production in accordance with changes in the agricultural sector of the region will

Continuation of table C.1

1	2
	be solved; in the environmental sphere – the rational use and protection of land, enrichment of the environment with natural landscapes, ensuring the technogenic and environmental safety of human life by substantiating environmentally acceptable levels and modes of land use; in the social sphere, the creation and maintenance of a full-fledged living environment, the protection and rational use of historical and cultural heritage [318].
In the Ivano-Frankivsk region	1. Justification of ways and means of solving the problem: the lack of appropriate land management, cadastral, urban planning and environmental documentation, inhibits the completion of land reform, does not allow for the protection of land rights, and the introduction of a civilized land market; organizational support does not meet modern requirements, are put before land management, and requires improvement, the corresponding material and technical support; there is no proper cadastral registration of all land plots of all forms of ownership and related real estate objects that are objects of civil law turnover and taxation, an automated database of cadastral registration objects; software and hardware systems based on modern software and geographic information systems, information protection tools that provide effective automation of the processes of formation, accounting, evaluation of land plots and real estate objects have not been introduced; it is not envisaged to ensure the compatibility of information systems related to the formation, state accounting, technical inventory, valuation of land and real estate, registration of rights to them, management and disposal of real estate, the creation of an electronic exchange of information between them; the process of reforming land relations, the introduction of private ownership of land continues. The redistribution of land, carried out, contributes to an increase in the number of land owners and land users, an increase in the number of concluded lease agreements, on the purchase of leased land. All this leads in the future to the creation of conditions for the functioning of the land and real estate market. 2. The objectives of the program: development and implementation by local authorities of an action plan for the further development of land relations in the region and the city, the establishment of the boundaries (districts) of the city on the basis of the General Plan; the implementation of land management and land management; effective information support of the territorial community on the state of affairs; promotion of individual housing construction; commercialization of land for the rational use of the city and the like; definition and implementation of the main directions of the city council policy aimed at improving land relations and creating favorable conditions for sustainable development of land use in urban and rural areas, contributing to the solution of

Continuation of table C.1

1	2
	environmental and social problems, developing highly efficient competitive production, preserving the natural values of agricultural landscapes; meeting the needs of the population and economic sectors in land resources and their rational use; aims to implement the state policy of Ukraine to ensure sustainable development of land use, environmentally friendly living conditions of the population and economic activities, improve land relations, the scientific justification of the distribution of land for its intended purpose, taking into account state, communal, public and private interests, the formation of a rational land tenure system and land use; rational allocation and optimal provision of land with production resources and a harmonious combination of production development with environmental protection, identification and ensuring the implementation of priority measures aimed at rational use and protection of land, protecting them from degradation processes and pollution, reproduction of fertility and other useful properties, conservation landscape and biological diversity, the creation of environmentally friendly living conditions and the implementation of economic Noah activity; the implementation of the measures provided for by the Program will allow the use and protection of land at a qualitatively new level, the protection of land from. harmful anthropogenic impacts, the reproduction and increase of soil fertility, and more, which in turn will allow the conservation and use of land as an integral part of the natural resource and territorial basis , turn the main national wealth into an independent factor in the growth of the local economy in particular and the state economy as a whole. 3. The main directions of development of land relations: the fundamental directions in the implementation of measures to protect land and reform land relations in the city until 2020 are: land inventory Ivano-Frankivsk; updating the normative monetary value of the city's land and its approval in the manner prescribed by law; development of a land management project to establish the boundaries of the city (as well as, if necessary, a land management project to change the boundaries of the city, the establishment of the boundaries of a settlement in the manner prescribed by law and the inclusion of data on the boundaries of a settlement in the State Land Cadastre system. Accompanying measures for the implementation of land reform in the city at the same time is: removal of the boundaries of the village in kind (in the area) development of land management projects to organize and establish the boundaries of the territories of the nature reserve fund; development of land management projects for an inventory of the boundaries of historical and cultural territories; development of land management projects to establish the boundaries of water protection zones, coastal protection zones inventory,

Continuation of table C.1

1	2
	development of land management projects and the conservation of degraded and unproductive land through mortgaged and afforestation; updating the planning and cartographic material of filming of previous years The reform of land relations within the framework of the Program provides for the organization and implementation of the following types of work: substantiation of the placement and establishment of borders of territories with special environmental, recreational and conservation regimes; preparation of projects for the creation of new and streamlining of the existing territories of land ownership and land use; updating the planning and cartographic material of filming of past years preparation of projects for the allocation of land to ownership and use, transfer of borders in kind (to the area) of the seized (redeemed) and provided land; A prerequisite for the implementation of land transformations provided for by the Program, and the implementation of these works is the planning and cartographic material. The program provides for the allocation of funds to provide planning and cartographic material for land reform work. Estimates for individual program items will be calculated as work progresses. The implementation of priority measures on land management is carried out at the expense of state and local budgets, land owners and land users and is carried out by state and other land management organizations, business entities that have the appropriate permission for this [415].
In the Kiev region	1. Justification of ways and means of solving the problem: the efforts of regional and district structures, primarily local councils of all levels, district state administrations, the Main Directorate of Derzhgeokadastru in the Kiev region, the Department of Urban Planning and Architecture of the Regional State Administration, land management organizations are combined; the proposed composition and content of the principles of development of land relations in a market economy should be considered as an objective prerequisite for the implementation of practical measures to manage land resources, especially such important functions as land management, state control over the rational and environmentally safe use of land, maintaining the state cadastre, economic stimulating the organization of rational use of land; the intentions and needs of the use of land in the Kiev region are defined in national and regional programs of economic, scientific, technical, social, national and cultural development, environmental protection, other programs, schemes for the development of industries, which stipulate the need for a significant reduction in arable land and production areas (especially under open-cast mines,

Continuation of table C.1

1	2
	quarries, related facilities of industry, transport and communications) with the transfer of released land stranded for other uses and increase the land area of nature reserve and other nature conservation, recreational, health and historical and cultural purposes; uneven arrangement of recreational areas makes it difficult to organize recreation. The existing recreational potential can be used only after intensive development of the territories and improvement of the functioning of the resort and recreational facilities. It is necessary to expand the territory of natural and cultivated landscapes with the aim of promising recreational and therapeutic development of the most populated regions; Kiev region has a large area of forest land, in addition, unproductive land and land withdrawn from agricultural production are subject to afforestation. At the same time, water erosion of soils is observed in the region and there is a need to increase afforestation volumes; reliable data on the area, border, land composition and configuration of land plots make it possible to forecast land use, provide for budget revenues at various levels, reasonably charge a land tax, and promote the implementation of a rational policy in the field of land market formation. It is important to know which land plots are not used, or are used irrationally, not for their intended purpose, contrary to the requirements of land and environmental legislation. A means of obtaining such knowledge is an inventory. Completion of land inventory, as well as updating inventory data from previous years; information on determining the location of land use objects, their borders, sizes, legal status, identifying lands that are not used or used irrationally, for other purposes, which is the result of land inventory, will increase revenue to budgets of various levels and serve as a solid basis for maintaining the state land cadastre according to the results of the inventory, an information base will be created for maintaining the state land cadastre, regulating land relations, rational use and protection of land resources, land taxation, the quality will improve and the cost of these works will decrease; The normative monetary valuation of land plots is used to determine the amount of land tax, state duty for exchange, inheritance and donation of land in accordance with the law, rent for land plots of state and communal property, losses of agricultural and forestry production, as well as in the development of indicators and mechanisms of economic incentives rational use and protection of land. 2. The objectives of the program: in assisting in the implementation of state policy aimed at the balanced provision of the needs of the population and sectors of the economy in land resources, their protection and rational use; land inventory, carrying out a normative monetary valuation of land, increasing the investment attractiveness of land use; creation of environmentally friendly living conditions of the population and conducting business activities; conservation of landscape and biological diversity; stabilization of production, increasing land

Continuation of table C.1

1	2
	productivity; determines the system of legal, organizational, economic and other measures aimed at ensuring safety, rational use of land, carried out at the regional level; assistance in the development of land relations in the region, the creation of such legal, organizational and economic conditions that would stimulate the desire of each owner or user of the land plot in its legal and effective use, increase responsibility for land conservation, stimulate citizens' activity to certify ownership of land, and thereby contributed to the development of market relations; analysis of the state of land use, which ensures its reproduction, functional balance and evolution, as the basis of socio-economic development of society; identifying land reserves suitable for intended use in various sectors of the economy; a comparative analysis of the intentions and needs of land use, defined in national and regional programs of economic, scientific, technical, social, national and cultural development, environmental protection, other programs, schemes for the development of sectors of the economy, with the identification of possible ways and optimal solutions to problem issues ; the formation of regional and local data banks on land plots of the forest fund that are not included in the forest fund, land plots of the water fund and water bodies on them, the standard monetary value of land; It is aimed at the rational distribution and optimal provision of land with production resources, a harmonious combination of economic activity with environmental protection on this basis, the conditions for the growth of production volumes to ensure the economic development of the region by: phased restoration of an ecologically balanced ratio of land in zonal land use systems and an increase in the forest cover of the region; reservation of land for nature conservation and other environmental, recreational, recreational and historical-cultural use; priority environmental safety and compliance with environmental requirements for the protection of land in the process of land management; restrictions on the withdrawal (redemption) of especially valuable lands, in particular the forest fund, for non-economic needs; the priority of the implementation of preventive measures in relation to lands that have not yet been degraded or have been slightly affected; improving the efficiency of public administration and control over the rational use of land, ensuring an inventory of land, compliance with legislation in the provision, withdrawal and sale of land, protecting land ownership, ensuring a special regime for the use of especially valuable lands, increasing the investment attractiveness of lands, increasing efficiency state regulation of pricing in the field of land relations, ensuring the implementation of public monitoring the

Continuation of table C.1

1	2
	decision to regulate land relations, as well as the implementation of measures for the rational use of land.
	3. The main directions of development of land relations: ensuring the redistribution of the land fund between sectors of the economy based on the suitability of land for use in the composition of different categories of land categories; land structure optimization; implementation of conservation of degraded, unproductive and technologically polluted lands; increase in land area with natural landscapes to a level sufficient to preserve landscape and biological diversity; creation and regulation of water protection zones and coastal protective strips of water bodies; ensuring the conservation of natural landscapes on the lands of industry, transport, communications, defense and other purposes; development of a model of sustainable land use for individual regions of the region; based on the results of the normative monetary assessment of the increase in income from land payments and support for local budgets; according to the results of an inventory of the creation of an information base for maintaining the state land cadastre, regulation of land relations, rational use and protection of land, taxation; security: in the economic sphere – increasing the efficiency of social production due to a more rational use of the natural resource potential of lands, natural, economic and other types of regional resources; in the environmental sphere - the rational use and protection of land, enrichment of the environment with natural landscapes, ensuring the technogenic and environmental safety of human life by substantiating environmentally acceptable levels and modes of land use; in the social sphere, the creation and maintenance of a full-fledged living environment, the protection and rational use of historical and cultural heritage [321].

Annex D

Methods and models of territorial development of land use in regions

Table D.1

Characteristics of the adequacy of mathematical models characterizing the impact of indicators in the system of territorial development of land use in regions, based on the use of correlation and regression analysis

Indicator Name	Characteristic
1	2
Correlation coefficient (R)	determines the degree of influence of an independent indicator (indicators) (x_i) on a dependent variable (y), allows you to establish causal relationships between indicators. In the case when a one-factor model is built (one independent indicator affects the dependent variable), the value of the correlation coefficient varies from -1 to 1. The «–» sign shows the feedback between the indicators. The value of the correlation coefficient determines the level of exposure, namely: 0 – there is no connection between the indicators; from 0.01 to 0.25 – low level of impact of an independent indicator on a dependent variable; 0.251 – 0.5 – mediocre level of exposure; 0.501 – 0.75 – significant level of exposure; 0.751 – 0.99 – high level of exposure; 1 – the absolute relationship between the indicators. When constructing a multi-factor model (the dependent variable is influenced by two or more independent indicators), the value of the correlation coefficient varies in the range from 0 to 1 and characterizes the general effect of the indicators on the resulting component of the model.
Determintation coefficient (R^2)	is defined as the square of the correlation coefficient and characterizes a more accurate value of the level of influence of an independent indicator (s) on the dependent variable of the model. Its value varies from 0 to 1.
Student t-Test (t)	It is used to verify the established relationships between indicators to determine the statistical significance of indicators that are taken into account in the mathematical model. The actual values of the student coefficient are compared with the normative (tabular) by which a conclusion is drawn on the statistical significance of the indicators. If the actual values of the coefficient exceed the normative ones, then the indicators are statistically significant, if on the contrary, the indicator presented is excluded by modeling. To evaluate the student coefficient, the average values of the first arithmetic comparative

Continuation of table D.1

1	2
	population (V_1), the value of the second arithmetic comparative population(V_2), and the average errors of the first (v_1) and second (v_2) comparative population are taken into account: $t = \frac{V_1 - V_2}{\sqrt{v_1^2 + v_2^2}}$. (4.1)
Fisher's test (F)	used to confirm the significance of correlation coefficients, characterizing the degree of influence of independent indicators on the generalizing criterion. It shows the reliability of the established relationships between indicators. For verification, the actual value of the Fisher coefficient is determined, which is compared with the standard (tabular). In the case when the actual value exceeds the normative, a conclusion is drawn on the reliability of the established relationships. Otherwise, the model is considered inadequate, the established connections are unreliable. Fisher's criterion is determined by the relation: $F = \frac{\eta^2}{p-1} : \frac{1-\eta^2}{n-p}$, (4.2) η – correlation ratio characterizing the relationship between indicators; p – regression model parameters; n – number of observations related to indicators of the regression model.
Homo or heteroskedasticity indicators	are used to test models for homo or heteroskedasticity, characterizing the uniformity or branching of the distribution residuals of a random value of indicators. The adequacy of the mathematical model corresponds to homoskedasticity. If heteroskedasticity is detected, additional studies are carried out to obtain observations and fill in the "uncertain" zones of the parameters of the model indicators. To identify homo or heteroskedasticity, the following tests are used: Broysch-Paran, White, Golfeld-Quandt, Glazer, Aitken tests.
Darbin–Watson criterion (d)	used to test the model for residual autocorrelation. During the verification, the ranges of the Darbin - Watson criterion are determined. Limit minimum and maximum range values are determined. (d_L та d_U). If $d < d_L$, then the hypothesis of independence of random deviations is thrown back – positive autocorrelation. If $d > d_U$, then the hypothesis is not rejected – negative autocorrelation. If $d_L < d < d_U$ is the zone of uncertainty, a decision is made on either positive or negative autocorrelation of residues, additional studies are carried out [155].

Continuation of table D.1

1	2
The coefficient of checking relationships for multicollinearity	checking the relationships for multicollinearity between independent indicators is carried out on the basis of pair correlation coefficients (r). In this case, the ranges of the values of the pair correlation coefficients are determined, which correspond to the level of multicollinearity: the pair correlation coefficient is 0 – there is no multicollinearnism; r = 0.01 – 0.25 – low multicolinearnism; r = 0.26 – 0.5 – mediocre multicolinearnism; r = 0.51 – 0.75 – significant multicolinearnism; r = 0.76 – 0.99 – high multicolinearnism; r = 1 – absolute multicolinearnism. If the value of the pair correlation coefficient corresponds to the levels of absence, low or mediocre multicollinearity, then the independent indicators presented in the model are used in further modeling and do not reduce the reliability of the established relationships. If the coefficient value is determined by a significant level, then tools are used to reduce multicollinearity: checking indicators, their correspondence and the need to be included in a mathematical model, checking the values of pair correlation coefficients to identify possible errors, checking the procedure for selecting indicators used for modeling. The methods for reducing multicollinearity are: additional regression, which consists in determining additional regressors, additional regression, estimating the Fisher coefficient for additional regressors and pair correlation coefficients; methods using additional information, which is characterized by relevant theoretical constraints, external empirical estimates and additional information.

Table D.2

Characteristics of the software used for processing geodetic information to summarize the results of field studies, the level of land use and the interaction of spatial, urban, environmental and investment factors affecting the use of land in regions

Software name	Characteristic
1	2
Sokkia Link	aimed at ensuring the interaction of electronic tools Sokkia, which allows you to create a

Continuation of table D.2

1	2
	hardware-software complex for data processing [339].
ProLINK Comms	It is used to import field data from electronic tacheometers, storage controllers or GPS receivers into a personal computer for further editing, reduction and transformation of data in the SDR, MOSS, SDMS and ASCII formats [339].
Delta/Digitals	used for processing geodetic and photogrammetric information, based on the Digitals cartographic core with the ability to perform stereoscopic measurements [339].
Software package CREDO v 3.1	it is used for desk processing of geodetic measurements, their editing, implementation of drawings, plans and maps, and the solution of spatial, urban planning problems. It is characterized as a complex technology, which has a modular structure, forms into automated production lines (engineering geodesy, land management, design of master plans for objects, and design of transport infrastructure, etc.) [339].
Software package CREDODAT	It is aimed for automated cameral processing of engineering and geodetic data in the field of various types of work that imports data from the Nikon, Trimble, Geodimeter, Sokkia, Leica, Topcon, UOMZ instrumentation stations (2Ta5, 3TA5).
Software package «Geodetic engineering networks and surveys»	used to determine the accuracy of high-altitude network of arbitrary configuration, search for significant errors. It consists of a set of interconnected data import modules, the processing results are used to determine the accuracy of planning-high-altitude networks of arbitrary configuration, and search for significant errors. It consists of a set of interconnected data import modules, processing results.
Software package Topocad	specialized software package, which is used for processing planar and linear surveys for the formation of topographic and geodetic support, the generation of data for geographic information analysis.
Software package GIPSY/OASIS-II (GOA-II)	used for GPS processing, to ensure the determination of data coordinates.
Software Bernese GPS Software v.5.0	It is used for complex processing of information from GNSS observations with a high degree of accuracy [113].

Continuation of table D.2

1	2
Software GAMIT/GLOBK v.10.35	used to process GPS extra-long data [113].
Software Trimble Total Control v.2.73	It is aimed at processing GPS and GLONASS data on medium and long bases [113].
Software VRS Software	used to control the operation of GPSBase measuring stations [113].
Software package GNSMART	allows you to most accurately determine the spatial characteristics of objects.
Integrated software package Leica GNSS Spider Software	designed to control a complex of stations for geodetic and photogrammetric measurements.
Software Trimble: Survey Controller v.11.10 12.45	allows you to carry out and process field geodetic measurements, generate monitoring information in real time.
Software Spectra Precision Survey Pro v. 4.7 4.8.1	software that is used in the field of geodetic measurements.
Software Sokkia: SDR+	multifunctional software that allows processing geodetic measurements using RTK and «Blunder Detection» technologies for signal filtering and error detection [113].
Software Topcon: TopSURV v.7.2 7.5	it is used to perform field work using FC-100 FC-2000 controllers, which is based on the principles of operation of TS, Robotic, GPS +, GIS modules [113].
Software Javad: TRACY v.1.2 2.2	aims to carry out after field measurements to assess the quality of measurements.
Software CHC: LandStar	allows you to implement and process the results of field geodetic works, monitors the measurement results, the formation of the database.

Table D.3

Models of territorial development of land use in regions

(summarized by the authors)

№	Model name	Characteristic	Advantages	Disadvantages
1	2	3	4	5
1.	«Traditional»	formed on the basis of the existing land management system, in the determination of real estate and land as separate categories on the basis of the	provides an increase in the effectiveness of land relations in the short term, formed scientific, personnel and financial support	the lack of a unified management system for the formation, distribution, assessment and use of land and real estate objects, the fragmentation of the implementation of land relations does not solve the strategic problems of

Continuation of table D.3

1	2	3	4	5
		developed legal support		the territorial development of land use in regions.
2.	Land Administration System Model	a single system of interaction is being formed between the functions of the formation, distribution, assessment and use of land in the region, real estate is considered as a system category that includes land resources and takes into account the influence of spatial, urban, investment and environmental factors	allows you to create a unified information system with the implementation of the possibilities of applying geographic information systems and technologies, and the only body that provides land relations management determines the levels of land administration	there are problems with the information support of land administration.
3.	A model that takes into account legal, organizational, financial, logistical and urban factors	it is determined on the basis of the directions and characteristics of the interaction between legal, organizational, financial, material, technical and urban factors, it is used to solve specific problems in the relevant areas of territorial development of land use in regions	allows you to determine the level of interaction between the factors presented, creates the conditions for the formation of an assessment soil regarding the territorial development of land use in the region. Directions are established and features of interaction between legislative bodies and local self-government, bodies on land resources and state control over the use and protection of land, land management and design organizations,	characterized by the fragmentation of the interaction of the functions of the formation, distribution, assessment and use of land in regions.

Continuation of table D.3

1	2	3	4	5
			urban planning and construction organizations and enterprises based on relevant regulatory support are identified	
4.	A model that takes into account the influence of spatial factors on land use	characterized by a complex of spatial factors affecting the formation of the territorial development of land use in regions	allows you to determine the complex of spatial factors affecting the territorial development of land use in regions	To build a model, it is necessary to obtain complete and reliable spatial information about the objects of territorial development, the processes that are carried out in the system. However, problems arise in the formation and use of spatial information due to the low rate of implementation and use of information and geographic information systems and technologies.
5.	A model based on providing greater autonomy in matters of regional management, formation and distribution of land resources	includes the provision of greater authority to local authorities to ensure the territorial development of land use in regions	the level of substantiation of managerial decisions in the field of territorial development of land use in regions and the speed of response to the impact of external and internal factors	To implement the model, problems arise regarding the relatively low level of training of personnel operating in the field of land relations, the level of technical support for the process of formation, distribution and use of land. An increase in the powers of local authorities can lead to imbalances arising in the social, political, budgetary and other spheres, which reduces the effectiveness of decision-making, since the level of control and cooperation between state bodies is reduced. The presented imbalances are also associated with a

Continuation of table D.3

1	2	3	4	5
				decrease in human resources, information and technical support.
6.	A model based on the implementation of the principle of coordination and synchronization of actions of all levels of government and administration	It provides for the determination of state priorities for the development of the country, the development of regional strategies for the development of land relations, their implementation taking into account state policy	clear horizontal and vertical ties are being built between state authorities and local self-government, interregional and intermunicipal ties are being formed	problems when making decisions on the formation, distribution and use of land, if there are imbalances at the appropriate stage of regional and state administration.
7.	A model for leveling the level of development of regions in the field of formation, distribution and use of land	characterized by the directions and features of the interaction of subjects and objects of regional development for the formation, distribution and use of land	helps reduce asymmetries in the development of regions, providing support for poor regions	the implementation of the presented model leads to further asymmetries in the development in regions, the spread of areas of depression, since the interaction is carried out at the expense of richer regions compared to poor ones. The latter, in the future, get used to appropriate assistance and do not provide the implementation of incentives and promising areas of territorial development.
8.	A model based on the concentration of significant resources in successful regions	determined by the level of resource use, directions and features of their concentration, characterized by criteria that determine the success in regions	allows to ensure the further development of successful regions, to implement investment and innovative programs in the field of land relations	interests of other regions are not taken into account and, possibly, incentives for their development are leveled, regional imbalances and asymmetries are aggravated.
9.	Partnership model for managing the	based on the determination of	provides for partnership between	there are certain difficulties in ensuring

Continuation of table D.3

1	2	3	4	5
	territorial development of land use in regions	directions and criteria for ensuring partnerships in the system of managing the territorial development of land use in regions	regional policy makers, relevant institutions, government and the private sector, research and practice	the interaction between the represented subjects of regional policy, the complexity and ambiguity of the existing relations affecting the formation, distribution and use of land in regions
10.	A model based on the implementation of the cluster approach, which provides for the creation of economic opportunities in the relevant sectors related to the sphere of land relations	characterized by the formation of clusters in the relevant sectors of land relations	allows to ensure the development of business entities based on the concentration of resources for the growth of decision-making efficiency	the complexity of existing relations at the regional level, economic problems with the possibility of concentration of resources for the implementation of projects, the imbalance of external and internal relations between business entities leads to a decrease in the effectiveness of land relations at the regional level.
11.	Resource model	characterized by the determination of directions and increasing the efficiency of use of land resources and their other types aimed at the formation, distribution and use of land in regions	the importance of land resources, the capabilities of business entities that become subjects of regional policy is increasing	problematic issues arise to ensure the effectiveness of intersectoral partnerships.
12.	Land Use Sustainability Model	includes a set of elements: factors, subjects, interests of subjects, scenarios, sustainable development	allows you to build a system of interaction between its elements	difficulties arise in the formation of information support at each stage of the implementation of the model.
13.	Functional model of land management system	including functional aspects and builds a chain of functions –	allows you to define a set of functional areas and factors affecting their	there are difficulties in ensuring integrated interaction between the functional elements of

Continuation of table D.3

1	2	3	4	5
		priority activities – the goal. Local functional models are formed: a model that evaluates the quality of a specific urban area; model of the territorial organization of functional ties in the city;mathematical model; model of the intersectoral approach "input-output"; model of the natural and technological subsystem of the urban planning system. The mechanisms for the implementation of the functional model are determined: administrative-legal; socio-psychological; development of land relations; organizational; financial and economic	formation and use, justifies activities and goals at each functional level	the model. Some of them are not characterized by specific criteria, in particular, to achieve technological progress.
14.	Structural-logical model of the organization of land management	consists of subsystems: land use, which is characterized by a technical, economic and environmental status, monitoring,	allows you to create a land management system	in the context of implementation, indicators and criteria that characterize it are of particular importance.

Continuation of table D.3

1	2	3	4	5
15.	Land Use Planning Model	permanent land use; design and management is determined by information parameters, areas of implementation of design and management decisions determined by a set of interconnected actions: determination of the goal of the territorial development policy; formulating a strategy to achieve a specific goal; determination of principles and tools for implementing the strategy; ensuring the interaction of economic, environmental and social trends in the formation of territorial development; development of formalized models of spatial development planning; implementation of planned activities implementation of planning models	directions for ensuring territorial land use planning are identified	criteria for formalizing the process of spatial planning are not defined.

Table D.4

Theoretical and methodological approaches to assessing the territorial development of land use in regions

№	Approach name	Essence	Advantages	Disadvantages
1	2	3	4	5
Assessment of the territorial development of the region				
1.	Multi-aspect	determined by a set of interrelated areas (investment attractiveness; quality of life; use of human resources; formation of infrastructure; the region's ability to support high-tech industries; interaction with regulatory authorities; formation of business infrastructure; interaction with public authorities), affecting the territorial development of the region. In this case, the following indicators are determined: aggregate social product; net production in regions; national income used; end products of the region; necessary and surplus product; performance indicators (material consumption, capital intensity, labor intensity)	The directions that ensure the territorial development of regions are characterized. This creates the basis for informed decisions in the areas and territorial development in regions	focusing attention only on certain areas leads to imbalances in the system of territorial development in regions.
2.	System	characterized by interconnected elements forming a single system of territorial development in regions. The system of indicators is built	allows you to create a systematic basis for assessing the territorial development in regions	there are problematic aspects of information support in the formation and determination of the system of indicators of the territorial development in regions.

Continuation of table D.4

1	*2*	*3*	*4*	*5*
3.	Factorial	determined by the influence of factors affecting the territorial development of the region and is characterized by structural, socio-economic economic and demographic economic and environmental financial and economic features. The interconnections between regional authorities, regional business structures, interested social groups, and the population are investigated.	allows you to build a system of factors affecting the territorial development in regions	at a low level are characterized by spatial features that affect the spatial development in regions.
4.	Process	characterized by a set of indicators determining the territorial development in regions: motivation for the use of regional development tools; formation of interests of regional development entities; determination of the competitive advantages of regional development entities; assessments of social, environmental, economic, and institutional effects; determination of values and resource component of regional development; formation of the structure of values, taking into account the objectives and goals of regional development	allows you to create a system of indicators that determine the territorial development in regions, forms an estimated basis, takes into account various aspects of the directions of territorial development	problematic aspects arise in the formation of information support for determining the indicators of the territorial development in regions.
5.	Targeted	based on indicators that are formed based on the objectives of the territorial development in region	allows you to create a system of indicators, taking into account the objectives of the territorial development in	Of particular importance are the definition of goals and tools to achieve them, problems arise in the formation of

Continuation of table D.4

1	2	3	4	5
			regions	information support for the formation of indicators of the territorial development in regions.
6.	Based on definitions of regional imbalances	characterized by the implementation of assessment procedures based on indicators determining regional imbalances and asymmetries. Interconnected actions are formed: determination of goals and objectives of the assessment; substantiation of requirements for information support; collection of information; implementation of the settlement analytical stage; drawing conclusions	allows developing measures to counteract regional imbalances and asymmetries	of particular importance are the definition of regional imbalances and asymmetries; problems arise regarding their quantitative assessment and information support for the implementation of assessment procedures.
7.	Spatial	based on the implementation of assessment procedures to determine the territorial development of the region based on the formation of a system of spatial factors, determined by the directions and characteristics: industrial and geographical location; agro-geographical position; market position; demographic position; recreational and geographical position. The following indicators are determined: utility level; potentiality; market position.	allows you to create a system of indicators characterizing the directions and features of the spatial support of the territorial development of the region, the estimated basis for determining the level of territorial development in regions	leads to imbalances as a result of taking into account only spatial characteristics in the territorial development system is regions, in particular, urban planning, environmental, and investment factors are not determined.

Continuation of table D.4

1	2	3	4	5
8.	Functional	the directions of the territorial development of the region are described. Determined by indicators: scientific and technical development; population level and social development; structural and institutional transformations in the economy, demonopolization of production, development of entrepreneurship; use of natural resources; use of secondary resources; financial indicators; foreign economic activity; development of special (free) zones	allows you to define a set of problems to ensure the territorial development in regions: lack of a systematic approach to regional policy; the uncertainty of the strategic prospects for regional development; insufficient use of existing instruments of state regulation aimed at stimulating the development of regions, including depressed territories; low institutional and financial viability of local authorities in resolving issues of local importance; the lack of effective and efficient mechanisms for the formation of local budgets on the basis of state-guaranteed social standards for the provision of services to the population regardless of place of residence; incomplete formation and imperfection of the management model at the regional level	there are problems of information support for evaluating indicators within the framework of the presented approach.
9.	Innovative Investment	the main focus is on the areas of formation and use of investments at the regional level for the implementation of innovative projects	the directions of the formation and use of investments are determined, the level of innovative projects ensuring regional development is	focusing on certain areas in region's territorial development (innovation and investment) leads to corresponding

Continuation of table D.4

1	2	3	4	5
			characterized	asymmetries.
Assessment of land use in regions				
10.	Expert	based on a combination of methods: comparison of selling prices of similar land plots; correlation method; accounting for the costs of the construction of real estate on a land plot; capitalization of net income from the use of land; a combination of several methodological approaches for the conditional distribution of a built-up land plot into components warehouses (land dilyanka, budivlya, equipment). To register the collection of grocery items. Realize yourself on a great deal, then realize on a real time: Information about information, how to deal with a cat; more efficiently, like being victorious and more likely to land land; vibration i characteristic of methods, such as vikoristovuyutsya for the commission, I will loan land land; possible varianti and the results Company má land land; regular rank and secure zvilnennyam about the company, who will get to know the land dilyany; Presentation of the offer for the offer, even more clearly in its own power	allow to take into account a wide range of factors affecting land use	subjectivity in obtaining the results of land use assessment, separate problems arise regarding the formation of information support for the assessment process.
11.	Multi-criteria	based on the definition of a generalized environmental and economic indicator, taking into account their spatial, infrastructural,	the indicators characterizing the ecological-economic, industrial-	Separate problems arise in the formation of information support for

Continuation of table D.4

1	2	3	4	5
		environmental, functional components	technical, social-ecological-economic efficiency are determined	assessing the effectiveness of land use.
12.	Resulting	characterized by indicators determining land use results	allows you to determine the level of land use based on the resulting indicators	focuses only on certain aspects of land use, ignoring other areas.
13.	Technical and technological	defines a set of indicators characterizing the technical and technological aspects and directions that affect the level of land use	characterized by technical and technological aspects and areas that affect the level of land use	certain aspects of land use are determined.
14.	Investment	focuses on indicators of land investment attractiveness	directions and indicators are determined to assess the investment attractiveness of land	urban planning, environmental components of land use are not taken into account.
15.	An approach based on determining the impact of energy indicators on land use	formed and implemented through the prism of determining the impact of energy indicators on land use	allows you to take into account the impact of the energy component on the level of land use	only one component that affects the level of land use is taken into account.
16.	Urban planning	based on the use of a system of urban development indicators characterizing: access to concentrated places of employment; accessibility to places of public rest; provision of kindergartens; school supply; prestige of the area for living; water supply level; gas supply level; power supply level; noise level; air purity level;	allows you to determine the factors affecting the urban development of land use: formation of a general plan for planning the territories of Ukraine; determination of the directions for the formation of land plots, the distribution of territories in accordance with building codes, state standards	only urban components to assess land use leads to asymmetries and imbalances.

Continuation of table D.4

1	2	3	4	5
		accessibility to public transport; accessibility to the center of the village; provision of trade and public catering establishments; provision of public services; Provision of cultural and sports facilities; Groundwater flooding rate; a variety of places of employment; complicated relief; soil quality.	and rules; description of urban planning conditions and restrictions (in the absence of a zoning plan for the territory) or clarification of urban planning conditions and restrictions in accordance with the zoning plan of the territory; determination of needs in enterprises and public service institutions, their location; feasibility description, volumes, sequence of building reconstruction; sequence and volumes of engineering preparation of the territory; formation of a system of engineering networks; organization of transport and pedestrian traffic; comprehensive improvement and gardening, the need for the formation of an ecological network; determination of the boundaries of coastal protective strips and beach areas of water bodies (in the	

Continuation of table D.4

1	2	3	4	5
			absence of a zoning plan for the territory). In the framework of the presented approach, information support is being formed at the regional and city levels.	
17.	Stakeholder	based on certain areas and features of interaction between stakeholders	allows you to determine the group of stakeholders that affect the formation and use of land: 1st group (landowners (legal entities and individuals who own land) 2nd group (land users (legal entities and individuals using land plots); 3rd group (state bodies that form and implement land relations create regulatory support); 4th group (local authorities that form and implement land relations determine the legal support included in their authority) 5th group (territorial community, which influences and realizes the right of ownership of land); 6th group (financial	complexity in the formation of information support for the assessment, which creates problems in assessing the steyholder indicators.

Continuation of table D.4

1	2	3	4	5
			institutions (banking and other financial institutions providing the formation and lending of financial resources for needs in the land sector) 7th group (investors who invest financial resources in the use of land resources of cities) 8th group (public organizations that influence the formation and implementation of land policy at the non-state level) 9th group (organizations implementing information policy in the field of land relations)	
18.	Functional Approach	based on the determination of functional indicators affecting land use	determine the physicochemical properties of soils, nutritional status and level of pollution, productivity	take into account only a separate characteristic of land use - functional, reduces the level of complexity of the assessment.
19.	System	based on the use of a set of interrelated indicators characterizing: ecological state (structure of land resources, structure of sown areas, rates of restoration of soil fertility, intensity of erosion processes, content of harmful substances, degree of maturity, litteriness, level of expenses for solving environmental	allows for a comprehensive assessment of land use, which takes into account their various directions and features	there are problems in determining some indicators due to the low level of information support.

Continuation of table D.4

1	2	3	4	5
		issues); level of development of territories; level of investment attractiveness of land; economic in kind and value, social, associated with the level of implementation of social issues affecting the level of land use. Factors taken into account: the formation of territories and the establishment of borders of settlements; demarcation of lands of state and communal property; inventory of non-agricultural land; establishing the boundaries of coastal protective strips of water bodies; the allocation of territories of recreational, nature reserve and other especially valuable lands; determination of the boundaries of local territories; maintaining the state land cadastre preparation of land management projects that provide environmental and economic justification of crop rotation and land management; land conservation measures for the conservation, reproduction and ensuring the rational use of land resources. It provides for the interaction of state, regional and local authorities, given the complex nature of cadastral data		

Continuation of table D.4

1	2	3	4	5
20.	Mass Assessment Approach	It is based on the application of a set of interrelated actions and statistical methods for groups of objects and land plots at the corresponding date. includes the following steps: the formation of information support for the formation and use of land; definition of signs, characteristics, factors affecting the formation and use of land; definition of tools for land valuation; obtaining the result of the assessment and interpretation of the results. To implement the proposed approach, some experts identified the need for the use of geographic information systems and technologies, based on preferences: automation of the collection and processing of information, given the complex of interrelated spatial, urban and environmental factors; the possibility of conducting geographic information analysis using a mathematical apparatus; providing quick search, sorting and use of information on the cost characteristics of land; high-quality preparation of land valuation results characteristics, factors affecting the formation and use of land; definition of tools for land valuation; obtaining the result of the	allows you to determine the value of land, taking into account the influence of various factors, taking into account market changes	complexity taking into account rickshaw changes and their assessment, due to low information support.

Continuation of table D.4

1	2	3	4	5
		assessment and interpretation of the results. To implement the proposed approach, some experts identified the need for the use of geographic information systems and technologies, based on preferences: automation of the collection and processing of information, given the complex of interrelated spatial, urban and environmental factors; the possibility of conducting geographic information analysis using a mathematical apparatus; providing quick search, sorting and use of information on the cost characteristics of land; high-quality preparation of land valuation results		
21.	Tax	provides for the determination of an objective tax burden for a mass assessment of their market value	relevance to changes occurring in the internal and external environment; the ability to display market reality; development of measures to search for the effective use of land; create the basis for a constant search for directions to improve land use efficiency. The justification of the taxation system, land mortgage lending, socio-economic regionalization, the initial value of	the complexity of its application, given the methods and models for determining the cost, given the directions and features of taxation.

Continuation of table D.4

1	2	3	4	5
			transactions for the sale and purchase, market research for realtors and insurance companies is carried out	
Assessment of the territorial development of land use in the region				
22.	Costly	the costs of the formation and use of land at the regional level are determined taking into account environmental and economic factors. The costs of: land development; improving the quality of land; accumulation rates; labor productivity in the field of land relations at the regional level, Of particular importance is the composition of soils; the qualitative composition of soils is characterized	allows you to determine the costs of the formation and use of land at the regional level to ensure territorial development	the issues of formation of information and spatial support for assessing the costs of the formation and use of land at the regional level remain problematic.
23.	Normative	based on the definition of differential (rental) income standards, which takes into account the totality of regional factors: site location; remoteness from the main highways and infrastructure regional level of prices; wage level; the impact of the legal regime (restrictions, burdens) on land use; additional capital costs for land improvements; expenses due to tribunal reasons	allows you to implement a revenue approach taking into account regional factors	Imbalances arise as a result of taking into account certain indicators that determine the economic areas of land use in the region, while ignoring other areas.
24.	Managerial	based on determining the directions and features of managing the territorial development of land use in the region, take into account:	defines managerial aspects in the system of territorial development of land use in	there are problems with the assessment of indicators that form a system for managing the

Continuation of table D.4

1	2	3	4	5
		spatial factors; economic; environmental; social	regions	territorial development of land use in the region, focusing only on certain aspects affecting territorial development leads to imbalances, limited information and analytical support for indicators of the territorial development of land use in the region, the level of interaction between stakeholders is not taken into account, affecting territorial development, a high level of subjectivity in determining the appropriate their indicators, provides for the clearness of a clear system of territorial development management at the regional level, the need to ensure the reliability and completeness of information support for indicators of the formation of a territorial development management system.
25.	Land resource	in the system for assessing the territorial development of land use in the region, an	allows you to assess the land and resource potential	there are disproportions in the results of the

Continuation of table D.4

1	2	3	4	5
		approach is being formed that characterizes the land and resource potential in regions	of the region, taking into account the features of the directions of formation and use of land, the availability of resources, potential opportunities that determine the territorial development of land use in regions	assessment of the territorial development of land use in regions, since only certain aspects of this process, in particular, land resources, are taken into account.
26.	Economic and mathematical	allows you to assess the territorial development of land use in the region based on the use of mathematical tools, taking into account the features and directions of economic relations of directions at the regional level	in the presented system, indicators are used that characterize the reliability of the results of an expert assessment: concordance coefficient; Pearson test	problems in the formation of information and analytical support for indicators of the territorial development of land use in regions, taking into account only the economic aspects of territorial development while ignoring other (urban, environmental), the complexity of constructing an economic and mathematical model, when applying the method of expert assessments, a certain level of subjectivity of their results arises.
27.	Spatial	the essence is to determine the spatial factors affecting the use of land, increase the efficiency of their use to ensure the territorial development of the region. The integrated assessment method has been	allows to determine the integral indicator characterizing the influence of spatial factors that affect the territorial development of	the assessment system does not take into account other factors affecting the territorial development of land use in

Continuation of table D.4

1	2	3	4	5
		implemented. The spatial models of the regional level are defined: include social and economic factors; administrative factors; physical factors	land use in regions. The value of the integral indicator allows us to develop measures to ensure the territorial development of land use in the region. Within the framework of the presented approach, it is proposed to model the influence of spatial factors and apply modern integrated geographic information systems	regions.
28.	Geoecological	where an integrated assessment of the geoecological state of land use in regions is implemented, factors that affect the geoecological situation are identified: environmental; factors of land use in regions, the corresponding models for assessment were built, the impact of environmental and environmental factors of the region's land use in the generalized indicator of regional development was modeled	allows assessment, taking into account factors affecting the geoecological state of land use in regions	focuses only on environmental and land use indicators in regions.
29.	Determination of investment attractiveness of the region's lands	implement through the prism of indicators: functional planning characteristics; spatial; environmental; historical and cultural; level of engineering support and land improvement;	allows you to get an integrated indicator of investment attractiveness of the use of land in regions	Certain imbalances occur while reducing the importance of the influence of spatial factors.

Continuation of table D.4

1	2	3	4	5
		normative monetary value. The analytical method, hierarchy analysis, correlation and regression analysis are applied		

ANNEX E

Criteria for selection of factors influencing the territorial development of land use in regions

Table E.1

Quantitative basis for the selection of territorial factors influencing the spatial support of territorial development of land use in regions (developed by the authors)

Selection criteria	Meaning	Justification of selection	Selection decision
1	2	3	4
Stimulating and financing the development in regions	0–0,49	There are no opportunities for financing the development in regions, the presented process is not provided, the tools of financing and stimulation are not used, there is an increase in the number of depressed areas, disproportionate processes in the system of regional development are identified.	Not included
	0,5	Instability of financing of development in regions, non-systemic stimulation of development in regions is carried out, the corresponding tools of stimulation and financing are applied, normative-legal maintenance of process of stimulation and financing of development of the region is developed	Not determined requires additional neural network training
	0,51–1	Stability of financing of development of the region, systematic stimulation of development in regions is carried out, instruments of stimulation and financing are actively applied, normative-legal maintenance of process of stimulation and financing of development of the region is developed and applied	Included
Formation and development of united territorial communities	0–0,49	There is no process of growth of formation and development of united territorial communities, no new united territorial communities are created, no financing of the process of creation of united territorial communities is carried out, normative and legal support for the creation and functioning of united territorial communities is formed and applied at a low level communities	Not included

Continuation of table E.1

1	2	3	4
	0,5	Create a new amalgamated community, haphazard funding process for the establishment and functioning of the United territorial community, at a low level, the spatial support, has developed a legal provision for the establishment and functioning of the United territorial community, but its use is not systematic	Not determined, requires additional neural network training
	0,51–1	Create a new amalgamated community, systematically financed the creation process and functioning of the unified territorial communities that are created and used spatial software developed by the regulatory support for the establishment and functioning of the United territorial communities, the use of which is systemic	Included
Implementation of directions of territorial development in regions	0–0,49	There are no directions of territorial development of the region is absent or at a low level have developed and applied a spatial implementation of directions of territorial development of the region, funding for implementation of their directions, is made or at a low level interact with local authorities to ensure the territorial development in regions	Not included
	0,5	Implemented the directions of territorial development of the region, however, this process is non-systemic, missing or at a low level have developed and applied a spatial implementation of directions of territorial development regions, systematic funding for the implementation of the presented directions, the interaction of local authorities to ensure the territorial development in regions	Not determined, requires additional neural network training
	0,51–1	Systematically implemented the directions of territorial development in regions, developed and applied a spatial implementation of directions of territorial development in regions, systematic funding for the implementation of the presented directions, the interaction of local authorities to ensure the territorial development in regions	Included

Table E.2

Quantitative basis for the selection of functional factors influencing the spatial support of territorial development of land use in regions (developed by the authors)

Selection criteria	Meaning	Justification of selection	Selection decision
1	2	3	4
The level of land use in regions	0–0,49	The low level of effectiveness of land use in regions, which are agricultural lands, residential and public construction, natural reserve Fund and other nature protection purposes, health, recreational, historical-cultural, forestry purposes, water resources, industry, transport, communications, energy, defense and other purposes, do not exist the direction of sustainable development of territories is the state support of the regions, there are no directions for the development of social, engineering and transport, the national ecological infrastructure, low level of organization and planning, land management, not implemented or at a low level are realized directions of development of information and provide spatial trends of land use in regions, the low level of participation of regional authorities in realization of regional programs of land use, improving soil fertility, protection of land, their coordination in system of land use, low impact, local and other spatial factors on the formation of decisions on the use of land in regions	Not included
	0,5	Systematically implemented use of land in regions, which increase the efficiency of their use, and relate to agricultural lands, residential and public construction, natural reserve Fund and other nature protection purposes, health, recreational, historical-cultural, forestry purposes, water fund, industry, transport, communications, energy, defense and other purposes, do not exist the direction of sustainable development of territories, haphazard is the state support in regions, systematically implemented the directions of development of social, engineering and transport, the national ecological infrastructure, low level of organization and planning, land management,	Uncertainty requires additional neural network training

Continuation of table E.2

1	2	3	4
		systematically implemented the directions of formation of information and providing spatial trends of land use in regions, the participation of regional authorities in realization of regional programs of land use, improving soil fertility, protection of land, their coordination in system of land use, the low level of influence of local and other spatial factors on the formation of decisions on the use of land in regions	
	0,51–1	Areas of land use in regions are systematically implemented, which increase the efficiency of their use and belong to agricultural lands, housing and public buildings, nature reserves and other nature conservation, health, recreational, historical and cultural, forestry, water, industry , transport, communications, energy, defense and other purposes, directions of sustainable development of territories are realized, state support of territories is systematically carried out, directions of development of social, engineering-transport, national ecological infrastructure are systematically realized, low level of organization and planning of land management, systematically realized directions formation of information and spatial support for land use in the region, there is the participation of regional authorities in the implementation of regional programs of land use, increasing soil fertility, land protection, their coordination in the system of land use, a high level of influence of local and other spatial factors on the formation of decisions on land use in regions	Included
The level of spatial support for land use in regions	0–0,49	There is no spatial provision for decision-making at the regional level on land use, no master plan has been developed, there is outdated spatial provision, there is no information on the level of land use, united territorial communities are not provided with relevant spatial information, there is no interaction of local authorities on formation and use of spatial information	Not included

Continuation of table E.2

1	2	3	4
	0,5	Spatial provision for decision-making at the regional level on land use has been formed and applied at a low level, a master plan has been developed, outdated spatial provision, information on the level of land use has been formed, united territorial communities have not been provided with relevant spatial information. formation and use of spatial information	Uncertainty requires additional neural network training
	0,51–1	Spatial provision for decision-making at the regional level on land use has been formed and applied at a high level, a master plan has been developed, spatial provision is being updated, information on the level of land use has been formed, united territorial communities have been provided with relevant spatial information. formation and use of spatial information	Included

Table E.3

Quantitative basis for the selection of social factors influencing the spatial support of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of provision of social infrastructure	0–0.49	At the regional level, there is a decrease in the level of housing, children's preschools, secondary schools, medical institutions (hospitals, clinics, pharmacies), cultural facilities (theaters, cinemas, dance halls, clubs, libraries), trade facilities (shops , markets, catering facilities), household services (households, dry cleaners, laundries), affordable housing for citizens, especially the poor, with disabilities, orphans and children deprived of parental care, persons from among them, youth, workers of the budgetary sphere, as well as large families, the formation of a powerful state order for the construction of social housing, the revival of affordable mortgage lending	Not included

Continuation of table E.3

1	2	3	4
	0.5	At the regional level, there is an unsystematic increase in the level of housing, children's preschools, secondary schools, medical institutions (hospitals, clinics, pharmacies), cultural facilities (theaters, cinemas, dance halls, clubs, libraries), trade facilities (shops, markets, catering facilities), consumer services (households, dry cleaners, laundries), affordable housing for citizens, especially the poor, with disabilities, orphans and children deprived of parental care, persons from among them, youth, employees of the budget sphere, andalso large families, the formation of a powerful state order for the construction of social housing, the revival of affordable mortgage lending	Uncertainty requires additional neural network training
	0.51–1	At the regional level, there is a systematic increase in the level of housing, children's preschools, secondary schools, medical institutions (hospitals, clinics, pharmacies), cultural facilities (theaters, cinemas, dance halls, clubs, libraries), trade facilities (shops, markets, catering facilities), consumer services (households, dry cleaners, laundries), affordable housing for citizens, especially the poor, with disabilities, orphans and children deprived of parental care, persons from among them,youth, public sector workers, as well as large families, the formation of a powerful government order for the construction of social housing, increasing the level of affordable mortgage lending	Included

Table E.4

Quantitative basis for the selection of political factors influencing the spatial support of territorial development of land use in regions

(developed by the author)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Determining the directions of formation and implementation of land use policy in regions	0–0.49	There are no directions of formation and implementation of land use policy in regions, protection of national interests in the regions is not provided, rule of law is not ensured, low level of realization of human and civil rights and freedoms, no respect for the dignity of each person, special care for the child and realization of his rights , there is no equality of all subjects of property rights before the law, no protection of competition in the sphere of economic activity, low level of openness and transparency of preparation and decision-making processes by state authorities and local self-government bodies, lack of balance of interests of subjects of land relations at regional level, low level of social partnership and civil solidarity, low level of local approval self-government as the foundation of democracy, expansion of powers of local councils by decentralization of functions of state authorities, mechanisms of ensuring active participation of territorial communities and local self-government bodies in formation and implementation of state regional policy, low level of functional capacity of personnel potential of regions,First of all, by creating a system and technologies for attracting investment for the training of highly professional managers, low level of ensuring the vital interests of man and citizen, society and state, timely detection, prevention and neutralization of real and potential threats to national interests in land relations. improving the formation of land market infrastructure, ensuring the registration of title documents for land ownershipAreas for improving the formation of land market infrastructure, ensuring the registration of title documents for land ownership are not implementedAreas for improving the formation of land market infrastructure, ensuring the registration of title documents for land ownership are not implemented	Not included

Continuation of table E.4

1	2	3	4
	0.5	Unsystematically implemented areas of formation and implementation of land use policy in the region, the protection of national interests in regions, the rule of law is not ensured, the level of realization of human and civil rights and freedoms is low, there is no respect for the dignity of each person, no special care for the child and realization of his rights is provided, there is no equality of all subjects of property rights before the law. economic activity, low level of openness and transparency of preparation and decision-making processes by public authorities and local governments, unsystematic balance of interests and transparency of government processes and bodies of land relations at the regional level, low level of social partnership and civic solidarity, low level of establishment of local self-government as the foundation of democracy, expansion of powers of local councils by decentralization of public authorities, mechanisms for active participation of territorial communities and local governments in the formation and implementation of state regional policy, low level of functional capacity of human resources of the regions, primarily by creating a system and technologies for attracting investment to train highly professional managers, low level of vital interests of man and citizen, society and state, timely detection ,,prevention and neutralization of real and potential threats to national interests in the field of land relations of regions, unsystematically implemented areas for improving the formation of land market infrastructure, ensuring the registration of title documents to land ownership	Uncertainty requires additional neural network training
	0.51–1	Areas of formation and implementation of land use policy in the region are systematically implemented, national interests in the regions are protected, the rule of law is not ensured, a high level of human and civil rights and freedoms is exercised, respect for the dignity of each person is respected, special care for children and their rights is provided. equality of all subjects of property rights before the law is ensured, protection of competition in the sphere of economic activity is systematically carried out, high level of openness and transparency of processes of preparation and decision-making by	Included

Continuation of table E.4

1	2	3	4
		state authorities and local governments, systematically provided balance of interests of subjects of land relations at regional level , high level of social partnership and civic solidarity, high levelestablishment of local self-government as the foundation of democracy, expansion of powers of local councils by decentralization of functions of state authorities, mechanisms of ensuring active participation of territorial communities and local self-government bodies in formation and realization of state regional policy, high level of functional capacity of personnel potential of regions. and technologies to attract investment for the training of highly professional managers, a high level of ensuring the vital interests of man and citizen, society and the state, timely detection, prevention and neutralization of real and potential threats to national interests in land relations,Areas for improving the formation of land market infrastructure, ensuring the registration of title documents to land ownership are systematically implemented	
The level of influence of political conditions on the directions of land use in regions	0–0.49	High level of influence of political conditions on the directions of land use in regions, the presence of negative phenomena of raiding, the lack of partnership between the state and entities operating in the field of land use	Not included
	0.5	High level of influence of political conditions on the directions of land use in regions, availability of mechanisms for counteracting the negative phenomena of raiding, partnership relations between the state and entities operating in the field of land use	Uncertainty requires additional neural network training
	0.51–1	Low level of influence of political conditions on the directions of land use of the region, available mechanisms of effective counteraction to the negative phenomena of raiding, partnership relations between the state and the subjects functioning in the field of land use	Included
The level of openness and freedoms in the system of use lands in regions	0–0.49	Closed system of land use in regions, no areas for obtaining complete and reliable information on land use, lack of freedom in decision-making on land use, low	Not included

Continuation of table E.4

1	2	3	4
		the level of openness and freedoms regarding the interaction of subjects in the field of land use	
	0.5	Low level of openness of the land use system in regions, identified areas for obtaining complete and reliable information on land use, formed mechanisms to ensure freedom in decision-making on land use, provided openness and freedom regarding the interaction of entities in the field of land use	Uncertainty requires additional neural network training
	0.51–1	High level of openness of the land use system in regions, areas of obtaining complete and reliable information on land use are defined and widely used, mechanisms for ensuring freedom in decision-making on land use are formed and implemented, high level of openness and freedom of interaction in land use	Included

Table E.5

Quantitative basis for the selection of factors of cartographic and geodetic support of land use in regions that affect the spatial support of territorial development (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Completeness of cartographic and geodetic support of land use in regions	0–0.49	Low level of completeness of cartographic and geodetic support of land use in regions, non-compliance with standards and normative and technical documentation, not developed directions of implementation and organization of software, technological and technical support of efficient use of digital maps and geographic information systems, modern systems of storage and accounting of topographic geodetic, cartographic, aerial surveying and space materials, lack of systematic analysis of the state astronomical and geodetic basis on the territory of Ukraine and compliance of cartographic materials with the current state of the area, low level of creation of geodetic and cartographic materials and data for spatial planning, design, construction and reconstruction of capital construction, low level of engineering and transport infrastructure, as well as conducting the necessary engineering	Not included

Continuation of table E.5

1	2	3	4
		surveys, low level of geographic information systems, areas of systematic creation of thematic maps are not implemented, plans and atlases of special purpose in graphic, digital and other forms, publication of such maps, plans and atlases, low level of development and application of normative and technical documentation in the field of topographic-geodetic and cartographic activities, which establishes the order of topographic-geodetic and cartographic works, technical requirements for them, norms and rules of their implementation,low level of development of the national mapping system to provide modern multi-scale high-precision topographic and thematic maps, other cartographic materials, streamlining of the system and boundaries of administrative-territorial units, navigation, spatial planning and construction, land and forest management, land, water, urban planning, other state cadastres, registers and systems of accounting, delimitation and accounting of land use and land tenure, taking into account their belonging to various forms of ownership, inventory and valuation of agricultural land, as well as non-agricultural land, management of utilities, transport and engineering communications, state environmental monitoringassessment of the impact of high-risk facilities on the environment, prevention of emergencies of man-made and natural nature, recreation, tourism and others needs, low level of creation with the involvement of leading research and production centers of national and special geographic information systems, as well as information banks and geospatial databases for management and other needs at the national, regional and local levels, providing access to them in accordance with the legislation of interested enterprises, institutions and organizations, scientists and other citizens, is not included in the plans and programs of educational institutions that train specialists in the field of topographic, geodetic and cartographic activities, the study of relevant latest technical means, methods and technologies	

Continuation of table E.5

1	2	3	4
	0.5	The cartographic and geodetic support of land use in regions is formed and applied, requirements of standards and normative and technical documentation are observed, directions of introduction and the organization of software, technological and technical maintenance of effective use of digital maps and geoinformation systems are not developed, modern systems of storage and accounting of topograph -geodetic, cartographic, aerial surveying and space materials, lack of systematic analysis of the state astronomical and geodetic basis on the territory of Ukraine and compliance of cartographic materials with the current state of the area, created and used geodetic and cartographic materials and data for planning, design, construction and reconstruction capital construction,low level of creation of engineering and transport infrastructure, and also carrying out of necessary for this purpose engineering researches, low level of creation of geographical information systems, directions of system creation of thematic maps, plans and atlases of special purpose in graphic, digital and other forms, publication of such maps, plans and atlases, low level of development and application of normative and technical documentation in the field of topographic and geodetic and cartographic activities, which establishes the order of organization of topographic and geodetic and cartographic works, technical requirements, standards and rules of their implementation, there is a development of the national mapping system to provide modern multi-scale high-precision topographic and thematic maps, other cartographic materials, streamlining the system and boundaries of administrative-territorial units, navigation, spatial planning and construction, land and forest management, land, water urban planning , other state cadastres, registers and accounting systems,delimitation and accounting of land uses and land holdings taking into account their belonging to different forms of ownership, inventory and valuation of agricultural lands, as well as non-agricultural lands, management	Uncertainty requires additional neural network training

Continuation of table E.5

1	2	3	4
		of public utilities, transport and engineering communications, state environmental monitoring, environmental impact assessment state of the environment, prevention of man-made and natural emergencies, recreation, tourism and other needs, low level of creation with the involvement of leading research and production centers of national and special geographic information systems, as well as information banks and geospatial databases for management and other needs. national, regional and local levels,ensuring access to them in accordance with the legislation of the interested enterprises, institutions and organizations, scientists and other citizens, no inclusion in the plans and programs of educational institutions that train specialists in the field of topographic, geodetic and cartographic activities, the study of relevant latest technical means, methods and technologies	
	0.51–1	The cartographic and geodetic support of land use of the regions is formed and systematically applied, the requirements of standards and normative-technical documentation are observed, the directions of introduction and organization of software, technological and technical support of effective use of digital maps and geoinformation systems are developed and implemented. accounting of topographic and geodetic, cartographic, aerial and space materials, lack of systematic analysis of the state astronomical and geodetic basis on the territory of Ukraine and compliance of cartographic materials with the current state of the area, created and systematically used geodetic and cartographic materials and data for spatial planning, design, construction and reconstruction capital construction facilities, high level of creation of engineering and transport infrastructure, as well as conducting necessary engineering surveys, high level of creation of geographical information systems, directions of systematic creation of thematic maps, plans and atlases of special purpose in graphic, digital and other forms, publication of such maps, plans and atlases, high level of development and application of normative and technical documentation in the field of topographic-geodetic and topographic-	Included

Continuation of table E.5

1	2	3	4
		geodetic and cartographic works, technical requirements to them, norms and rules of their execution,plans and atlases of special purpose in graphic, digital and other forms, publication of such maps, plans and atlases, high level of development and application of normative and technical documentation in the field of topographic-geodetic and topographic-geodetic and cartographic works, technical requirements to them, norms and rules for their implementation,plans and atlases of special purpose in graphic, digital and other forms, publication of such maps, plans and atlases, high level of development and application of normative and technical documentation in the field of topographic-geodetic and topographic-geodetic and cartographic works, technical requirements to them, norms and rules for their implementation, there is a development of a national mapping system to provide modern high-precision multi-scaletopographic and thematic maps, other cartographic materials, organization of the system and boundaries of administrative-territorial units, navigation, territorial planning and construction, land and forest management, maintenance of land, water, urban planning, other state cadastres, registers and systems of accounting, delimitation and accounting of land use and land holdings taking into account their belonging to various forms of ownership, inventory and assessment of agricultural lands, as well as non-agricultural lands, management of public utilities, transport and engineering communications, state environmental monitoring, assessment of the impact of high risk objects on the environment the emergence of emergencies of man-made and natural nature, recreation,tourism and other needs, a high level of creation with the involvement of leading research and production centers of national and special geographic information systems, as well as information banks and geospatial databases for management and other needs at the national, regional and local levels, providing access to them in accordance with law interested enterprises, institutions and organizations, scientists and other citizens, is included in the plans and programs of educational institutions that train	

Continuation of table E.5

1	2	3	4
		specialists in the field of topographic, geodetic and cartographic activities, study of relevant latest technical means, methods and technologies, low level of implementation of cartographic activities. establishes the order of organization of advanced technologies and methods of organization of topographic-geodetic and cartographic production,methods and methods safe for human life and health, the state of the environment and objects with historical	
The level of application of modern tools in the field of cartographic and geodetic support of land use of regions	0–0.49	cultural value, the quality of topographic, cartographic, cadastral surveys and the activity of updating maps and plans, surveys of the continental shelf and water bodies in a single system of coordinates and altitudes, development of geodetic networks, creation and updating of the cartographic basis of the state cadastre, creation local coordinate systems, no research and development work, low level of technical support of topographic, geodetic and cartographic activities, which is based on the use of computer and information technology, technical means to perform topographic, geodetic and cartographic works, low level of formation and application of information systems and technologies, geoinformation systems and technologies,low level of creation of geodetic networks with the involvement of leading research and production centers of national and special geographic information systems, as well as information banks and geospatial databases for management and other needs at the national, regional and local levels, providing access to them in accordance with the legislation of interested enterprises, institutions and organizations, scientists and other citizens	Not included
	0.5	Unsystematic introduction of advanced technologies and methods of organization of topographic, geodetic and cartographic production, unsystematically used methods and methods safe for human life and health, the state of the environment and topographic, cartographic, cadastral surveys and the activity of updating maps and plans, surveying the continental shelf and water bodies, objects in a single system of coordinates and heights, does not provide development, geodetic networks, creation and updating the cartographic basis	Uncertainty requires additional neural network training

Continuation of table E.5

1	2	3	4
		of the state cadastre, creating local coordinate systems, no research and development work, technical support for topographic and geodetic and cartographic activities, which is based on the use of computer and information technology, technical means for topographic and geodetic and cartographic works, the formation and application of information systems and technologies, geographic information systems and technologies, areas of geodetic networks with the involvement of leading research and production centers of national and special geographic information systems, as well as information banks and geospatial databases for management and other needs. national, regional and local levels, ensuring access to them in accordance with the legislation of interested enterprises, institutions and organizations, scientists and other citizens	
	0.51–1	High level of introduction of advanced technologies and methods of organization of topographic-geodetic and cartographic production, methods and ways safe for life and health of people, state of environment and objects of historical and cultural value, high level of quality of execution of topographic, cartographic, cadastral surveys and high activity of updating maps and plans, surveying the continental shelf and water bodies in a single system of coordinates and altitudes, development is not provided, geodetic networks, creation and objects of historical and cultural value, reduced quality of updating cartographic basis of the state cadastre, creation of local coordinate systems, research and development works are carried out systematically, high level technical support of topographic, geodetic and cartographic activities, objects of historical and cultural value, the quality of updating the cartographic basis of the state cadastre is reduced, local coordinate systems are created, research and development works are systematically carried out, a high level of technical support of topographic, geodetic and cartographic activities is based on use of computer and information equipment, technical means for topographic and geodetic and cartographic works, high level of formation and application	Included

Continuation of table E.5

1	2	3	4
		of information systems and technologies, geoinformation systems and technologies, high level of creation of geodetic networks with involvement of leading scientific and production centers of national and special geoinformation systems, as well as information banks and geospatial databases for management and other needs at the national, regional and local levels, providing access to them in accordance with the laws of interested enterprises, institutions and organizations, scientists and other citizens	
The level of interaction of subjects in the field of formation of cartographic and geodetic support of land use of regions	0–0.49	Low level of interaction of subjects in the field of formation of cartographic and geodetic support of land use of regions, low level of provision of state executive power and local self-government of all levels, other individuals and legal entities with modern aerial, topographic and geodetic cartographic and scientific and technical information, low level interaction of regional authorities with the bodies of state geodetic supervision in the implementation of topographic and geodetic and cartographic works, as well as the use of carriers of topographic, geodetic and cartographic information, which is state property, low level of implementation of regional programs projects on geodesy and cartography, low level of activity support, low level of definition of regions and responsible enterprises for topographic-geodetic and cartographic support of certain territories, provision of enterprises with necessary topographic-geodetic and cartographic materials for formation of regional funds, low level of delegation of relevant powers for interaction with regional bodies of state executive power and local self-government–geodetic and cartographic support	Not included

Continuation of table E.5

1	2	3	4
	0.5	Unsystematic interaction of subjects in the field of formation of cartographic and geodetic support of land use of regions, low level of provision of state executive authorities and local governments of all levels, other individuals and legal entities with modern aerial, topographic and geodetic cartographic and scientific and technical information, non-systemic interaction regional authorities with state geodetic supervision in the implementation of topographic and geodetic and cartographic works, as well as the use of topographic and geodetic and cartographic information, which is state property, the implementation of regional programs and projects on geodesy and cartography, provides assistance to public geodetic , cartographic and other professional organizations in the regions,determination of regions and responsible enterprises for topographic-geodetic and cartographic support of certain territories, provision of enterprises with necessary topographic-geodetic and cartographic materials for formation of regional funds is carried out, delegation of the corresponding powers to interact with regional bodies of state executive power and local self-government on issues of topographic, geodetic and cartographic public geodetic, cartographic and other professional organizations in the regions, providing	Uncertainty requires additional neural network training
	0.51–1	High level of interaction of subjects in the field of formation of cartographic and geodetic support of land use of regions, high level of provision of state executive authorities and local governments of all levels, other individuals and legal entities with modern aerial, topographic and geodetic cartographic and scientific and technical information, high level interaction of regional authorities with the bodies of state geodetic supervision in the implementation of topographic and geodetic and cartographic works, as well as the use of topographic and geodetic and cartographic information, which is state property, high level of implementation of regional programs and	

Continuation of table E.5

1	2	3	4
		projects on geodesy and cartography, high level of assistance activities of public geodetic, cartographic and other professional organizations in the regions,high level of definition of regions and responsible enterprises for topographic-geodetic and cartographic support of certain territories, provision of enterprises with necessary topographic-geodetic and cartographic materials for formation of regional funds, high level of delegation of relevant powers for interaction with regional bodies of state executive power and local self-government - geodetic and cartographic supporthigh level of delegation of relevant powers for cooperation with regional bodies of state executive power and local self-government on issues of topographic, geodetic and cartographic supporthigh level of delegation of relevant powers for cooperation with regional bodies of state executive power and local self-government on issues of topographic, geodetic and cartographic support	Included

Table E.6

Quantitative basis for the selection of zonal factors influencing the formation and implementation of urban policy in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of formation and determination of zonal urban planning factors	0–0.49	Low level of formation of decisions on planning and development of the territory, low level of reflection of the existing development of territories, engineering and transport infrastructure, as well as the main elements of the planning structure of territories, low level of consideration of local conditions when defining functional zones, low the level of establishment for each zone of permitted and permissible uses of territories for urban needs, conditions and restrictions on their development, low level of coordination of boundaries with the boundaries of natural complexes, strips of sanitary protection,	Not included

Continuation of table E.6

1	2	3	4
		sanitary, protection and other areas of limited land use, red lines, low level of determination of zonal factors for water bodies, for public buildings, residential, recreational zone of the region, the town-planning value of the territory within the settlements is not substantiated	
	0.5	Decisions on planning and development of the territory are formed unsystematically, low level of reflection of the existing development of territories, engineering and transport infrastructure, as well as the main elements of the planning structure of territories, systematically taking into account local conditions when determining functional zones, low level of establishing for each zone permitted and permissible uses of territories for urban needs, conditions and restrictions regarding their development, low level of coordination of borders of zones with borders of territories of natural complexes, strips of sanitary-protective, sanitary, protection and other zones of limited land use, red lines, determine zonal factors for water bodies, for public buildings, housing, recreational area of the region, reliably substantiated urban value of the territory within the settlements	Uncertainty requires additional neural network training
	0.51–1	High level of formation of decisions on planning and development of the territory, high level of reflection of the existing development of territories, engineering and transport infrastructure, as well as the main elements of the planning structure of territories, low level of consideration of local conditions when determining functional zones, high the level of establishment for each zone of permitted and permissible uses of territories for urban needs, conditions and restrictions on their development, a high level of coordination of boundaries with the boundaries of natural complexes, strips of sanitary protection, sanitary, protection and other areas of limited land use, red lines, high level of determination of zonal factors for water bodies, for public buildings, residential, recreational zone of the region, substantiated town-planning value of the territory within the settlements	Included

Table E.7

Quantitative basis for the selection of functional and planning factors that shape the urban planning factors of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of provision and implementation of urban conditions that affect the use of land in regions	0–0.49	Low level of establishment of functional purpose, definition of modes and parameters of building of one or several land plots, distribution of territories according to building norms, state standards and rules, low level of provision of needs in the enterprises and establishments of public service, low level of expediency, volumes, sequence of reconstruction of building, low level of ensuring the order and volume of engineering preparation of the territory, low level of formation of the system of engineering networks, the order of organization of transport and pedestrian traffic, low level of ensuring the order of complex improvement and landscaping, the need for eco-network, low level of coastal protection zones and beach areas (in the absence of a zoning plan), low level of changes in the volume of housing construction, low level of formation of characteristics of territories (plots) for new housing construction in vacant areas, within and outside the settlement, as well as in areas of reconstruction by capacity, storeys and density of buildings with the allocation of areas for the formation of land for the construction of social and affordable housing,summary data on the needs in the territories for all types of construction, low level of formation of ecological and urban characteristics of the planned urban development with the definition of planning measures to improve the environment, low level of formation of ecological and urban characteristics planned territorial development of the settlement taking into account the value of land or property complexes in the surrounding areas, compensation and other costs associated with the change of functional use or	Not included

Continuation of table E.7

1	2	3	4
		inclusion in the city limits, low level and completeness of architectural and spatial composition, low level of green areas general use, general landscaping of the settlement, low level of provision of main streets, roads and their crossings, determination of directions of construction (reconstruction) of main streets, use of underground space, construction of bridges, tunnels, transport interchanges, bicycle paths and pedestrian zones, density of street network (with allocation of this indicator for each categories of main streets separately), low level of provision of engineering equipment by types (water supply, drainage, gas, electricity, heat supply) and principles of their development taking into account the advanced pace of construction in relation to housing, low level of engineering measures for development, including suburban , for construction or other uses,low level of formation of boundaries of territories of priority development and placement of construction objects at the forecasted stage 7–10 years, low the level of implementation of design, organizational and engineering measures to improve the ecological condition of territories (including suburban), their preparation for construction, the low level of development of proposals for the location of construction sites, urban development at the forecast stage 7–10 years.	
	0.5	The functional purpose, definition of modes and parameters of building of one or several are substantiated land plots, distribution of territories in accordance with building norms, state standards and rules, identified needs in enterprises and public service institutions, low level of expediency, volume, sequence of reconstruction of buildings, low level of ensuring the sequence and scope of engineering training of the territory, low level of formation of the system of engineering networks, the order of organization of transport and pedestrian traffic, low level of ensuring the order of complex improvement and landscaping, the need for eco-network, established boundaries	Uncertainty needs more

Continuation of table E.7

1	2	3	4
		of coastal protection zones and beach areas (in the absence of a zoning plan), unsystematically changes in the volume of housing construction, formed the characteristics of areas (plots) for new housing construction in vacant areas, within and outside the settlement, as well as in areas of reconstruction by capacity, number of floors and density buildings with the allocation of territories for the formation of land for the construction of social and affordable housing,summary data on the needs in the territories for all types of construction, the low level of formation of ecological and urban characteristics of the planned urban development with the definition of planning measures to improve the environment, low the level of formation of ecological and urban characteristics of the planned territorial development of the settlement taking into account the value of land or property complexes in the surrounding areas, compensation and other costs associated with the change of functional use or inclusion in the city limits, low level and completeness of formation of architectural and spatial composition, low level of provision of areas of green areas of common use, general landscaping territory of the settlement, low level of provision of main streets, roads and their crossings, determination of directions of construction (reconstruction) of main streets, use of underground space, construction of bridges, tunnels, transport interchanges, bicycle paths and pedestrian zones, density of street network (with allocation of this indicator for each categories of main streets separately), low level of provision of engineering equipment by types (water supply, drainage, gas, electricity, heat supply) and principles of their development taking into account the advanced pace of construction in relation to housing, low level of implementation of engineering measures for development, including suburban, for construction or other uses, the boundaries of the territories of priority development and location of construction objects for the forecasted stage	neural network training

Continuation of table E.7

1	2	3	4
		are formed 7–10 years, low level of implementation of design, organizational and engineering measures to improve the ecological condition of territories (including suburban), their preparation for construction, unsystematically developed and implemented proposals for the location of construction sites, urban development at the forecast stage 7–10 years.	
	0.51–1	High level of functional purpose, determination of modes and parameters of construction of one or more land plots, distribution of territories according to building norms, state standards and rules, low level of provision of needs in enterprises and establishments of public service, high level of establishment of expediency, volumes, sequence of building reconstruction, high level of ensuring the order and volume of engineering training of the territory, high level of formation of the system of engineering networks, the order of organization of transport and pedestrian traffic, a high level of ensuring the order of integrated landscaping and landscaping, the need to form an ecological network, the boundaries of coastal protection zones and beach areas of water bodies (in the absence of zoning plan), a high level of change in housing growth, high the level of formation of characteristics of territories (plots) for placement of new housing construction in vacant territories, within and outside the settlement, as well as in reconstruction areas by capacity, number of storeys and building density with allocation of territories for formation of land plots for social and affordable housing, summary data on the needs in the areas for all types of construction, a high level of formation of ecological and urban characteristics of the planned urban development with the definition of planning measures to improve the environment, high the level of formation of ecological and town-planning characteristics of the planned territorial development of the settlement taking into account the value of lands or property complexes in the adjacent territories,	Included

Continuation of table E.7

1	2	3	4
		compensation and other costs associated with the change of functional use or inclusion in the city limits, high level of provision and completeness of formation of architectural-spatial composition, high level of provision of areas of green public areas, general greenness of the settlement, high level of provision of main streets, roads and their intersections, determination of directions of construction (reconstruction) of main streets, use of underground space, construction bridges, tunnels, transport interchanges, bicycle paths and pedestrian zones, the density of the street network (with allocation of this indicator for each category of main streets separately), high level of provision of engineering equipment by types (water supply, drainage, gas, electricity, heat supply) and principles of their development taking into account the advanced pace of construction relative to housing, high level of engineering measures for the development of the territory, in particular suburban, for construction or other uses, formed the boundaries of the territories of priority development and location of construction sites at the projected stage 7–10 years, a high level of implementation of design, organizational and engineering measures to improve the ecological condition of areas (including suburban), preparing them for construction, a high level of implementation of proposals for the location of construction sites, urban development at the forecast stage 7–10 years.	
The level of reliability and completeness of planning decisions that affect the use of land in the region	0–0.49	Low level of reliability and completeness of planning decisions in the field of land use for urban planning, low level of implementation and realization of the principles of planning and spatial organization of construction, low level of installation of red lines and building regulation lines, low level of urban planning conditions and restrictions (in the absence of zoning plan territory) or clarification of town-planning conditions and restrictions according to the zoning plan of the territory	Not included
	0.5	The reliability and completeness of certain planning decisions in the field of land use for urban development is ensured, the	Uncertainty requires additional

Continuation of table E.7

1	2	3	4
		implementation and realization of the principles of planning and spatial organization of construction is ensured, the installation of red lines and building regulation lines is ensured, urban planning conditions and restrictions are met (in case of no zoning plan).or clarification of town-planning conditions and restrictions according to the zoning plan of the territory	neural network training
	0.51–1	High level of reliability and completeness of planning decisions in the field of land use for urban planning, high level of implementation and realization of the principles of planning and spatial organization of construction, the installation of red lines and building regulation lines, a high level of urban planning conditions and restrictions (in the absence of a zoning plan) or clarification of urban conditions and restrictions in accordance with the zoning plan	Included

Table E.8

Quantitative basis for the selection of structural and planning factors influencing the formation of urban areas of territorial development of land use (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of provision of territories with structural and planning components	0–0.49	Low impact of residential areas (manor, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing): community centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main residential streets and squares, low impact of the share of green areas of common use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower greenhouses), low impact of industrial, communal and warehouse areas, low impact of the share of resort areas, low impact of the share of landscape and recreational areas, in particular the territories of horticultural societies, country houses, recreation and	Not included

Continuation of table E.8

1	2	3	4
		leisure facilities, resort hotels, low impact of the share of forests, forest parks, meadows, botanical parks, landscape parks, reservoirs, watercourses, nature reserves, low impact of the share of agricultural areas, low impact of the territory of the territory, low impact of the share of historical and cultural monuments of national and local significance on the territorial development of land use in regions	
	0.5	Low impact of residential areas (homestead, low-rise, medium-rise, high-rise buildings, multifunctional, public housing): community centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main residential streets and squares, high impact of the share of green areas of public use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower greenhouses), low impact of industrial, communal and warehouse areas, low impact of the share of resort areas, high impact of the share of landscape and recreational areas, including horticultural societies, cottages, recreation and leisure facilities, resort hotels, high impact of the share of forests, forest parks, meadows, parks, botanical parks watercourses, objects of nature reserve fund, high influence of specific weight of agricultural territories, low influence of specific weight of territories of engineering infrastructure, low influence of specific weight of territories of historical and cultural monuments of national and local value on territorial development land use in regions	Uncertainty requires additional neural network training
	0.51–1	High impact of residential areas (manor, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing): public centers and major facilities of city and district importance, public and business buildings, existing buildings marked on a cartographic basis, main residential streets and squares, high impact of the share of green areas of common use, green areas of special purpose (green sanitary protection zones, coastal protection strips, nurseries and flower	Included

Continuation of table E.8

1	2	3	4
		greenhouses), high impact of industrial, communal and warehouse areas, high impact of the share of resort areas, high impact of the share of landscape and recreational areas, including areas of horticultural societies, cottages, recreation and leisure facilities, resort hotels, high impact of the share of forests, forest parks, meadows, parks, botanical parks watercourses, objects of nature reserve fund, high influence of specific weight of agricultural territories, high influence of specific weight of territories of engineering infrastructure, high influence of specific weight of territories of historical and cultural monuments of national and local value on territorial development of land use in regions	

Table E.9

Quantitative basis for the selection of planning and limiting factors that form urban areas of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Completeness and reliability of information support on the formation and application of planning and restrictive factors	0–0.49	Low level of completeness and reliability in the formation and application of planning and limiting factors (the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of gassiness, excessive noise, electromagnetic radiation, electromagnetic radiation pollution, the presence of areas of minerals, the presence of sanitary protection zones of industrial enterprises, cemeteries and other utilities, the presence of restricted areas in the areas of airports in terms of flight safety, the presence of districts and sanitary protection zones of resorts, the presence of sanitary protection zones of water supply sources, water treatment facilities, the presence of protective zones of quarries, dumps, pipelines and other facilities, the presence of water protection zones and coastal protection zones of reservoirs and watercourses, the presence of territories and	Not included

Continuation of table E.9

1	2	3	4
		protection zones of nature reserves, monuments of nature, architecture, history and culture and the zone of regulation of buildings, protected landscapes, the presence of particularly valuable productive lands)	
	0.5	Completeness and reliability in the formation and application of certain planning and limiting factors (the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic noise, electromagnetic pollution, the presence of areas of minerals, the presence of sanitary protection zones of industrial enterprises, cemeteries and othersutilities, the presence of restricted areas in the areas of airports in terms of flight safety, the presence of districts and areas of sanitary protection of resorts, the presence of sanitary protection zones of water supply sources, water treatment facilities, the presence of protective zones of quarries, dumps, pipelines and other facilities, the presence of water protection zones and coastal protection zones of reservoirs and watercourses, the presence of territories and protection zones of nature reserves, monuments of nature, architecture, history and culture and development control zones, protected landscapes, the presence of particularly valuable productive lands)	Uncertainty requires additional neural network training
	0.51–1	High level of completeness and reliability in the formation and application of certain planning and limiting factors (the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of gassing zones, excessive noise, electromagnetic noise radiation pollution, the presence of areas of minerals, the presence of sanitary protection zones of industrial enterprises, cemeteries and other communal facilities, the presence of restricted areas in the areas of airports in terms of flight safety, the presence of districts and zones of sanitary protection of resorts, the presence of sanitary protection zones of water supply sources, water treatment facilities, the presence of protection zones of quarries,	Included

Continuation of table E.9

1	2	3	4
		dumps, pipelines and other objects, the presence of water protection zones and coastal protection strips of reservoirs and watercourses the presence of territories and protection zones of nature reserves, natural monuments, architecture, history and culture and development zones, landscapes protected, availability of particularly valuable productive lands)	

Table E.10

Quantitative basis for the selection of factors of engineering training and equipment of territories in the urban aspect of the development in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of engineering support of territories in urban development of the region	0–0.49	It is not possible to determine the directions of zoning of industrial and communal territories according to the sanitary classification of productions, low level of supply with high-voltage power lines, providing the main objects of communication, provision of electronic and low-current devices	Not included
	0.5	the definition of zoning directions of industrial and communal territories according to the sanitary classification of productions, low level of provision with high-voltage power lines is not fully provided, providing the main objects of communication, provision of electronic and low-current devices	Uncertainty requires additional neural network training
	0.51–1	The definition of zoning directions of industrial and communal territories according to the sanitary classification of productions, a high level of supply with high-voltage power lines is fully provided, providing the main objects of communication, provision of electronic and low-current devices	Included
The level of implementation of measures for the formation of engineering support of territories in the urban	0–0.49	Low level of implementation of measures that require a significant amount of backfilling or cutting of soils, drainage, peat, low level of implementation of measures for the formation and reconstruction of urban hydraulic structures, low level of implementation of measures for riverbeds and other bodies of water subject to regulation, cleaning,	Not included

Continuation of table E.10

1	2	3	4
development of the region		dredging, locking in pipes, low level of implementation of measures for the formation of water protection zones and coastal protection strips of reservoirs, low level of implementation of measures for reclamation of disturbed areas, low level of implementation of measures for formation and reconstruction of engineering structures and springs, low level of construction of new and reconstruction of existing water, heat, electricity, gas supply networks, low level of construction and reconstruction of storm sewers and sewage treatment plants, low level of implementation of measures for construction and reconstruction of treated wastewater	
	0.5	Unsystematically implemented measures that require a significant amount of backfilling or cutting of soils, drainage, peat, measures for the formation and reconstruction of urban hydraulic structures, measures for riverbeds and other bodies of water to be regulated, cleaned, dredged, locked in the formation of the pipe water protection zones and coastal protection strips of reservoirs, measures for reclamation of disturbed territories, measures for formation and reconstruction of engineering structures and springs, construction of new and reconstruction of existing main networks of water, heat, electricity, gas supply, construction and reconstruction of storm sewers and treatment facilities sewerage, measures for construction and reconstruction of treated wastewater discharge sites	Uncertainty requires additional neural network training
	0.51–1	High level of implementation of measures that require a significant amount of backfilling or cutting of soils, drainage, peat, high level of implementation of measures for the formation and reconstruction urban hydraulic structures, a high level of implementation of measures for sections of riverbeds and other bodies of water that are subject to regulation, cleaning, dredging, locking in pipes, a high level of implementation of measures for formation of water protection zones and	Included

Continuation of table E.10

1	2	3	4
		coastal protection strips of reservoirs, high level of implementation of measures reclamation of disturbed areas, high level of implementation of measures for the formation and reconstruction of engineering structures and springs, high level of construction of new and reconstruction of existing main networks of water, heat, electricity, gas supply, high the level of construction and reconstruction of storm sewers and sewage treatment plants, a high level of implementation of measures for the construction and reconstruction of places of discharge of treated wastewater	

Table E.11

Quantitative basis for the selection of urban factors of transport, affecting the territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of transport support in the implementation of urban policy in the system of territorial development of land use in the region	0–0.49	Low level of classification of street and road network in regions, low level of provision of main objects and lines of urban and external transport, provision of routes and structures of off-street rail public transport, provision of metro depots, tram, bus and trolleybus parks, garages and parking lots and trucks	Not included
	0.5	The classification of the road network in regions is low the level of provision of the main objects and lines of urban and external transport, provision of routes and structures of off-street rail public transport, provision of metro depots, tram, bus and trolleybus parks, garages and parking lots for cars and trucks	Uncertainty requires additional neural network training
	0.51–1	High level of classification of street and road network in regions, high level of provision of main objects and lines of urban and external transport, provision of routes and structures of off-street rail public transport, provision of metro, tram, bus and trolleybus parks, garages and parking lots for cars and trucks	Included

Continuation of table E.11

1	2	3	4
Implementation of transport support measures in the implementation of urban policy in the system of territorial development of land use in the region	0–0.49	Low level of implementation of measures to improve the road network and passenger transport system, low level of implementation of the designed transport facilities, low level of activity of car and passenger flows	Not included
	0.5	High level of implementation of measures to improve the road network and passenger transport system, low level of implementation of the designed transport facilities, high level of activity of car and passenger flows	Uncertainty requires additional neural network training
	0.51–1	High level of implementation of measures to improve the road network and passenger transport system, high level of implementation of the designed transport facilities, high level of activity of car and passenger flows	Included

Table E.12

Quantitative basis for the selection of urban historical and cultural factors of territorial development of land use in the region (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of availability of historical and cultural sites and their impact on the territorial development of land use in regions	0–0.49	Low level of availability of monuments of national and local significance of all types and kinds according to the classification of cultural heritage sites, identified cultural heritage sites of all types and kinds according to the classification of cultural heritage sites, low level of historical buildings (significant and ordinary historical buildings: public, in particular religious, availability of residential and economic, industrial and fortification structures) of territories that have the status of lands of historical and cultural purpose, high level of availability of lost seats buildings, structures, fortifications fortifications that had important historical or urban significance, a high level the presence of disharmonious buildings and structures, low level of availability of natural monuments, nature reserves, valuable natural landscapes, low level presence of the formed lists reflected on the historical and architectural reference plan of objects of cultural heritage, low level the	Not included

Continuation of table E.12

1	2	3	4
		presence of the formation of the boundaries of the settlement at each stage of development, the most important historical paths, streets, squares, prominent historic buildings, structures and complexes, tracing of preserved and lost lines of fortifications, low availability of landscape art, natural monuments, nature reserves, sanctuaries, etc., defined slope faces, formed natural dominants, water surfaces, greenery, low level the presence of cultural heritage sites located outside the settlement and historically related to it, the main directions of inspection of its historic center from the entrances to it, valuable landscapes	
	0.5	Low level of availability of monuments of national and local significance of all types and kinds according to the classification of cultural heritage sites, identified cultural heritage sites of all types and kinds according to the classification of cultural heritage sites, low level of historical buildings (significant and ordinary historical buildings: public, in particular religious, availability of residential and commercial, industrial and fortification structures) of territories that have the status of lands of historical and cultural purpose, high level of availability of lost houses, buildings, fortifications that had important historical or urban significance, low level of disharmonious buildings and structures, low level of monuments nature, nature reserves, valuable natural landscapes, high level presence of the formed lists reflected on the historical and architectural reference plan of objects of cultural heritage, low level the presence of the formation of the boundaries of the settlement at each stage of development, the most important historical paths, streets, squares, prominent historic buildings, structures and complexes, tracing of preserved and lost lines of fortifications, high level the presence of monuments of landscape art, natural monuments, nature reserves, sanctuaries, etc., defined facets of slopes, formed natural dominants, water surfaces, greenery, low level the presence of cultural heritage sites located outside the settlement and historically related to it, the main directions of inspection of its historic center from the entrances to it, valuable landscapes	Uncertainty requires additional neural network training

Continuation of table E.12

1	2	3	4
	0.51–1	High level of availability of monuments of national and local significance of all types and species according to the classification of cultural heritage sites, identified cultural heritage sites of all types and species according to the classification of cultural heritage sites, high level of historical buildings (significant and ordinary historical buildings: public, in particular religious, availability of residential and commercial, industrial and fortification structures) of territories that have the status of lands of historical and cultural purpose, low level of availability of places of lost houses, constructions, fortifications which had important historical or town-planning value, low level the presence of disharmonious buildings and structures, low level of availability of natural monuments, nature reserves, valuable natural landscapes, high level of availability of the formed lists reflected on historicalarchitectural reference plan of cultural heritage sites, high level the presence of the formation of the boundaries of the settlement at each stage of development, the most important historical paths, streets, squares, prominent historic buildings, structures and complexes, tracing of preserved and lost lines of fortifications, high level the presence of monuments of landscape art, natural monuments, nature reserves, sanctuaries, etc., defined facets of slopes, formed natural dominants, water surfaces, greenery, high level the presence of cultural heritage sites located outside the settlement and historically related to it, the main directions of inspection of its historic center from the entrances to it, valuable landscapes	Included
The level of formation of historical and cultural objects in the territorial development of land use in regions	0–0.49	Low level of formation of borders of historical areas of the settlement, low level of formation of boundaries of protection zones of cultural heritage monuments, which are valid at the time of drawing up the historical and architectural reference plan (in the presence of protection zones approved in previous times), low level of formed boundaries of the historic center (in the presence of defensive ramparts or walls – along these fortifications), suburbs, etc., low level of formed historical and modern urban dominants, architectural accents,	Not included

Continuation of table E.12

1	2	3	4
		architectural ensembles and complexes, main and subordinate planning and composition axes and nodes, characteristic types of urban spaces (closed, open), disharmonies , water surfaces, low level of the formed zones of review of architectural monuments which are architectural dominants and accents, low level of formed observation points, axes, fronts, low the level of the formed zones of reflection of species	
	0.5	Low level of formation of borders of historical areas of the settlement, low level of formation of zone boundaries protection of cultural heritage monuments that are valid at the time of drawing up the historical and architectural reference plan (in the presence of previously approved protection zones), low level of formed boundaries of the historic center (in the presence of defensive ramparts or walls – along these fortifications), suburbs, etc. systematically formed historical and modern urban dominants, architectural accents, architectural ensembles and complexes, main and subordinate planning and compositional axes and nodes, characteristic types of urban spaces (closed, open, disharmonious), faces water surfaces, low the level of the formed zones of review of architectural monuments, which are architectural dominants and accents, is low the level of the formed observation points, axes, fronts, low level of the formed zones of display of kinds	Uncertainty requires additional neural network training
	0.51–1	High level of formation of borders of historical areas of the settlement, a high level of formation of the boundaries of the zones of protection of cultural heritage monuments, which are valid at the time of drawing up the historical and architectural reference plan (in the presence of previously approved protection zones), high level of formed boundaries of the historic center (in the presence of defensive walls or walls - along these fortifications), suburbs, etc., systematically formed historical and modern urban dominants, architectural accents, architectural ensembles and complexes, main and subordinate planning and compositional axes and nodes types of urban spaces (closed, open, disharmonious), faces of slopes, water surfaces, high the level of the	Included

Continuation of table E.12

1	2	3	4
		formed zones of review of architectural monuments, which are architectural dominants and accents, is high the level of the formed observation points, axes, fronts, the high level of the formed zones of display of kinds	

Table E.13

Quantitative basis for the selection of urban factors that characterize the functioning of the construction sector in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
The level of development of the construction industry	0–0.49	Low level of construction products index, low level of construction volume index, low standardized value of housing commissioning indicator, low standardized value of commissioning rate of apartments in residential buildings at the construction site, low standardized value of total area of commissioned buildings	Not included
	0.5	Low level of construction products index, low level of construction volume index, high standardized value of housing commissioning index, high standardized value of commissioning of apartments in residential buildings at the construction site, high standardized value of total area of commissioned buildings	Uncertainty requires additional neural network training
	0.51–1	high level of construction products index, high level of construction volume index, high standardized value of housing commissioning indicator, high standardized value of commissioning of apartments in residential buildings at the construction site, high standardized value of total area of commissioned buildings	Included

Table E.14

Quantitative basis of selection factors level of application of spatial information in urban development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of completeness and reliability of the applied	0–0.49	Low level of formation of a single digital topographic basis of the territory of the Autonomous Republic of Crimea and oblasts on the basis of topographic maps and planning and	Not included

Continuation of table E.14

1	2	3	4
spatial information in spatial development of land use in regions		cartographic basis of the state land cadastre in the respective territories, low level of establishment of administrative boundaries territorial units on the basis of data of the state land cadastre, low level of development of planning schemes of the territory of the Autonomous Republic of Crimea, oblasts and separate parts of the territory with objects of regional significance outside settlements, low level of development and application of results of monitoring of formation of general plans of settlements, zoning plans and detailed plans, low level of formation and implementation of information resources of branch cadastres and information systems on land use, ecological, engineering-geological, seismic, hydrogeological and other zoning of the region on the basis of data received from the relevant branch cadastres and information systems, low level of implementation of regulatory legal acts in the field of urban planning, as well as building codes,state standards and rules on the basis of decisions on their approval in accordance with the law	
	0.5	Low level of formation of a single digital topographic basis of the territory of the Autonomous Republic of Crimea and regions on the basis of topographic maps and planning and cartographic basis of the state land cadastre for the respective territories, low the level of establishing the boundaries of administrative-territorial units on the basis of the state land cadastre, high level of development of planning schemes of the territory of the Autonomous Republic of Crimea, oblasts and separate parts of the territory with objects of regional significance outside the settlements, low level of development and application of results of monitoring of the state of formation of general plans of settlements, plans of zoning of territories (zonings) and detailed plans, high level of formation and realization of information resources of branch cadastres and information systems on use of territories, ecological, engineering-geological, seismic, hydrogeological and other zoning of the region on the basis of data that received from relevant industry inventories and information systems, high the level of implementation of regulations in the	Uncertainty requires additional neural network training

Continuation of table E.14

1	2	3	4
		field of urban planning, as well as building codes, state standards and rules on the basis of decisions on their approval in accordance with the law	
	0.51–1	High level of formation of a single digital topographic basis of the territory of the Autonomous Republic of Crimea and regions on the basis of topographic maps and planning and cartographic basis of the state land cadastre on the respective territories, high level of establishing boundaries of administrative-territorial units on the basis of state land cadastre, high level of development of planning schemes of the territory of the Autonomous Republic of Crimea, oblasts and separate parts of the territory with objects of regional significance outside settlements, high level of development and application of results of monitoring of formation of general plans of settlements, zoning plans and detailed plans, high level of formation and implementation of information resources of branch cadastres and information systems on the use of territories, ecological, engineering-geological, seismic, hydrogeological and other zoning of the region on the basis of data received from the relevant branch cadastres and information systems, high the level of implementation of regulations in the field of urban planning, as well as building codes, state standards and rules on the basis of decisions on their approval in accordance with the law	Included

Table E.15

Quantitative basis for selection of factors of the level of formation of cadastral information in the field of land use in regions for urban planning (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of completeness and reliability of the formation of cadastral information in the field of land	0–0.49	Low level of interaction with the basic subjects of urban cadastre and constant receipt of information from them to be registered in the urban cadastre, low level of primary processing, input control and systematization of data and documents and their entry into the database of urban cadastre information system, low level	Not included

Continuation of table E.15

1	2	3	4
use of regions for urban planning		maintenance of software and hardware of the information system and geoportal of the urban cadastre, low level of maintenance of information storage and archiving system, low level of organization of information exchange with other cadastres, registers and information systems, low level of organization of information protection against unauthorized access in accordance with regulations documents, low level of formation of cadastral documents and their issuance in the order,established by the relevant authorized body of urban planning and architecture, low level of generalization of information and preparation of analytical reports on the state of land use, state and changes of architectural, urban and construction activities in the territory, low level of creation and maintenance of metadata database on information resources of urban cadastre, formation of open information resources of urban cadastre and providing access to them in the network of geoportals, low level of cadastral certificates at the request of users within the authorized access to information resources of urban cadastre and their provision, low level of direct authorized access to the cadastral system of individual userslow level of provision of direct authorized access to the cadastral system of individual users in accordance with the list approved by the administratorinformation resources of the town-planning cadastre, low level of adaptation and supplementation of standard methodical and normative documents of town-planning cadastre, low level of development and improvement of means of town-planning cadastre, low level of entering information on town-planning documentation into the town-planning cadastre system, low level of other creation and other activities. town-planning cadastre, low level of development and implementation of programs on creation of town-planning cadastre, low level of development of legal, normative and methodical maintenance on creation of town-planning cadastre, low level of organization of functioning of Service of town-planning cadastre low level of formation of program-technical complexes on creation and use of town-planning cadastre,low level of organization of works on information content of databases on creation of	

Continuation of table E.15

1	2	3	4
		town-planning cadastre, low level of formation of information-communication system of information exchange in system of town-planning cadastre, low level of staffing on creation and use of town-planning cadastre, low level of financing of works. creation of the urban cadastre and its maintenance, formation and maintenance of the Urban Cadastre Service at the state level, which are carried out at the expense of the state budget, at the regional and basic (administrative district, city) levelslow level of staffing for the creation and use of urban cadastre, low level of funding for activities identified by the program for the creation of urban cadastre and its maintenance, formation and maintenance of the Urban Cadastre Service at the state level, carried out at the expense of the state budget, regional and basic (administrative district, city) levelslow level of staffing for the creation and use of urban cadastre, low level of funding for activities defined by the program for the creation of urban cadastre and its maintenance, formation and maintenance of the Urban Cadastre Service at the state level, carried out at the expense of the state budget, regional and basic (administrative district, city) levels– at the expense of relevant local budgets or other sources not prohibited by law, low level of involvement of research and design organizations for the implementation of innovative technologies for urban cadastre, low level of interaction of authorized bodies of urban planning and architecture, technical inventory, land resources, state statistics management and disposal of state property, state sanitary and epidemiological control, environmental protection, control over the use and protection of cultural heritage, enterprises for cartographic and geodetic works and civil engineering surveys, other structural units of the relevant executive authorities and local governments their registers and databases on the creation and use of urban cadastre, low level of interaction of other enterprises, institutions and organizations that perform natural surveys, surveys and surveys on the creation and use of urban cadastre, low level of interaction of legal entities and individuals with the necessary materials for the formation of urban cadastre, low level of	

Continuation of table E.15

1	2	3	4
		completeness and reliability of cadastral information,used by the bodies responsible for solving problems and preparing proposals for policies of resource and legally balanced development of the territory and settlements, determining investment priorities - to perform their functions, the low level of completeness and reliability of cadastral information used by customers of urban planning documentation, developers – for the provision of land for development, obtaining urban conditions and restrictions on land development, design tasks, technical conditions for engineering support of the construction site, search and construction works, formation of construction passport, low level of completeness and reliability of cadastral information used design, survey, research and construction companies – to obtain initial data for the performance of relevant works, the low level of completeness and reliability of cadastral information used by the authorized bodies of urban planning and architecture to compile urban planning conditions and restrictions, control over the development of urban planning documentation, assignment, town-planning development and use of land plots, provision of other town-planning activities, low level of completeness and reliability of cadastral information used by land resources bodies for regulation of land use, organization of establishment of boundaries of settlements and administrative-territorial units, separate land plots, preparation of proposals for payment for land and normative assessment of land plots taking into account the urban value of the territory, monitoring of settlement lands, low level of completeness and reliability of cadastral information used by state supervision (control) bodies in the agro-industrial complex–to control the use of land in accordance with the intended purpose, low level of completeness and accuracy of cadastral information used by state property management and disposal bodies - to assess real estate taking into account its urban value and associated territory, low level of completeness and reliability of cadastral information used by environmental protection bodies to develop environmental measures, monitor, supervise and control the use of natural resources and the state	

Continuation of table E.15

1	2	3	4
		of the environment of settlements, their systems, low level of completeness and reliability of cadastral information used by financial institutions, investors,insurance companies to determine rent payments taking into account the town-planning value of the territory, assessment and insurance of investment risk during the development of the territory, low level of completeness and reliability of cadastral information used by state cadastre services and branch data banks to coordinate distributed databases and obtain cadastral information, low level of completeness and reliability of cadastral information used by the authorities thatwhich use the organs thatwhich use the organs that conduct state registration of rights to real estate, low level of completeness and reliability of cadastral information used by other public authorities, local governments, legal entities and individuals to obtain relevant information for urban needs	
	0.5	Unsystematic interaction with the basic subjects of the urban cadastre and constant receipt of information from them, which is subject to registration in the urban cadastre, low level of primary processing, input control and systematization received data and documents and entering them into the database of the urban cadastre information system, low level of maintenance of software and hardware of the information system and geoportal of the urban cadastre, low level of maintenance of information storage and archiving system, low level of organization of information exchange with other cadastres, registers and information systems, low level of organization of work to protect information from unauthorized access in accordance with regulations, the formation of cadastral documents in the manner prescribed by the relevant authorized body of urban planning and architecture, low level of generalization of information and analytical reports on land use, status and changes architectural objects,urban planning and construction activities in the relevant territory, low level of creation and maintenance of metadata database on information resources of urban cadastre, formation of open information resources of urban cadastre and providing access to them in the network of geoportals, provided cadastral	Uncertainty requires additional neural network training

Continuation of table E.15

1	2	3	4
		references to user requests within authorized access to information resources urban cadastre and their provision, providing direct authorized access to the cadastral system of individual users in accordance with the list approvedprovided for the formation of cadastral certificates at the request of users within the authorized access to information resources of urban cadastre and their provision, providing direct authorized access to the cadastral system of individual users in accordance with the list approvedprovided for the formation of cadastral certificates at the request of users within the authorized access to information resources of urban cadastre and their provision, providing direct authorized access to the cadastral system of individual users in accordance with the list approvedmanager of information resources of urban cadastre, high level of adaptation and supplementation of standard methodological and normative documents of urban cadastre, high level of development and improvement of means of urban cadastre, high level of information on urban planning documentation in the system of urban cadastre, non-systematic implementation of other activities urban cadastre, unsystematic development and implementation of programs for the creation of urban cadastre, non-systemic measures for the development of legal, regulatory and methodological support for the creation of urban cadastre, non-systemic organization of the Urban Cadastre Service, non-systemic formation of software and hardware for the creation and use of urban cadastre, non-systemic organization data on the creation of urban cadastre, non-systematic formation of information and communication system of information exchange in the urban cadastre system, low level of staffing for the creation and use of urban cadastre, non-systemic financing of activities defined by the program for creating urban cadastre and its maintenance,formation and maintenance of the Urban Cadastre Service at the state level, carried out at the expense of the state budget, at the regional and basic (administrative district, city) levels at the expense of relevant local budgets or other sources not prohibited by law, unsystematic involvement of research and development organizations for the introduction of innovative	

Continuation of table E.15

1	2	3	4
		technologies for urban cadastre, non-systemic interaction of authorized bodies of urban planning and architecture, bodies of technical inventory, land resources,unsystematic involvement of research and design and survey organizations for the introduction of innovative technologies for urban cadastre, unsystematic interaction of authorized bodies of urban planning and architecture, bodies of technical inventory, land resources,unsystematic involvement of research and design and survey organizations for the introduction of innovative technologies for urban cadastre, unsystematic interaction of authorized bodies of urban planning and architecture,resources, state statistics, management and disposal of state propertystate sanitary and epidemiological control, environmental protection, control over the use and protection of cultural heritage, enterprises for cartographic and geodetic works and civil engineering surveys, other structural units of the relevant executive authorities and local governments that maintain their registers and databases data on the creation and use of urban cadastre, low level of interaction of other enterprises, institutions and organizations that perform natural surveys, surveys and surveys on the creation and use of urban cadastre non-systematic interaction of legal entities and individuals with materials needed for urban cadastre the level of completeness and reliability of cadastral information used by the authorities,responsible for solving tasks and preparing policy proposals for balanced resource and legal development of territories and settlements, determining investment priorities to perform their functions, low level of completeness and reliability of cadastral information used by customers of urban planning documentation, developers to provide land for development, obtaining town-planning conditions and restrictions on land development, design tasks, technical conditions for engineering support of the construction object, search and construction works, formation of construction passport, low level of completeness and reliability of cadastral information used by design, survey, research and construction companies to obtain initial data for the relevant works,low level of completeness and reliability	

Continuation of table E.15

1	2	3	4
		of cadastral information used by the authorized bodies of urban planning and architecture to compile urban planning conditions and restrictions, control over the development of urban planning documentation, allotment, town-planning development and use of land plots, ensuring other urban planning activities, low level of completeness and reliability of cadastral information used by land resources bodies to regulate land use, organization of establishment of boundaries of settlements and administrative – territorial units, individual land plots, preparation of proposals for establishing the amount of land payments and normative assessment of land plots taking into account the urban value of the territory, monitoring of settlement lands, low level of completeness and reliability of cadastral information used by state supervision (control) in agro-industrial complex for control over the use of land plots in accordance with the intended purpose, low level of completeness and reliability of cadastral information used by state property management and administration bodies to assess real estate taking into account its urban value and associated territory, low level of completeness and reliability cadastral information,which use environmental protection bodies to develop environmental measures, monitor, supervise and control the use of natural resources and the state of the natural environment of settlements, their systems, low level of completeness and reliability of cadastral information used by financial institutions, investors, insurance companies to determine rent payments taking into account the urban value of the territory, assessment and insurance of investment risk during the development of the territory, the low level of completeness and reliability of cadastral information used by state cadastre services and sectoral data banks forsupervision and control over the use of natural resources and the state of the environment of settlements, their systems, low level of completeness and reliability of cadastral information used by financial institutions, investors, insurance companies to determine rent payments based on urban value, assessment and insurance of investment risk during the development of the territory, the low	

Continuation of table E.15

1	2	3	4
		level of completeness and accuracy of cadastral information used by state cadastre services and sectoral data banks forsupervision and control over the use of natural resources and the state of the environment of settlements, their systems, low level of completeness and reliability of cadastral information used by financial institutions, investors, insurance companies to determine rent payments based on urban value, assessment and insurance of investment risk during the development of the territory, the low level of completeness and accuracy of cadastral information used by state cadastre services and sectoral data banks forlow level of completeness and reliability of cadastral information used by state cadastre services and industry data banks forlow level of completeness and reliability of cadastral information used by state cadastre services and industry data banks for mutual coordination of maintaining distributed databases and obtaining cadastral information, low level of completeness and reliability of cadastral information used by bodies conducting state registration of real estate rights, low level of completenessand reliability of cadastral information used by other public authorities, local governments, legal entities and individuals to obtain relevant information for urban planning needs	
	0.51–1	High level of interaction with basic subjects of urban cadastre and constant receipt from them of information subject to registration in urban planning cadastre, high level of primary processing, incoming control and systematization of received data and documents and their entry into database of urban cadastre information system, high level maintenance of software and hardware of the information system and geoportal of urban cadastre, high level of maintenance of information storage and archiving system, high level of organization of information exchange with other cadastres, registers and information systems, high level of organization of information protection against unauthorized access in accordance with regulations documents, a high level of formation of cadastral documents and their issuance in the order,established by the relevant authorized body of urban planning and architecture, a high	Included

Continuation of table E.15

1	2	3	4
		level of generalization of information and analytical reports on the use of the territory, the state and changes of architectural, urban and construction activities in the territory, a high level of creation and maintenance of metadata database on information resources of urban cadastre, formation of open information resources of urban cadastre and providing access to them in the network of geoportals, high level of formation of cadastral certificates on user requests within authorized access to information resources of urban cadastre and their provision, high level of direct authorized access to cadastral system of individual users according to the list ,,approved by the manager of information resources of urban planningcadastre, high level of adaptation and supplementation of standard methodical and normative documents of town-planning cadastre, high level of development and improvement of means of town-planning cadastre, high level of entering information about town-planning documentation into the town-planning cadastre system, high level of other activity on creation and maintenance of town-planning cadastre high level of development and implementation of programs for the creation of urban cadastre, high level of development of legal, regulatory and methodological support for the creation of urban cadastre, high level of organization of the Urban Cadastre Service, high level of software and hardware for the creation and use of urban cadastre,high level of organization of work on information content of databases on creation of town-planning cadastre, high level of formation of information and communication system of information exchange in system of town-planning cadastre, high level of staffing on creation and use of town-planning cadastre, high level of financing of works. creation of urban cadastre and its maintenance, formation and maintenance of the Urban Cadastre Service at the state level, carried out at the expense of the state budget, at the regional and basic (administrative district, city) levels at the expense of relevant local budgets or other sources not prohibited by law,high level of involvement of research and design organizations for the introduction of innovative	

Continuation of table E.15

1	2	3	4
		technologies for urban cadastre, high level of cooperation of authorized bodies of urban planning and architecture, bodies of technical inventory, land resources, state statistics, management and disposal of state property, state sanitary and epidemiological control, environmental protection, control over the use and protection of cultural heritage, enterprises for cartographic and geodetic works and civil engineering surveys, other structural units of relevant executive authorities and local governments that maintain their registers and databases data on the creation and use of urban cadastre, high level of interaction of other enterprises, institutions and organizations performing natural surveys, surveys and surveys on the creation and use of urban cadastre low level of interaction of legal entities and individuals with materials needed to form urban cadastre low the level of completeness and reliability of cadastral information used by the authorities,responsible for solving tasks and preparing policy proposals for balanced resource and legal development of territory and settlements, determining investment priorities to perform their functions, a high level of completeness and reliability of cadastral information used by customers of urban planning documentation, developers to provide land for development, obtaining town-planning conditions and restrictions on land development, design tasks, technical conditions for engineering support of the construction object, search and construction works, construction passport formation, high level of completeness and reliability of cadastral information used by design, survey, research and construction companies to obtain initial data for the relevant works,high level of completeness and reliability of cadastral information used by authorized bodies of urban planning and architecture for drawing up town-planning conditions and restrictions, control over development of town-planning documentation, allotment, town-planning development and use of land plots, ensuring other urban planning activities, high level of completeness and reliability of cadastral information used by land resources bodies to regulate land use, organization of establishment of boundaries of settlements and administrative -	

Continuation of table E.15

1	2	3	4
		territorial units, separate land plots, preparation of proposals for land payments and normative assessment of land plots taking into account the urban value of the territory, monitoring of settlement lands, high level of completeness and reliability of cadastral information used by state supervision (control) bodies in the agro-industrial complex to control land use in accordance with the intended purpose, high level of completeness and reliability of cadastral information,which use the bodies for management and disposal of state property for real estate appraisal taking into account its urban value and related territory, high level of completeness and reliability of cadastral information, which are used by environmental protection bodies for development of environmental measures, monitoring, supervision and control over the use of natural resources and the state of the environment of settlements, their systems, high level of completeness and reliability of cadastral information used by financial institutions, investors, insurance companies to determine rent payments based on urban value, assessment and insurance of investment risk time of development of the territory, high level of completeness and reliability of cadastral information,which use state cadastre services and industry data banks for mutual coordination of maintenance of distributed databases and obtaining cadastral information, high level of completeness and reliability of cadastral information used by bodies conducting state registration of real estate rights, high level of completeness and reliability of cadastral information used by other public authorities, local governments, legal entities and individuals to obtain relevant information for urban planning needs	

Table E.16

Quantitative basis for the selection of evaluation factors influencing the formation of investment attractiveness in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of completeness of information support of indicators of investment attractiveness of lands in regions	0–0.49	Low level of information support on the results of soil evaluation, low level of information support of economic evaluation of lands, changes in the normative monetary valuation of land per hectare of the region, low level of application of expert valuation in the system of monetary valuation of land, low level of information support to determine coefficients that take into account regional differences in rent income and are determined for industrial, transport, land'language, energy, defense and other purposes, low level of information support indicator that determines the share of the number of settlements that have a normative monetary value in their total number	Not included
	0.5	Unsystematic formation of information support on the results of soil evaluation, low level of information support of economic evaluation of lands, changes in the normative monetary valuation of land per hectare of the region are unsystematic application of expert assessment in the system of monetary valuation of land, low level of information support for determining the coefficients that take into account regional differences in the formation of rental income and are determined for land for industry, transport, communication'language, energy, defense and other purposes, low level of information support indicator that determines the proportion of quantity settlements that have a normative monetary value in their total number	Uncertainty requires additional neural network training
	0.51–1	High level of formation of information support on the results of soil grading, high level of information support of economic evaluation of lands, changes in the regulatory monetary valuation of land per hectare of the region is high the level of application of expert assessment in the system of monetary valuation of land, a high level of information support for determining the coefficients that take into account regional differences in the formation of rental income and are determined for land for industry transport,	Included

Continuation of table E.16

1	2	3	4
		communication, energy, defense and other purposes, a high level of information support indicator that determines the share of the number of settlements that have a normative monetary value in their total number	

Table E.17

Quantitative basis for the selection of factors in the level of use of funds, property and property rights that affect the formation of investment attractiveness in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of use of funds, property and property rights that affect the formation of investment attractiveness in the system of territorial development of land use in regions	0–0.49	Low level of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations, low level of use of movable and immovable property (buildings, structures, equipment and other tangible assets) located in disposal of regional authorities, low level of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations, low level of use of capital investments in regions	Not included
	0.5	Unsystematic use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations, low level of use of movable and immovable property (buildings, structures, equipment and other tangible assets) available regional authorities, unsystematic formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations, low level of use of capital investments in regions	Uncertainty requires additional neural network training
	0.51–1	High level of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations, high level of use of movable and immovable property (buildings, structures,	Included

Continuation of table E.17

1	2	3	4
		equipment and other tangible assets values) at the disposal of regional authorities, a high level of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in land relations, a high level of use of capital investments in regions	

Table E.18

Quantitative basis for the selection of stakeholder factors influencing investment attractiveness in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of interaction of stakeholders that affect the investment attractiveness in the system territorial development of land use in regions	0–0.49	Low level of interaction between state authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local governments in the system of land use, low the level of interaction of legal entities and individuals in settlements in the system of land use of the regions is low level of interaction of landowners and land users, low level of interaction of united territorial communities, low level of interaction of customers of construction products engaged in building territories, low the level of interaction of construction companies that ensure the development of territories, the low level of interaction of design organizations that ensure the creation of construction projects, the low level of interaction of survey organizations that form materials and data on engineering and geodetic, engineering and geological other survey works and information on restrictions use of the territory in the approved projects, low level of interaction of economic entities of appraisal activity, carrying out interaction in the field of land use of regions and which are registered in the order established by the legislation– business entities, as well as legal entities, regardless of their organizational and legal form and form of ownership, which carry out economic activities, which include	Not included

Continuation of table E.18

1	2	3	4
		at least one appraiser, and which have received a certificate of the subject of appraisal), low level of interaction of agricultural enterprises, institutions and organizations, personal farms and farms, low level of interaction of territorial development entities on the formation, distribution and use of lands of nature reserves, which are determined by land and water areas with natural complexes and objects that have a special nature protection, ecological, scientific, aesthetic, recreational and other value, which in accordance with the law are given the status of territories and objects of the nature reserve fund, low level of interaction of subjects of territorial development concerning formation, distribution and use of the lands of improving appointment having natural medical properties which are used or can be used for prevention of diseases and treatment of people, low the level of interaction of territorial development entities on the formation, distribution and use of recreational lands used for recreation, tourism and sporting events, low level of interaction of territorial development entities on the formation, distribution and use of historical and cultural lands, on which are located cultural heritage sites, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums, memorial museums, estates, low level of interaction of territorial development entities on the formation, distribution and use of forest lands, which are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands,which are provided and used for forestry needs, low the level of interaction of territorial development entities on the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, other water	

Continuation of table E.18

1	2	3	4
		management structures and canals, as well as land allocated for drainage strips for them; coastal waterways; artificially created land plots within the waters of seaports, low level of interaction of subjects territorial development for the formation, distribution and use of industrial lands, which are provided for the location and operation of main, auxiliary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, utilities, office buildings, other structures , low level of interaction of territorial development entities on the formation, distribution and use of transport lands, which include lands provided to enterprises, institutions and organizations of railway, road and road transport, sea, river, aviation, pipeline transport and urban electric transport to perform the assigned on them tasks concerning operation, repair and development of objects of transport,low level of interaction of territorial development entities on the formation, distribution and use of communication lands, which are provided for air and cable telephone and telegraph lines and satellite communications, low level of interaction of territorial development entities on the formation, distribution and use lands of the energy system, which are provided for power generation facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation facilities to the user, low level of interaction of territorial development entities on formation, distribution and use of defense lands provided for the location and permanent operation of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military formations,formed in accordance with the legislation of Ukraine, low level of interaction of public organizations of disabled people of Ukraine, their enterprises (associations), institutions and organizations, low level of interaction of religious organizations low level of interaction of subjects of territorial development on	

Continuation of table E.18

1	2	3	4
		substantiation and maintenance of achievement of rational land use; protection of agricultural lands, forest lands and bushes from their unjustified withdrawal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low forest lands and shrubs from their unjustified removal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low forest lands and shrubs from their unjustified removal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low compaction, contamination with	

Continuation of table E.18

1	2	3	4
		industrial waste, chemical and radioactive substances and other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low compaction, contamination with industrial waste, chemical and radioactive substances and other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low level of interaction of organizations providing security in the field of formation, distribution and use of lands of the region, low level of interaction of financial organizations and institutions thatprovide funding for land use regions, low level of interaction of foreign investors and other subjects of foreign economic activity carrying out activity in the field of land relations of regions, low level of interaction of domestic investors carrying out activity in the field of land relations in regions	
	0.5	Low level of interaction between state authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local self-government bodies in the system of land use, high the level of interaction of legal entities and individuals in settlements in the system of land use of the regions is high level of interaction of landowners and land users, low level of interaction of united	Uncertainty requires additional neural network training

Continuation of table E.18

1	2	3	4
		territorial communities, high level of interaction of customers of construction products engaged in building territories, high the level of interaction of construction companies that provide development of territories, the high level of interaction of design organizations that ensure the creation of construction projects, the high level of interaction of survey organizations that form materials and data on engineering and geodetic, engineering and geological other survey works and information on restrictions use of the territory in the approved projects, low level of interaction of economic entities of appraisal activity which carry out interaction in the field of use of lands of regions and which are registered in the order established by the legislation (physical persons– business entities, as well as legal entities, regardless of their organizational and legal form and form of ownership, which carry out economic activities, which include at least one appraiser, and who have received a certificate of the subject of appraisal activities), low level of interaction agricultural enterprises, institutions and organizations, personal farms and farms, low level of interaction of territorial development entities on the formation, distribution and use of lands of nature reserves, which are determined by land and water areas with natural complexes and objects that have special nature protection, ecological, scientific, aesthetic, recreational and other value, which according to the law are given the status of territories and objects of nature reserve fund, low level of interaction of territorial development subjects on formation, distribution and use of health lands natural healing properties that are used or can be used for disease prevention and treatment,low level of interaction ofterritorial development entities on the formation, distribution and use of recreational lands used for recreation, tourism and sporting events, low level of interaction of territorial development entities on the formation, distribution and use of historical and cultural lands, which are cultural heritage sites, their	

Continuation of table E.18

1	2	3	4
		complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums, memorial museums, estates, low level of interaction of territorial development entities on the formation , distribution and use of forest lands, which are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands,which are provided and used for forestry needs, low level of interaction of territorial subjects development of the formation, distribution and use of water fund lands, which development of the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, other water management structures and canals, as well as land allocated for drainage strips for them; coastal waterways; artificially created land plots within the seaports, low level of interaction of territorial development entities on the formation, distribution and use of industrial lands, which are provided for placement and operation of main, auxiliary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, administrative and domestic buildings, other structures, low level of interaction of territorial development entities on the formation, distribution and use of transport lands, which include lands provided to enterprises, institutions and organizations of railway, road transport and road management, sea, river, aviation, pipeline transport and urban electric transport to perform the tasks assigned to them on the operation, repair and development of transport facilities, low level of interaction of territorial development entities on the formation, distribution and use of communication lands, which are provided for overhead and cable telephone and telegraph	

Continuation of table E.18

1	2	3	4
		lines and satellite communications, low level of interaction of territorial development entities on the formation, distribution and use of lands of the energy system,which are provided for power generation facilities (nuclear, thermal, hydroelectric, power plants using energy low level of interaction of educational institutions regardless of the form of ownership in the formation, distribution and use of land in the region, low level of interaction of apartment building co-owners to maintain such a building and meet the housing, social and household needs of owners (co-owners) and tenants (tenants) , located in an apartment building, low level of interaction of organizations and companies that provide information support for the formation, distribution and use of land regions, low level of interaction of territorial development entities to justify and ensure the achievement of rational land use; protection of agricultural lands, forest lands and bushes from their unjustified withdrawal for other needs; adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands, low level of interaction of organizations providing security in the field of formation, distribution and use of lands of the region, low level of interaction of financial organizations and institutions providing financing of the sphere of land use of regions, low level of interaction of foreign investors and other subjects of foreign economic activity carrying out activity in the field of land relations of regions, low level of interaction of domestic investors carrying out activity in the field of land relations in regions	
	0.51–1	High level of interaction between state authorities, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous	Included

Continuation of table E.18

1	2	3	4
		Republic of Crimea and local governments in the system of land use, high the level of interaction of legal entities and individuals in settlements in the system of land use of the regions is high level of interaction of landowners and land users, high level of interaction of united territorial communities, high level of interaction of customers of construction products engaged in building territories, high the level of interaction of construction companies that provide development of territories, the high level of interaction of design organizations that ensure the creation of construction projects, the high level of interaction of survey organizations that form materials and data on engineering and geodetic, engineering and geological other survey works and information about Restrictions on the use of territory in approved projects, a high level of interaction of economic entities of appraisal activities that interact in the field of land use of regions, and which are registered in the manner prescribed by law (individuals, business entities and legal entities regardless of their organizational and legal form and forms of ownership that carry out economic activities, which includes at least one appraiser, and who have received a certificate of the subject of appraisal activities), a high level of interaction between agricultural enterprises, institutions and organizations, personal farms and farms, high the level of interaction of the subjects of territorial development on the formation, distribution and use of lands of the nature reserve fund,which are determined by land and water areas with natural complexes and objects that have special environmental, ecological, scientific, aesthetic, recreational and other value, which in accordance with the law are given the status of territories and objects of nature reserves, high level of interaction subjects of territorial development for the formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people, highhigh level of interaction of the subjects of territorial development on the	

Continuation of table E.18

1	2	3	4
		formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people, highhigh level of interaction of the subjects of territorial development on the formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people, high the level of interaction of territorial development entities on the formation, distribution and use of recreational lands used for recreation, tourism and sporting events, the high level of interaction of territorial development entities on the formation, distribution and use of historical and cultural lands, on which they are located cultural heritage monuments, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums, memorial museums-estates, high level of interaction of territorial development entities on the formation, distribution and use forest lands that are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands that are provided and used for forestry needs, high the level of interaction of territorial development entities on the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, other water management structures and canals, as well as land allocated under the created land plots in the right-of-way for them; coastal waterways; artificially within the waters of seaports, a high level of cooperation of territorial development entities on the formation, distribution and use of industrial lands, which are provided for the location and operation of main, auxiliary and ancillary buildings and structures of industrial, mining, performance of the tasks assigned to them on the operation, repair and	

Continuation of table E.18

1	2	3	4
		development of transport facilities, a high level of cooperation of territorial development entities on the formation, distribution and use of communication lands, which are provided for overhead and cable telephone and telegraph lines and satellite communications, a high level of interaction subjects of territorial development on the formation, distribution and use of lands of the energy system, which are provided for power generation facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation facilities to the user, a high level of cooperation of the subjects of territorial development on the formation, distribution and use of defense lands is provided for the location and permanent operation of military units, institutions, military educational institutions,enterprises and organizations of the Armed Forces of Ukraine, other military formations formed in accordance with the legislation of Ukraine, a high level of interaction of public organizations of disabled people of Ukraine, their enterprises (associations), institutions and organizations, high level of interaction of religious organizations of Ukraine, the statutes (regulations) of which are registered in the manner prescribed by law, exclusively for the construction and maintenance of religious and other buildings necessary to ensure their activities, high level of interaction of educational institutions regardless of ownership, land distribution and use , high level of interaction of co-owners of an apartment building to maintain such a house and meet the residential, social and domestic needs of owners (co-owners) and tenants (tenants) of apartments and non-residential premises located in an apartment building, high level of interaction of organizations and companies providing information processesformation, distribution and use of lands of regions, high level of interaction of subjects of territorial development concerning substantiation and maintenance of achievement of rational land use; protection of agricultural lands, forest	

Continuation of table E.18

1	2	3	4
		lands and bushes from their unjustified withdrawal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; level of interaction of organizations providing security in the field of formation, distribution and use of lands of the region, high level of interaction of financial organizations and institutions providing financing of the sphere of land use of regions, high level of interaction of foreign investors and other subjects of foreign economic activity carrying out activity in the field of land relations of regions, high level of interaction of domestic investors carrying out activity in the field of land relations in regions	

Table E.19

Quantitative basis for the selection of innovative factors that form the investment attractiveness in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of formation and use of innovative factors that affect the investment attractiveness in the system of territorial development of	0–0.49	Low level of formation and implementation of innovative programs and projects in the field of land use of regions, low level of formation and implementation of new knowledge and intellectual products in the field of land use of regions, low level of application of modern production equipment and processes, low level of production and entrepreneurship infrastructure lands of regions, low level of implementation of organizational and technical solutions of production,	Not included

Continuation of table E.19

1	2	3	4
land use in regions		administrative, commercial or other nature, which significantly improve the structure and quality of land use of regions, low the level of formation and implementation of the legal framework for the field of innovation, which is used for the use of regional lands, the low level of formation and implementation of strategic priority areas of innovation in the field of regional land use, low the level of formation and use of allocations for financial support of innovative activities in the field of land use of the regions is low the level of formation of an innovative product in the field of land use of regions, which is the result of an innovative project and research and (or) research and development of new technology (including information) or products with the production of an experimental sample or experimental batch and meets the requirements and the efficiency of innovative enterprises in the field of land use of regions, which are created in any form of ownership, if more than 70 percent of its production (in monetary terms) for the reporting tax period are innovative products and (or) innovative products and can operate in the form of an innovation center, business incubator, technopolis, technopark, etc., low level of full interest-free lending (in terms of inflation indexation) of priority innovation projects at the expense of the State Budget of Ukraine, the Autonomous Republic of Crimea and local budgets; partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other sub-projects of innovative activity; full or partial compensation (at the expense of the State Budget of Ukraine, funds of the budget of the Autonomous Republic of Crimea and funds of local budgets) interest paid by the subjects of innovation to commercial banks and other financial institutions for lending to innovative projects; providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of innovative projects by	

Continuation of table E.19

1	2	3	4
		insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use	
	0.5	Low level of formation and implementation of innovative programs and projects in the field of land use of regions, high level of formation and implementation of new knowledge and intellectual products in the field of land use of regions, high the level of application of modern production equipment and processes, the low level of formation of infrastructure of production and entrepreneurship in the field of land use of the regions, the low level of implementation of organizational and technical solutions of production, administrative, commercial or other naturesignificantly improve the structure and quality of land use in the regions, a high level of formation and implementation of the legal framework for innovation, which is used for land use in the regions, low the level of formation and implementation of strategic priority areas of innovation in the field of land use of the regions is low the level of formation and use of allocations for financial support of innovative activities in the field of land use of the regions is low level of full interest-free lending (on the terms of inflation indexation) of priority innovation projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets; partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other sub-projects of innovative activity; full or partial compensation partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other sub-projects of innovative activity; full or partial compensation partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State	Uncertainty requires additional neural network training

Continuation of table E.19

1	2	3	4
		Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other sub-projects of innovative activity; full or partial compensation (at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets) interest paid by the subjects of innovation to commercial banks and other financial institutions for lending to innovative projects; providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use	
	0.51–1	High level of formation and implementation of innovative programs and projects in the field of land use in regions, high level of formation and implementation of new knowledge and intellectual products in the field of land use of regions, high level of application of modern production equipment and processes, high level of formation of infrastructure of production and entrepreneurship in the field of land use in regions, high level of implementation of organizational and technical solutions of industrial, administrative, commercial or other nature, significantly improving the structure and quality of land use the level of formation and implementation of the legal framework for the sphere of innovation, which is used for the use of lands of the regions, is high the level of formation and implementation of strategic priority areas of innovation in the field of land use of the regions is high the level of formation and use of allocations for financial support of innovation in the field of land use of regions, high level of formation of innovative product in the field of land use of regions, which is the result of innovation project and research and (or) research and development of new technology) or products with manufacturing partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the	Included

Continuation of table E.19

1	2	3	4
		budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other sub- projects of innovative activity; full or partial compensation (at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets) of interest paid by the subjects of innovation to commercial banks and other financial institutions for lending to innovative projects; providing state guarantees to commercial banks lending to priority innovation projects	

Table E.20

Quantitative basis for the selection of factors for attracting foreign investment in the field of land relations in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of foreign investment in the field of land relations in regions	0–0.49	Low level of support for the development of trade, economic, scientific, technical and investment cooperation of Ukraine with foreign countries on the basis of mutual benefit in the field of land relations, low the level of expansion of international cooperation in the field of land relations in order to attract foreign investment, new technologies and management experience in the national economy in the interests of its reform, modernization and innovative development, low level of foreign economic activity of Ukraine to provide services to foreign economic entities land relations of regions, low level of scientific, scientific-technical, scientific-production, production, educational and other cooperation with foreign economic entities in the field of land relations of regions, low level of credit and settlement operations between foreign economic entities and foreign sub-regions objects of economic activity in the field of land relations of the regions,low level of establishment of banking, credit and insurance institutions by foreign economic entities on the territory of Ukraine to ensure the development of land relations in the regions, low level of joint business activities between foreign economic entities and foreign	Not included

Continuation of table E.20

1	2	3	4
		economic entities, including the establishment of joint ventures various types and forms, conducting joint business operations and joint ownership of property both in Ukraine and abroad in the field of land relations, low level of organization and implementation of activities in the field of exhibitions, auctions, auctions, conferences, symposia, seminars and others similar measures carried out on a commercial basis, with the participation of subjects of foreign economic activity to ensure the development of land relations,low level of lease implementation, in particular leasing, transactions between foreign economic entities and foreign economic entities in the field of land relations of the regions, low level of transactions for the purchase, sale and exchange of currency at currency auctions, currency exchanges and the interbank foreign exchange market to ensure land relations of the regions, low the level of work on a contractual basis of individuals of Ukraine with foreign economic entities both in Ukraine and abroad to ensure the development of land relations, the low level of work of foreign individuals on a contractual basis with the subjects of foreign economic activity as on the territory of Ukraine and abroad in the field of land relations of the regions in the field of land relations, the low level of other types of foreign economic activity,not prohibited directly and exclusively by the laws of Ukraine related to the formation, distribution and use of land relations of the regions, low level of activity of creation of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises , low level of acquisition of real estate or movable property not directly prohibited by the laws of Ukraine, including houses, apartments, premises and other property objects, by direct acquisition of property and property complexes connected with subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals land use rights in Ukrainedistribution and use of land relations of regions, low level of activity of creation of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises, low level of acquisition of real estate or	

Continuation of table E.20

1	2	3	4
		movable property, including houses , apartments, premises and other objects of property, by direct receipt of property and property complexes connected with subjects of foreign economic activity, acquisition independently by foreign investors or with participation of the Ukrainian legal or physical persons of the rights of use of the earth in the territory of Ukrainedistribution and use of land relations of regions, low level of activity of creation of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises, low level of acquisition of real estate or movable property, including houses , apartments, premises and other objects of property, by direct receipt of property and property complexes connected with subjects of foreign economic activity, acquisition independently by foreign investors or with participation of the Ukrainian legal or physical persons of the rights of use of the earth in the territory of Ukrainebranches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises, low level of acquisition of real estate or movable property not directly prohibited by the laws of Ukraine, including houses, apartments, premises and other property, by direct acquisition of property and property complexes, which are related to the subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals of land use rights on the territory of Ukrainebranches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises, low level of acquisition of real estate or movable property not directly prohibited by the laws of Ukraine, including houses, apartments, premises and other property, by direct acquisition of property and property complexes, which are related to the subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals of land use rights on the territory of Ukrainewhich are related to the subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals of land use rights on the territory of Ukrainewhich are related	

Continuation of table E.20

1	2	3	4
		to the subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals of land use rights on the territory of Ukraine	
	0.5	Low level of support for the development of trade, economic, scientific, technical and investment cooperation of Ukraine with foreign countries on the basis of mutual benefit in the field of land relations, lowthe level of expansion of international cooperation in the field of land relations in order to attract foreign investment, new technologies and management experience in the national economy in the interests of its reform, modernization and innovation development, low level of provision of foreign economic activity of Ukraine by services to foreign economic entities in the field of land relations of the regions, high level of scientific, scientific and technical, research and production, production, training and other cooperation with foreign economic entities in sphere of land relations of regions, high level of credit and settlement operations between subjects of foreign economic activity and foreign subjects of economic activity in the sphere of land relations in regions, high level of creation by foreign subjects of economic activity of banking, credit and insurance institutions on the territory of Ukraine development of land relations in the regions,high level of joint business activity between subjects of foreign economic activity and foreign subjects of economic activity, including creation of joint ventures of different types and forms, carrying out joint business operations and joint ownership of property both on the territory of Ukraine and abroad in the field of land relations, high level of organization and implementation of activities in the field of exhibitions, auctions, auctions, conferences, symposia, seminars and other similar events carried out on a commercial basis, with the participation of foreign economic entities to ensure the development of land relations, low level of lease , in particular leasing, operations between subjects of foreign economic activity and foreign subjects of economic activity in the field of land relations of regions,low the level of operations on purchase, sale and exchange of currency at currency auctions, currency exchanges and the interbank foreign exchange market to ensure land relations of the regions, low level of work on a contractual basis of	Uncertainty requires additional neural network training

Continuation of table E.20

1	2	3	4
		individuals of Ukraine with foreign economic entities both in Ukraine and outside it to ensure the development of land relations, a high level of work of foreign individuals on a contractual basis with the subjects foreign economic activity both on the territory of Ukraine and abroad in the field of land relations of regions in the field of land relations, low level of other types of foreign economic activity, not prohibited directly and exclusively by the laws of Ukraine relating to the formation, distribution and use of land relations regions, low level of activity of creation of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises, high the level of acquisition of immovable or movable property not directly prohibited by the laws of Ukraine, together with houses, apartments, premises and other objects of property, by direct acquisition of property and property complexes connected with subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals land use rights in Ukraine	
	0.51–1	High level of support for the development of trade, economic, scientific, technical and investment cooperation of Ukraine with foreign countries on the basis of mutual benefit in the field of land relations, high the level of expansion of international cooperation in the field of land relations in order to attract foreign investment, new technologies and management experience in the national economy in the interests of its reform, modernization and innovative development, high level of foreign economic activity of Ukraine to provide services to foreign economic entities land relations of regions, high level of scientific, scientific-technical, scientific-production, production, educational and other cooperation with foreign economic entities in the field of land relations of regions, high level of credit and settlement operations between foreign economic entities and foreign sub-regions objects of economic activity in the field of land relations of the regions, a high level of creation by foreign entities economic activity of banking, credit and insurance institutions on the territory of Ukraine to ensure the development of land relations in the regions, a high level of joint business activities	Included

Continuation of table E.20

1	2	3	4
		between foreign economic entities and foreign economic entities, including the establishment of joint ventures of various types and forms, joint business operations and joint ownership of property both in Ukraine and abroad in the field of land relations, a high level of organization and implementation of activities in the field of exhibitions, auctions, auctions, conferences, symposiums, seminars and other similar events carried out on a commercial basis. basis, with the participation of subjects of foreign economic activity to ensure the development of land relations, a high level of lease, including leasing, operations between subjects of foreign economic activity and foreign subjects of economic activity in the field of land relations of regions, high level of operations on purchase, sale and exchange of currency at currency auctions, currency exchanges and interbank foreign exchange market to ensure land relations of regions, high level of work on a contractual basis of individuals of Ukraine with foreign economic entities both in Ukraine and outside it to ensure the development of land relations, a high level of work of foreign individuals on a contractual basis with foreign economic entities both in Ukraine and abroad in the field of land relations of regions in the field of land relations, a high level of other types foreign economic activity, not prohibited directly and exclusively by the laws of Ukraine relating to the formation, distribution and use of land relations of the regions, high the level of activity of creation of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of full ownership of existing enterprises is high the level of acquisition of immovable or movable property not directly prohibited by the laws of Ukraine, together with houses, apartments, premises and other objects of property, by direct acquisition of property and property complexes connected with subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals land use rights in Ukraine	

Table E.21

Quantitative basis for the selection of factors according to the criterion of public-private partnership, which affects the formation of investment in the use of land in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of public-private partnership, which affects the formation of investment in land use in regions	0–0.49	Low level of equality before the law of public and private partners, low level of implementation of the prohibition of any discrimination of public or private partners, low level of coordination of interests of public and private partners for mutual benefit, low level of higher efficiency than in the case of such activities of a public partner without the involvement of a private partner, low the level of ensuring the invariability throughout the term of the contract concluded within the public-private partnership, purpose and form of ownership of objects that are in state or communal ownership or belong to the Autonomous Republic of Crimea, transferred to a private partner, low level of recognition by public and private partners rights and obligations under the laws of Ukraine and defined by the terms of the contract concluded within the public-private partnership, low level of ensuring fair distribution between public and private partners of risks related to the implementation of agreements concluded within the framework of public-private partnership, low level of definition private partner on a competitive basis, the low level of use of land in the region for public-private partnership, which are public-private partnership, together with the object of public-private partnership for a period established by the agreement concluded within the public-private partnership, or ensures no later than the date of entry into force of the agreement concluded within the public-private partnership, the acquisition by the private partner of the right to use land provided in the prescribed manner for the construction of public-private partnership, low level of project development land management for the allocation of land, other land management documentation, which in accordance with the law is required for the provision of land for use, as well as documentation on land required by a private partner for such a partnership, low level of funding for the development (production)	Not included

Continuation of table E.21

1	2	3	4
		of land management documentation and its examination, which is carried out at the expense of relevant budgets or at the expense of the person who submitted a proposal for public private partnership, low level of payment for work on development (production) of land management documentation and its examination by a person who submitted a proposal for public-private partnership, which does not create advantages for such a person in the competition to determine a private partner compared to other participants, low level compliance with the procedure and conditions for obtaining a private partner the right to use land,which are specified in the terms of the tender to determine a private partner for the conclusion of a contract within a public-private partnership, low level of state guarantees, guarantees of the Autonomous Republic of Crimea and local government, low level of funding from state or local budgets and other sources. local programs, low payout private partner other payments provided for in the contract concluded within the public-private partnership, in particular fees for readiness (availability) of the object of public-private partnership for operation (use), etc., low the level of acquisition by a state partner of a certain amount of goods (works, services) produced (performed, provided) by a private partner under an agreement concluded within the framework of a public-private partnership obtained on the basis of land use in the region is low the level of supply to the private partner of goods (works, services) necessary for the implementation of public-private partnership within the framework of the implementation of agreements on the use of land of the regions, low the level of control over the implementation of agreements concluded within the framework of public-private partnership, carried out by the central executive body and ensures the formation and implementation of public policy in the field of public-private partnership, other public and local governments, their officials in accordance with their powers in the manner prescribed by law	
	0.5	Low level of equality before the law of public and private partners, low level of implementation of the prohibition of any discrimination of the rights	Uncertainty requires additional

Continuation of table E.21

1	2	3	4
		of public or private partners, high level of coordination of interests of public and private partners for mutual benefit, high the level of ensuring higher efficiency of activities than in the case of such activities by a public partner without the involvement of a private partner, low the level of ensuring the invariability throughout the term of the agreement concluded within the public-private partnership, purpose and form of ownership of objects that are in state or communal ownership or belong to the Autonomous Republic of Crimea, transferred to a private partner, high level of recognition by public and private partners rights and obligations provided by the legislation of Ukraine and defined terms of the contract concluded within the public-private partnership, low the level of ensuring a fair distribution between public and private partners of the risks associated with the implementation of agreements concluded within the public-private partnership, the low level of determining the private partner on a competitive basis, the low level of use of land in the region for public-private partnership. objects of public-private partnership, together with the object of public-private partnership for the term established by the agreement concluded within the public-private partnership, or provides not later than the date of entry into force of the agreement concluded within the public-private partnership partner the right to use land plots provided in the prescribed manner for the construction of a public-private partnership,high level of development at the request of the state partner of land management projects for the allocation of land, other land management documentation required by law to provide land for use, as well as documentation for land required for private partner for such a partnership, a high level of funding for the development (production) of land management documentation and its examination, which is carried out at the expense of relevant budgets or at the expense of the person who submitted a proposal for public-private partnership, high level of payment for development (preparation) of land management documentation and its examination by a person who submitted a proposal for a public-private partnership, which does not create advantages for such a person in the tender to determine a private	neural network training

Continuation of table E.21

1	2	3	4
		partner compared to other bidders, low level of compliance with the procedure and conditions use of land plots, which are specified in the terms of the tender for determining a private partner for concluding a contract within the framework of public-private partnership, low level of state guarantees, guarantees of the Autonomous Republic of Crimea and local self-government, low level of funding from state or local budgets and other sources in accordance with national and local programs, low level of payments to a private partner of other payments under the state private partnership, in particular fees for readiness (availability) of the object of public-private partnership for operation (use), etc., low the level of acquisition by the state partner of a certain amount of goods (works, services) produced (performed, provided) by the private partner under the agreement concluded within the public-private partnership obtained on the basis of land use of the region, low level of supply of goods (works, services) to the private partner necessary for the implementation of public-private partnership within the implementation of agreements on land use of regions, a high level of control over the implementation of agreements concluded within the public-private partnership, carried out by the central executive body and ensures the formation and implementation of public policy partnerships, other state bodies and local self-government bodies, their officials in accordance with their powers in the manner prescribed by law	
	0.51–1	High level of equality before the law of public and private partners, high level of implementation of the prohibition of any discrimination of public or private partners, high level of coordination of interests of public and private partners for mutual benefit, high level of higher efficiency than in the case of such activities of a public partner without the involvement of a private partner, a high level of ensuring the invariability throughout the term of the contract concluded within the public-private partnership, purpose and form of ownership objects that are in state or communal ownership or belong to the Autonomous Republic of Crimea, transferred to a private partner, a high level of recognition by public and private partners of rights and obligations under Ukrainian law and defined by the terms of the agreement concluded	Included

Continuation of table E.21

1	2	3	4
		within public-private partnership, high the level of fair distribution between public and private partners of risks associated with the implementation of agreements concluded within the public-private partnership, the high level of identification of the private partner on a competitive basis, the high level of use of lands in the region for public-private partnership. objects of public-private partnership, together with the object of public-private partnership for the term established by the contract concluded within the limits of the public-private partnership, or provides not later than the date of entry into force of the contract concluded within the framework of public-private partnership the partner of the right to use the land plots provided in accordance with the established procedure for the construction of the object of public-private partnership,high level of development of land management projects commissioned by the state partner, other land management documentation required by law for the provision of land for use, as well as documentation on land required by a private partner for such a partnership, high level of funding on the development (production) of land management documentation and its examination, which is carried out at the expense of the relevant budgets or at the expense of the person who submitted a proposal for public-private partnership, high level of payment for the development (production) of land management documentation and its examination by a person which submitted a proposal for a public-private partnership,which does not create advantages for such a person in the competition to determine a private partner compared to other bidders, a high level of compliance with the procedure and conditions for obtaining a private partner the right to use land, which are specified in the terms of the tender to determine a private partner for a public-private partnership, a high level of state guarantees, guarantees of the Autonomous Republic of Crimea and local self-government, a high level of funding from state or local budgets and other sources in accordance with national and local programs, a high level of payment to the private partner of other payments under the agreement concluded within the public-private partnership, including readiness (availability) object of public-private partnership for operation	

Continuation of table E.21

1	2	3	4
		(use), etc., high the level of acquisition by the state partner of a certain amount of goods (works, services) produced (performed, provided) by the private partner under the agreement concluded within the public-private partnership obtained on the basis of land use of the region, high level of supply of goods (works, services) to the private partner necessary for the implementation of public-private partnership within the implementation of agreements on land use of regions, a high level of control over the implementation of agreements concluded within the public-private partnership, carried out by the central executive body and ensures the formation and implementation of public policy partnerships, other state bodies and local self-government bodies, their officials in accordance with their powers in the manner prescribed by law	

Table E.22

Quantitative basis for selecting factors of the level of investment activity in the field of land use in regions by domestic investors (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of investment activity in the field of land use in regions by domestic investors	0–0.49	Low level of state support for the implementation of domestic investment projects, low level of financing of investment projects through construction financing funds, low level of financing of investment projects through real estate funds, low level of financing of investment projects through co-financing institutions, low level of financing of investment projects by issuing target bonds enterprises whose obligations are fulfilled by transferring the object (part of the object) of housing construction, low level of implementation of organizational, technical and legal measures aimed at creating conditions conducive to maintaining investment, achieving the goal of investment, effective activity objects of investment and reinvestment, protection of legal rights and interests of investors, in particular,the right to receive a return (income) from investments	Not included
	0.5	Non-systemic state support for the implementation of domestic investment projects, non-systemic financing of investment projects through construction financing funds, non-systemic	Uncertainty requires additional

Continuation of table E.22

1	2	3	4
		financing of investment projects through real estate funds, non-systemic financing of investment projects through co-financing institutions, non-systemic financing of investment projects through the issuance of target bonds of enterprises, the fulfillment of obligations under which is carried out by transferring the object (part of the object) of housing construction, unsystematic implementation of organizational, technical and legal measures aimed at creating conditions conducive to the preservation of investment, achieving the goal of investment, effective operation of investment and reinvestment, protection of legal rights and interests of investors, in particular, the right to return on investment	neural network training
	0.51–1	High level of state support for the implementation of domestic investment projects, high level of financing of investment projects through construction financing funds, high level of financing of investment projects through real estate funds, high level of financing of investment projects through co-financing institutions, high level of financing of investment projects by issuing target bonds enterprises, fulfillment of obligations under which is carried out by transferring the object (part of the object) of housing construction, a high level of implementation of organizational, technical and legal measures aimed at creating conditions conducive to maintaining investment, achieving investment goals, effective activities objects of investment and reinvestment, protection of legal rights and interests of investors, in particular,the right to receive a return (income) from investments	Included
The level of implementation of investment activities in the field of land use in regions by domestic investors	0–0.49	Low level of investment made by citizens, non-state enterprises, business associations, unions and societies, as well as public and religious organizations, other legal entities based on collective ownership, low level of state investment made by public authorities at the expense of the state budget, loan funds, as well as state enterprises and institutions at the expense of own and loan funds, low level of local investment carried out by local governments at the expense of local budgets, loan funds, as well as utilities and institutions at the expense of own and loan funds	Not included

Continuation of table E.22

1	2	3	4
	0.5	Non-systemic investment carried out by citizens, non-state enterprises, business associations, unions and societies, as well as public and religious organizations, other legal entities based on collective ownership, non-systemic public investment carried out by public authorities at the expense of the state budget, loans, and state enterprises and institutions at the expense of own and borrowed funds, non-systemic local investment carried out by local governments at the expense of local budgets, borrowed funds, as well as utilities and institutions at the expense of own and borrowed funds	Uncertainty requires additional neural network training
	0.51–1	High level of investment carried out by citizens, non-state enterprises, business associations, unions and societies, as well as public and religious organizations, other legal entities based on collective ownership, high level of state investment carried out by public authorities at the expense of the state budget, loans, as well as state enterprises and institutions at the expense of own and borrowed funds, a high level of local investment by local governments at the expense of local budgets, loans, as well as utilities and institutions at the expense of own and borrowed funds	Included

Table E.23

Quantitative basis for selecting factors for the level of formation of special economic zones to ensure investment in the use of land in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of provision of special economic zones for investment in the use of land in regions	0–0.49	Low level of definition of perspective directions of development of special (free) economic zone, low level of operation and construction of networks of transport, communication, power supply and other objects of industrial infrastructure used in the field of land use of regions, low level of development of communication network with partners outside the special (free) economic zone, low level of streamlining and provision of special (free) economic zone for economic entities in the use of land, low level issuance of permits to economic	Not included

Continuation of table E.23

1	2	3	4
		entities of the special (free) economic zone for the construction of new economic facilities, registration of economic entities and investments made in the special (free) economic zone in the field of land use of regions, low level of state guarantees of all property and non-property rights	
	0.5	Low level of definition of perspective directions of development of special (free) economic zone, low level of operation and construction of networks of transport, communication, power supply and other objects of industrial infrastructure used in the field of land use in regions, separate networks of communication links are established. partners outside the special (free) economic zone, separate areas are implemented streamlining and granting special (free) economic zone to economic entities for land use, low level of issuing permits to special (free) economic zone economic entities for construction of new economic facilities, registration of economic entities and investments, carried out in a special (free) economic zone in the field of land use in regions, there is a provision of state guarantees of all property and non-property rights	Uncertainty requires additional neural network training
	0.51–1	High level of definition of perspective directions of development of special (free) economic zone, high level of operation and construction of networks of transport, communication, power supply and other objects of industrial infrastructure used in the field of land use in regions, high the level of development of the network of communication relations with partners outside the special (free) economic zone, the high level of streamlining and providing business entities with a special (free) economic zone for the use of land, the high level of issuing permits to special (free) economic entities) economic zone for the construction of new economic facilities, registration of economic entities and investments made in a special (free) economic zone in the field of land use regions, a high level of state guarantees of all property and non-property rights	Included

Table E.24

Quantitative basis for the selection of factors according to the criterion of formation and implementation of a special regime of innovative activity of technology parks in the field of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of formation and implementation of a special regime of innovative activity of technology parks in the field of land use in regions	0–0.49	Low level of financial support for technology park projects, for which a budget program to support technology park activities is introduced, low level of formation and use of import duties accrued in accordance with the customs legislation of Ukraine, when importing new equipment, equipment and components, as well as materials that are not produced in Ukraine in the field of land use of regions, low level of formation and use of special accounts of participants in technology parks and joint ventures, which are executors of technology park projects and accounted for 50 percent of import duties and the remaining 50 percent import duties are credited to a special account of the governing body of the relevant technology park, low the level of scientific, research and development work on the priority areas of technology parks in the field of land use of the regions, the low level of creation, development, modernization and reconstruction of scientific and technological, experimental and research and industrial sites, including tools, equipment and equipment used for the purposes of innovative activities in the field of land use of the regions, low level of preparation of design and technological documentation, technical conditions, technical projects and costs for the preparation of innovative products in the field of land use in regions, low level of patenting of developments, acquisition of intellectual property rights (patents, licenses for the use of inventions, utility models, industrial designs, know-how, etc.) in the field of use lands of regions, low level of implementation of overhead and current costs (for materials, technical support, etc.) that arise in the course of innovation; acquisition of equipment, facilities and other means of production related to the implementation of innovations in the field of land use in regions, low level of scientific and	Not included

Continuation of table E.24

1	2	3	4
		organizational activities of the governing body of the technology park, holding and participating in scientific, scientific and technical conferences, seminars and exhibitions, the level of control and monitoring over the implementation of technology park projects, which is carried out by the central executive body that implements the state policy in the field of scientific, technical and innovative activities, in the manner prescribed by the Cabinet of Ministers of Ukraine	
	0.5	Non-systematic provision of financial support for technology park projects, for which a budget program to support technology park activities is introduced, low level of formation and use of import duty amounts accrued in accordance with the customs legislation of Ukraine during import of new equipment, equipment and components, as well as materials that are not produced in Ukraine in the field of land use of regions, non-systematic formation and use of special accounts of participants in technology parks and joint ventures, which are executors of technology park projects and accrued 50 percent of import duties and the remaining 50 percent of import duties. duties are credited to a special account of the governing body of the relevant technology park, non-systematic research, research and development work on priority areas of technology parks in the field of land use of regions, non-systematic creation, development, modernization and reconstruction of scientific and technological, experimental and research and industrial sites, in particular for tools, equipment and facilities used for innovation in the field of land use of regions, non-systemic level of preparation of design and technological documentation, technical conditions, technical projects and costs for the preparation of innovative products in the field of land use, low level of patenting of developments, acquisition of rights to intellectual property rights (patents, licenses for the use of inventions, utility models, industrial designs, know-how, etc.) in the field of land use of regions, low level of overhead and current costs (for materials, technical support, etc.) that arise in the course of innovation; acquisition of equipment, facilities and other means of production related to the implementation of innovations in the field of	Uncertainty requires additional neural network training

Continuation of table E.24

1	2	3	4
		land use of regions, non-systematic implementation of scientific and organizational activities of the governing body of the technology park, holding and participating in scientific, scientific and technical conferences, seminars and exhibitions. research on priority areas of technology parks in the field of land use of the regions, low the level of control and monitoring over the implementation of technology park projects, which is carried out by the central executive body that implements the state policy in the field of scientific, technical and innovative activities, in the manner prescribed by the Cabinet of Ministers of Ukraine	
	0.51–1	High level of financial support for technology park projects, for which a budget program to support technology park activities is being introduced, high level of formation and use of import duty amounts accrued in accordance with the customs legislation of Ukraine, during the import to Ukraine for the implementation of projects of technological parks of new equipment, equipment and components, as well as materials not produced in Ukraine in the field of land use, high the level of formation and use of special accounts of participants of technology parks and joint ventures, which are executors of technology park projects and credited 50 percent of import duties, and the remaining 50 percent of import duties are credited to a special account of the governing body of the technology park, high the level of scientific, research and development work on the priority areas of technology parks in the field of land use of the regions, a high level of creation, development, modernization and reconstruction of scientific and technological, experimental and research and industrial sites, including tools, equipment and equipment used for the purposes of innovative activities in the field of land use of regions, high level of preparation of design and technological documentation, technical conditions, technical projects and costs for preparation of production of innovative products in the field of land use of regions, high level of patenting of developments, acquisition of rights to intellectual property rights (patents, licenses for the use of inventions, utility models,	Included

Continuation of table E.24

1	2	3	4
		industrial designs, know-how, etc.) in the field of land use of regions, high level of overhead and current costs (for materials, technical support, etc.) that arise in the course of innovation; acquisition of equipment, facilities and other means of production related to the implementation of innovations in the field of land use of the regions, a high level of scientific and organizational activities of the governing body of the technology park, holding and participating in scientific, scientific and technical conferences, seminars and exhibitions, publication of research results on priority areas of technology parks in the field of land use of the regions, high the level of control and monitoring over the implementation of technology park projects, which is carried out by the central executive body that implements the state policy in the field of scientific, technical and innovative activities, in the manner prescribed by the Cabinet of Ministers of Ukraine	

Table E.25

Quantitative basis for the selection of factors of environmental development

(developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of environmental development in the field of land use in regions	0–0.49	Low level of the state of the natural environment or its objects–land, water, subsoil, air, flora and fauna and their levels of pollution, low level of biodiversity and its components, together with genetically modified organisms and their interaction with the environment, high level of influence of factors, materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) on the state of the environment and human health, high level of threats and causes of environmental emergencies, the results of the elimination of these phenomena, low level of implementation of recommendations for measures aimed at reducing their negative impact on natural objects and human health, the low level of availability of developed environmental forecasts, plans and	Not included

Continuation of table E.25

1	2	3	4
		programs, measures,in particular administrative, which affect the state environmental policy, legislation on environmental protection, low level of implementation of costs associated with the implementation of environmental measures through funds environmental protection, other sources of funding, low level of application of the results of economic analysis conducted in the decision-making process on issues related to the low environmental significance of water bodies	
	0.5	Low level of the state of the natural environment or its objects–land, water, subsoil, atmospheric air, flora and fauna and levels of their pollution, formed biological diversity and its components, together with genetically modified organisms and their interaction with the environment, high level of influence of factors, materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) on the state of the environment and human health, low level of threats and causes of environmental emergencies, the results of elimination of these phenomena, low level of implementation of recommendations for measures to to reduce their negative impact on natural objects and human health, the high level of availability of developed environmental forecasts, plans and programs, measures, including administrative,affecting the state environmental policy, environmental legislation, high level of implementation of costs associated with the implementation of environmental measures through environmental funds, other sources of funding, low level of application of the results of economic analysis conducted in the decision-making process on issues related to the low environmental significance of water bodieslow ecological value of water bodieslow ecological value of water bodies	Uncertainty requires additional neural network training
	0.51–1	High level of state of the environment or its objects– land, water, subsoil, atmospheric air, flora and fauna and their levels of pollution, formed biological diversity and its components, together with genetically modified organisms and their interaction with the environment, low impact of factors, materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) on the state of the environment and human health, low level of	Included

Continuation of table E.25

1	2	3	4
		threats and causes of environmental emergencies, the results of the elimination of these phenomena, low level of implementation of recommendations for measures to to reduce their negative impact on natural objects and human health, high level of availability of developed environmental forecasts, plans and programs, measures, including administrative, which affect the state environmental policy, environmental legislation, high level implementation of costs associated with the implementation of environmental measures at the expense of environmental protection funds, other sources of funding,high level of application of the results of economic analysis conducted in the decision-making process on issues related to the high environmental significance of water bodies	

Table E.26

Quantitative basis for the selection of factors of the level of waste management in the system of territorial development of land use in regions

(developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of ensuring the directions of waste management in the system of territorial development of land use in regions	0–0.49	Low level of ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; minimization of waste generation and reduction of their danger, low level of ensuring integrated use of raw materials, low level of promoting the maximum possible waste disposal by direct reuse or alternative use of resource-valuable waste, low level of ensuring safe disposal of non-recyclable waste, by developing appropriate technologies, environmentally friendly methods and means of waste management, low the level of control over the sites or facilities of waste disposal to prevent their harmful effects on the environment and human health, the low level of implementation of a set of scientific, technical and marketing research to identify and determine the resource value of waste for efficient use, low level of assistance in the	Not included

Continuation of table E.26

1	2	3	4
		creation of waste management facilities, low level of social protection of employees engaged in waste management, low level of ensuring mandatory accounting of waste on the basis of their classification and certification, low level of creating conditions for separate collection of household waste by introducing socio-economic mechanisms aimed at encouraging the producers of this waste to separate collection, low level of promotion of non-state investments and other extrabudgetary sources of funding in the field of waste management, high impact of waste generation by region as a percentage of the total, high impact of the ratio of excess waste compared to the volume of their utilization, incineration and disposal in designated areas or facilities and the average population, low impact of environmental costs that affect the territorial development of land use in regions, low impact of capital investment on environmental protection by region, low impact of environmental costs and the average number in regions	
	0.5	Non-systemic provision of complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules in their management; minimizing waste generation and reduction of their danger, unsystematic ensuring the integrated use of material and raw material resources, non-systemic promotion of the maximum possible utilization of waste through direct reuse or alternative use of resource and valuable waste, non-systemic provision of safe disposal of non-recyclable waste through the development of appropriate technologies, environmentally friendly methods and means of waste management, non-systemic organization of control over places or objects of waste disposal to prevent their harmful impact on the environment and human health, unsystematic implementation of a set of scientific, technical and marketing research to identify and determine the resource value of waste for efficient use, low level of assistance creation of waste management facilities, low level of social protection of employees engaged in waste management, unsystematic provision of mandatory accounting of waste on the basis of	Uncertainty, requires additional training neural network

Continuation of table E.26

1	2	3	4
		their classification and certification, low the level of creating conditions for the implementation of separate collection of household waste through the introduction of socio-economic mechanisms aimed at encouraging the producers of this waste to their separate collection is unsystematic promotion of non-state investments and other extra-budgetary sources of financing in the field of waste management, high impact of waste generation in regions as a percentage of the total amount, high impact of the ratio of excess waste compared to their disposal, incineration and disposal in specially designated places or facilities and average population, low impact of environmental expenditures, which affect the territorial development of land use in regions, low impact the volume of capital investment in environmental protection by region, low impact of environmental costs and the average number in regions	
	0.51–1	High level of ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; minimization of waste generation and reduction of their danger, high level of ensuring integrated use of material and raw materials, high level of promoting the maximum possible waste disposal through direct reuse or alternative use of resource-valuable waste, high level of ensuring safe disposal of non-recyclable waste, by developing appropriate technologies, environmentally friendly methods and means of waste management, high level of organization of control over places or objects of waste disposal to prevent their harmful impact on the environment and human health, high level of implementation of a set of scientific, technical and marketing research to identify and determine the resource value of waste for efficient use, high the level of assistance to the creation of waste management facilities, the high level of social protection of employees engaged in waste management, the high level of ensuring mandatory accounting of waste on the basis of their classification and certification, high the level of creating conditions for the implementation of separate collection of	Included

Continuation of table E.26

1	2	3	4
		household waste through the introduction of socio-economic mechanisms aimed at encouraging the producers of this waste to separate collection, a high level of promoting non-state investment and other extrabudgetary sources of funding in waste management, low impact of waste generation in regions as a percentage of the total, the low impact of the ratio of excess waste generated compared with the volume of their utilization, incineration and disposal in specially designated places or facilities and the average population, the high impact of environmental expenditures that affect the territorial development of land use in regions, the high impact of capital investment on environmental protection by region , high impact of environmental costs and the average number in regions	

Table E.27

Quantitative basis for the selection of functional factors to reduce or prevent waste generation (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of ensuring the process of reducing or preventing waste generation	0–0.49	Low level of development and implementation of scientifically based standards of waste generation per unit of output (raw materials and energy), performance of works and provision of services regulating their quantitative and qualitative composition, in accordance with advanced technological achievements, low level of periodic revision of established waste generation standards. to reduce their volume, taking into account the best domestic and foreign experience and economic opportunities, low level of development and implementation of the system of handling packaging materials and packaging, low level of formation and implementation of the system of collection, removal, disposal and utilization of waste oils. formation of a system of collection, procurement and disposal of worn tires,low level of formation of the system of procurement and disposal of unusable vehicles, low level of formation of the system of collection and utilization of electrical and electronic equipment, low level of formation of the system of collection, removal, disposal, utilization of waste generated	Not included

Continuation of table E.27

1	2	3	4
		in the process of medical care, veterinary practice, related research, low level of development of general requirements for household waste management, low level of development of information, scientific and methodological support of waste producers with information on technological and other opportunities to reduce waste generation and disposal, low level of any economic activity related to waste generation , without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements of the Law, low level of use of research results, implementation of inventions, application of new equipment, imported equipment, technologies and systems, if they do not provide prevention or minimization of waste generation at all stages of the technological process, their utilization and safe disposal,low level of compliance with environmental standards of the location of enterprises, installations, landfills, complexes, storage facilities and other waste management facilities, design and build regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not meet environmental and sanitary requirements, low level of efficiency of decision-making on location and development of cities and other settlements without definition of technical and other measures for creation of conditions for utilization or removal of household waste, low level of intensity of commissioning of new and reconstructed enterprises and other facilities provided equipment and technologies for safe waste management, and in the absence of data,necessary to assess their impact on the environment and human health, in accordance with the established procedure, a high level of transfer or sale of hazardous waste to citizens, enterprises, institutions and organizations, if they do not ensure the disposal or disposal of this waste environmentally friendly low level of involvement of children and adolescents in the organized collection of waste (as a secondary raw material), hazardous to health, high level of violation of the processing of waste imported into Ukraine in accordance with quota conditions, high level of violation of established quotas for import of waste into Ukraine as secondary raw materials, a high level of import into Ukraine, except for	

Continuation of table E.27

1	2	3	4
		transit transportation, of any waste for the purpose of its storage or disposal, a low level of storage and disposal of waste, which is carried out in accordance with environmental safety requirements and in ways to maximize waste use or transfer their other consumers (except landfills), low level of waste disposal,which is carried out in accordance with the statutory requirements of environmental safety with the mandatory provision of the possibility of disposal or disposal of residual products in consultation with the central executive body implementing state policy in the field of sanitary and epidemiological welfare, low the level of storage and disposal of waste, which is carried out in places designated by local governments, taking into account the requirements of land and environmental legislation, with a permit for operations in the field of waste management, which defines the types and quantities of waste, general technical requirements, safety measures, information on the generation, purpose, methods of waste treatment in accordance with the established conditions of their storage, low level of formation and definition for storage and disposal of waste places or facilities that should be used only for waste declared for permission to conduct operations in the field of waste management waste, low level of waste disposal, for the disposal of which in Ukraine there is an appropriate technology,high level of unauthorized dumping and disposal of waste, including household waste, in underground horizons, in cities and other settlements, in natural areas, protected fund, on lands of nature protection, health, recreational and historical-cultural purpose, within water protection zones and zones of sanitary protection of water objects, in other places, which may create danger for the environment and human health, high level of burial waste in the subsoil, which is allowed in exceptional cases based on the results of special studies in compliance with standards, norms and rules provided by the legislation of Ukraine, low level of prevention of environmental pollution, low level of measures to prevent accidents, limit and eliminate their consequences and protection of people and the environment from their impact, low level of information about the accident that	

Continuation of table E.27

1	2	3	4
		occurred at the facility, and about measures,taken to eliminate its consequences, the executive branch, local government and the population, low the level of ensuring the operation of these facilities and transportation of hazardous waste in compliance with environmental legislation, low level of compliance with licensing conditions for operations in the field of hazardous waste management (not subject to licensing storage (accumulation) of hazardous waste generated by it, if during year from the date of generation of hazardous waste is transferred to economic entities licensed to carry out operations in the field of hazardous waste management), low level of identification of hazardous waste management facilities in accordance with the Law of Ukraine «On high risk facilities»; planning of localization and liquidation of accident on object, low level of formation of safety measures, activities that utilize, reduce waste and introduce low-waste technologies into production, in accordance with the legislation of tax, credit and other benefits, a low level of granting in the manner prescribed by law tax, credit and other benefits to businesses that hand over waste as secondary raw materials and engaged in the collection and procurement of such waste, low level of prioritization of funding under the state contract of enterprises implementing low-waste technologies, waste treatment and disposal, low level of targeted funding for research on specific problems of waste disposal and reduction, low level creation of funds for targeted financing of waste disposal measures through voluntary contributions of waste producers,their owners, domestic and foreign business entities, individual citizens, environmental insurance, ensuring the formation of a state data bank for the introduction of waste disposal technologies in Ukraine, etc.	
	0.5	Unsystematic development and implementation of scientifically sound standards for waste generation per unit of output (raw materials and energy), performance of works and provision of services regulating their quantitative and qualitative composition, in accordance with advanced technological achievements, unsystematic provision of periodic revision of established standards for waste generation their volumes, taking into account the best domestic and foreign	Uncertainty requires additional neural network training

Continuation of table E.27

1	2	3	4
		experience and economic opportunities, unsystematic development and implementation of a system for handling packaging materials and packaging, unsystematic formation and implementation of the system of collection, removal, disposal and utilization of waste oils (oils), non-systematic formation of the system and disposal of worn tires,rubber products and waste rubber production, unsystematic formation of a system of procurement and disposal of unusable vehicles funds, non-systemic formation of the system of collection and disposal of electrical and electronic equipment, non-systemic formation of a system of collection, removal, disposal, utilization of waste generated in the process of medical care, veterinary practice, related research, low the level of development of general requirements for household waste management, low level of development of information, scientific and methodological support of waste producers with information on technological and other opportunities to reduce waste generation and disposal, unsystematic conduct of any economic activity related to waste generation, without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the Law, low level of use of research results, implementation of inventions, use of new equipment, imported equipment, technologies and systems, if they do not provide prevention or minimization of waste generation at all stages of the technological process, their utilization and safe disposal, low level of compliance with environmental standards of the location of enterprises, installations, landfills, complexes, storage facilities and other waste management facilities, design and build regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not meet environmental and sanitary requirements, low level of efficiency of decision-making on location and development of cities and other settlements without definition of technical and other measures for creation of conditions for utilization or removal of household waste, low level of intensity of commissioning of new and reconstructed enterprises and other facilities provided equipment and technologies for safe waste management, and in the absence of	

Continuation of table E.27

1	2	3	4
		data,necessary to assess their impact on the environment and health human level, in accordance with the established procedure, high level of transfer or sale of hazardous waste to citizens, enterprises, institutions and organizations, if they do not ensure the disposal or disposal of this waste in an environmentally friendly way, low level of involvement of children and adolescents in organized waste collection (as secondary raw materials) , dangerous to health, high level of violation of terms of processing of the waste imported to Ukraine according to the conditions established by quotas, high level of violation of the established quotas on import to Ukraine of waste as secondary raw materials, high level of import to Ukraine, except transit transportation, any waste for the purpose of storage or disposal, low level of storage and disposal of waste, which is carried out in accordance with environmental safety requirements and methods,ensuring maximum use of waste or transfer to other consumers (except for landfilling), low level of waste disposal, which is carried out in accordance with statutory environmental safety requirements with mandatory provision of disposal or disposal of residual products in consultation with the central executive body implements state policy in the field of sanitary and epidemic welfare of the population, lowimplementing state policy in the field of sanitary and epidemiological welfare of the population, lowimplementing state policy in the field of sanitary and epidemiological welfare of the population, low the level of storage and disposal of waste, which is carried out in places determined by local governments, taking into account the requirements of land and environmental legislation, with a permit for operations in the field of waste management, which defines the types and quantities of waste, general technical requirements, safety measures, information on the generation, purpose, methods of waste treatment in accordance with the established conditions of their storage, low level of formation and definition for storage and disposal of waste places or facilities that should be used only for waste declared for permission to conduct operations in the field of waste management waste, low landfill waste, for the disposal of which in Ukraine there is an	

Continuation of table E.27

1	2	3	4
		appropriate technology, a high level of unauthorized dumping and disposal of waste, including household, in underground horizons, in cities and other settlements, in nature reserves, on the lands of nature protection, health, recreation and historical and cultural purpose, within water protection zones and zones of sanitary protection of water bodies, in other places that may pose a danger to the environment and human health, a high level of waste disposal in the subsoil, which is allowed in exceptional cases by results special researches with observance of standards, norms and rules provided by the legislation of Ukraine, low level of maintenance of prevention of pollution of the natural environment by them,unsystematic application of measures aimed at preventing accidents, limiting and eliminating their consequences and protecting people and the environment from their impact, low level of information about the accident that occurred at the site, and about the measures taken to eliminate its consequences, authorities executive power, local governments and the population, non-systemic operation of these facilities and transportation of hazardous waste in compliance with environmental legislation, non-systemic implementation of licensing conditions for operations in the field of hazardous waste management (not subject to licensing storage (accumulation) by the entity management of hazardous waste generated by it, if within a year from the date of generation of hazardous waste is transferred to business entities,licensed to carry out operations in the field of hazardous waste management), unsystematic ensuring the identification of hazardous waste management facilities in accordance with the Law of Ukraine «On high-risk facilities»; planning of localization and liquidation of accident on object, unsystematic formation of safety measures, low level of validity of setting environmental tax rates for waste disposal, with differentiation depending on the level of waste hazard and the value of the territory, low level of provision of business entities that recycle, reduce waste and introduce low-waste technologies in production, in accordance with legislation of tax, credit and other benefits, non-systematic provision in the manner prescribed by law of tax, credit and other benefits to business entities that hand over waste as a	

Continuation of table E.27

1	2	3	4
		secondary raw material and are engaged in the collection and procurement of such waste, unsystematic prioritization of financing under state contracts, implementing low-waste technologies, processing and disposing of waste,non-systemic targeted funding of research on specific problems of waste disposal and reduction of their generation, non-systematic creation of funds for targeted funding of waste disposal activities through voluntary contributions of waste producers, their owners, domestic and foreign economic entities, individual citizens, environmental insurance, ensuring the formation of a state data bank on the introduction of waste disposal technologies in Ukraine, etc.ensuring the formation of a state data bank for the introduction of waste disposal technologies in Ukraine, etc.ensuring the formation of a state data bank for the introduction of waste disposal technologies in Ukraine, etc.	
	0.51–1	High level of development and implementation of scientifically based standards of waste generation per unit of output (raw materials and energy), performance of works and provision of services regulating their quantitative and qualitative composition, in accordance with advanced technological achievements, high level of periodic revision of established waste generation standards. to reduce their volume, taking into account the best domestic and foreign experience and economic opportunities, a high level of development and implementation of a system for handling packaging materials and packaging, a high level of formation and implementation of the system of collection, removal, disposal and utilization of waste oils, systems collection, procurement and disposal of worn tires, rubber productsand waste of rubber production, high level of formation of the system of procurement and utilization of unusable vehicles, high level of formation of the system of collection and utilization of electrical and electronic equipment, high level of formation of the system of collection, removal, disposal, utilization of waste generated in medical care, veterinary practice related research, high level of development of general requirements for household waste management, high level of development of information, scientific and methodological	Included

Continuation of table E.27

1	2	3	4
		support of waste producers with information on technological and other opportunities to reduce waste generation and utilization, high level of any economic activity related to waste generation, without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements of the Law, high level of use of research results, implementation of inventions, use of new equipment, imported equipment, technologies and systems, if they do not prevent or minimization of waste generation at all stages of the technological process, their utilization and safe disposal,high level of compliance with environmental standards of the location of enterprises, installations, landfills, complexes, storage facilities and other waste management facilities, design and build regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not comply with environmental and sanitary requirements, a high level of efficiency in deciding on the location and development of cities and other settlements without defining technical and other measures to create conditions for the disposal or disposal of household waste, a high level of intensity of commissioning of new and reconstructed enterprises anddesign and build regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not meet environmental and sanitary requirements, high level of efficiency of decision-making on location and development of cities and other settlements without defining technical and other measures to create conditions for the disposal or disposal of household waste, a high level of intensity of commissioning of new and reconstructed enterprises anddesign and build regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not meet environmental and sanitary requirements, high level of efficiency of decision-making on location and development of cities and other settlements without defining technical and other measures to create conditions for the disposal or disposal of household waste, a high level of intensity of commissioning of new and reconstructed enterprises andhigh level of intensity of commissioning of new and reconstructed enterprises andhigh level of	

Continuation of table E.27

1	2	3	4
		intensity of commissioning of new and reconstructed enterprises andother facilities equipped with equipment and technologies for safe waste management, and in the absence of data necessary to assess their impact on the environment and human health, in accordance with the established procedure, low level of transfer or sale of hazardous waste to citizens , enterprises, institutions and organizations, if they do not ensure the disposal or disposal of this waste in an environmentally safe way, low level of involvement of children and adolescents in organized collection of waste (as secondary raw materials), hazardous to health, low level of violation of recycled waste to Ukraine in accordance with the conditions established by quotas, low level of violation of the established quotas for import of waste as secondary raw materials into Ukraine, high level of import to Ukraine,with the exception of transit, any waste for the purpose of storage or disposal, a high level of storage and disposal of waste, which is carried out in accordance with environmental safety requirements and methods that ensure maximum use of waste or transfer to other consumers (except landfill), high the level of waste disposal, which is carried out in accordance with the requirements of environmental safety established by law with the mandatory provision of disposal or disposal of residual products in coordination with the central executive body implementing state policy in the field of sanitary and epidemiological welfare, highcarried out in accordance with environmental safety requirements and in ways that ensure maximum use of waste or transfer it to other consumers (except for disposal), a high level of waste disposal, which is carried out in accordance with statutory environmental safety requirements with mandatory disposal or disposal of residual waste. products in coordination with the central executive body that implements state policy in the field of sanitary and epidemiological welfare of the population, highcarried out in accordance with environmental safety requirements and in ways that ensure maximum use of waste or transfer it to other consumers (except for disposal), a high level of waste disposal, which is carried out in accordance with statutory environmental safety	

Continuation of table E.27

1	2	3	4
		requirements with mandatory disposal or disposal of residual waste. products in coordination with the central executive body that implements state policy in the field of sanitary and epidemiological welfare of the population, highwhich is carried out in accordance with the statutory requirements of environmental safety with the mandatory provision of disposal or disposal of residual products in consultation with the central executive body implementing state policy in the field of sanitary and epidemiological welfare, highwhich is carried out in accordance with the statutory requirements of environmental safety with the mandatory provision of disposal or disposal of residual products in consultation with the central executive body implementing state policy in the field of sanitary and epidemiological welfare, high the level of storage and disposal of waste, which is carried out in places determined by local governments, taking into account the requirements of land and environmental legislation, with a permit for operations in the field of waste management, which defines the types and quantities of waste, general technical requirements, safety measures, information on the generation, purpose, methods of waste treatment in accordance with the established conditions of their storage, a high level of formation and definition for storage and disposal waste sites or facilities that should be used only for waste declared for permission to carry out operations in the field of waste management, high level of waste disposal, for the disposal of which in Ukraine there is an appropriate technology, low level of unauthorized dumping and disposal of waste, in particular household, in underground horizons, on the territory of cities and other settlements, on the territories of nature reserve fund, on lands of nature protection, health-improving, recreational and historical-cultural purpose, within water protection zones and zones of sanitary protection of water objects, in other places that may pose a danger to the environment and human health, a high level of waste disposal in the subsoil,which is allowed in exceptional cases based on the results of special studies in compliance with standards, norms and rules provided by the legislation of Ukraine, a high level of prevention of environmental	

Continuation of table E.27

1	2	3	4
		pollution, a high level of measures to prevent accidents, limit and eliminate their consequences and protect people and environmental environment from their impact, a high level of information about the accident that occurred at the site, and the measures taken to eliminate its consequences, the executive authorities, local governments and the population, a high level of operation of these facilities and transportation of hazardous waste in compliance with the requirements of environmental legislation,high level of fulfillment of licensing conditions for operations in the field of hazardous waste management is not subject to licensing of storage (accumulation) of hazardous waste generated by the business entity, if within a year from the date of generation hazardous waste is transferred to business entities licensed to carry out operations in the field of hazardous waste management), a high level of identification of objects hazardous waste management in accordance with the Law of Ukraine «On high-risk facilities»; planning of localization and liquidation of accident on object, unsystematic formation of safety measures, high level of substantiation of establishment of rates of the ecological tax which is levied for placement of waste, with differentiation depending on level of danger of waste and value of territory, high level of granting to business entities which utilize, reduce waste and introduce low-waste technologies into production, in accordance with the legislation of tax, credit and other benefits, a high level of granting in the manner prescribed by law tax, credit and other benefits to businesses that dispose of waste as secondary raw materials and engaged collection and procurement of such waste.	

Table E.28

Quantitative basis for selecting factors for the level of notification of the threat or occurrence of emergencies (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of provision of the process of notification of the threat or	0–0.49	Low level of functioning of national, territorial, local automated systems of centralized notification of threat or occurrence of emergency situations, special, local and object systems of notification, low	Not included

Continuation of table E.28

1	2	3	4
occurrence of emergencies		level of centralized use of public telecommunication networks, in particular mobile (mobile) communication, departmental telecommunication networks and telecommunication networks of business entities in the manner prescribed by the Cabinet of Ministers of Ukraine, as well as networks of national, regional and local radio and television and other technical means of transmitting (displaying) information, low level of automation of signaling and notification of threats or emergencies; operation of high-risk automated systems for early detection of emergencies and alerts, low level of organizational and technical integration of various centralized alert systems for the threat or occurrence of emergencies and automated systems for early detection of emergencies and alerts, low level of operation in settlements, and also places of mass stay people of loudspeakers and electronic information boards for the transmission of information on civil protection	
	0.5	Unsystematic support of the process of functioning of national, territorial, local automated systems of centralized notification of the threat or occurrence of emergencies, special, local and object notification systems, non-systemic provision of centralized use of public telecommunication networks, in particular mobile (mobile) communication, departmental telecommunication networks and telecommunication networks of business entities in accordance with the procedure established by the Cabinet of Ministers of Ukraine, as well as national, regional and local radio and television networks and other technical means of transmission (display) of information, non-systematic support of the process of automation of the process of transmission of signals and messages about the threat or occurrence of emergencies; operation of automated systems for early detection of emergency situations and warning at high-risk facilities	Uncertainty requires additional neural network training

Continuation of table E.28

1	2	3	4
	0.51–1	High level of functioning of national, territorial, local automated systems of centralized notification of threat or occurrence of emergency situations, special, local and object systems of notification, high level of centralized use of public telecommunication networks, in particular mobile (mobile) communication, departmental telecommunication networks and telecommunication networks of business entities in accordance with the procedure established by the Cabinet of Ministers of Ukraine, as well as networks of national, regional and local radio broadcastingand television and other technical means of transmitting (displaying) information, a high level of automation of the process of transmitting signals and messages about the threat or occurrence of emergencies; operation of automated systems for early detection of emergencies and alerts at high risk facilities, high level of organizational and technical integration of various centralized alert systems for the threat or occurrence of emergencies and automated systems for early detection of emergencies and alerts, high level of operation in settlements, and also in places of mass stay of people of signal and loud-speaking devices and electronic information boards for transfer of information on questions of civil protection.	Included

Table E.29

Quantitative basis for selection of factors of the level of shelter of the population in protective structures of civil defense (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Level of observance and control of shelter of the population in protective structures of	0–0.49	Low level of implementation of measures for the creation of protective structures, low level of design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the norms, low level of compliance with maintenance and operation of protective structures are determined by the central executive body. and implements state policy in the field of	Not included

Continuation of table E.29

1	2	3	4
civil protection		civil protection, the low level of maintenance of protective structures of civil protection in readiness for their intended use is carried out by economic entities on whose balance they are (including buildings that were not included in their authorized capital in the privatization process(corporatization), at its own expense, a low level of control over the readiness of civil defense structures for use as intended, provided by the central executive body, which carries out state supervision in the field of man-made and fire safety, together with relevant bodies and units of civil protection, local state administrations	
	0.5	Non-systematic level of implementation of measures for the creation of protective structures, low level of design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the norms, non-systematic level of compliance with maintenance and operation of protective structures is determined by the central executive body and implements state policy in the field of civil protection, the low level of maintenance of protective structures of civil protection in readiness for their intended use is carried out by economic entities on the balance of which they are (including buildings not included in their authorized capital in the privatization process). , at their own expense, non-systemic level of control over the readiness of civil protection structures for use as intended,provided by the central body of executive power, which carries out state supervision in the field of technogenic and fire safety, together with the relevant bodies and units of civil protection, local state administrations	Uncertainty requires additional neural network training
	0.51–1	High level of implementation of measures for the creation of protective structures, high level of design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the norms, high level of compliance with maintenance and operation of protective structures are determined by the central executive body. and implements state policy in the field of civil protection, high level maintenance of protective structures of civil defense in readiness for intended use is carried out by economic entities on the balance of which they are (in particular, buildings that are not included in their authorized capital in the process of privatization	Included

Continuation of table E.29

1	2	3	4
		(corporatization), at their own expense, high level of readiness control protective structures of civil protection for use for their intended purpose, provided by the central executive body, which carries out state supervision in the field of man-caused and fire safety, together with the relevant bodies and units of civil protection, local state administrations	

Table E.30

Quantitative basis for selection of factors of the level of engineering protection of territories (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of engineering protection of territories	0–0.49	low level of zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergencies related to them; assignment of cities to the relevant groups of civil defense and assignment of economic entities to the relevant categories of civil defense, low level of development and inclusion of requirements of engineering and technical measures of civil defense to the relevant types of urban planning and design documentation and their implementation during construction and operation, low level of accounting possible manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, high level of placement of objects increased risk, taking into account the consequences of accidents that may occur at such facilities, low level of development and implementation of measures for the smooth operation of high-risk facilities, low the level of construction of structures, buildings, utilities and transport communications with specified levels of safety and reliability, low level of construction of landslides, floods, anti-landslides, avalanches, erosion and other engineering structures of special purpose, their maintenance in functional condition, low level of completeness and regularity of inspections , buildings, utilities and transport communications, development and implementation of measures for their safe operation, low level of implementation of other measures of engineering protection of territories depending on the situation	Not included

Continuation of table E.30

1	2	3	4
	0.5	Unsystematic level of zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergencies related to them; assignment of cities to the relevant groups of civil defense and assignment of business entities to the appropriate categories of civil defense, non-systemic level of development and inclusion of requirements of engineering and technical measures of civil defense in the relevant types of urban planning and design documentation and their implementation during construction and operation. manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, the level of construction of buildings, structures, utilities and transport communications with specified levels of security and reliability, unsystematic level of construction of landslide, flood, anti-mud, anti-avalanche, anti-erosion and other engineering structures of special purpose, their maintenance in functional condition, non-system level of completeness and regularity of inspection of buildings, structures, utilities and transport communications, development and implementation of measures unsystematic implementation of other measures of engineering protection of territories depending on the current situation	Uncertainty requires additional neural network training
	0.51–1	High level of zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergencies related to them; assignment of cities to the relevant groups of civil defense and assignment of economic entities to the relevant categories of civil defense, high level of development and inclusion of requirements of engineering and technical measures of civil defense to the relevant types of urban planning and design documentation and their implementation during construction and operation, high level of accounting possible manifestations of dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, level of construction of structures, buildings, utilities and transport communications with specified levels of safety and reliability, high level of construction of landslides, floods, anti-mudflows,	Included

Continuation of table E.30

1	2	3	4
		avalanches, anti-erosion and other special purpose engineering structures, their maintenance in functional condition, high level of completeness and regularity inspection of buildings, structures, engineeringnetworks and transport communications, development and implementation of measures for their safe operation, high the level of implementation of other measures of engineering protection of territories depending on the current situation	

Table E.31

Quantitative basis for the selection of the level of radiation and chemical protection of the population and territories (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of formation and implementation of radiation and chemical protection of the population and territories	0–0.49	Low level of detection and assessment of radiation and chemical status, low level of organization and implementation of dosimetric and chemical control, low level of development and implementation of standard modes of radiation protection, low level of use of collective protection, low level of use of personal protective equipment, radiation and chemical reconnaissance devices, dosimetric and chemical control by rescue services, formations and specialized civil protection services involved in emergency rescue and other urgent work, extinguishing fires in the centers of radiation and chemically dangerous objects and the population living in areas of dangerous pollution, low level of iodine prophylaxis of rescuers involved in liquidation of radiation accident, personnel of radiation-dangerous objects and population,living in areas of possible contamination, radioactive iodine isotopes to prevent thyroid irradiation, low level of public access to personal protective equipment, dosimetric and chemical control devices, low level of sanitation and special treatment of transport, clothing , low level of development of general criteria, methods and methods of observation for evaluationlow level of development of general criteria, methods and methods of observation for evaluationlow level of development of general criteria, methods and methods of observation for evaluation radiation and chemical status, low the level of implementation of other measures of radiation	Not included

Continuation of table E.31

1	2	3	4
		and chemical protection, depending on the situation	
	0.5	Low level of detection and assessment of radiation and chemical status, unsystematic organization and implementation of dosimetric and chemical control, non-systemic development and implementation of standard modes of radiation protection, non-systemic use of means of collective protection, unsystematic use of means of individual protection, devices of radiation and chemical reconnaissance, dosimetric and chemical control by emergency rescue services, formations and specialized civil protection services involved in carrying out emergency rescue and other urgent works, extinguishing fires in centers destruction of radiation and chemically dangerous objects and the population living in zones of dangerous pollution, unsystematic carrying out of iodine prophylaxis of rescuers involved in liquidation of radiation accident, personnel of radiation dangerous objects and the population living in zones of possible pollution by radioactive isotopes of iodine in order to prevent radiation to the thyroid gland,unsystematic provision of the population with the opportunity to purchase for personal use personal protective equipment, dosimetric and chemical control devices, unsystematic sanitation of the population and special treatment of clothing, property and transport, low the level of development of general criteria, methods and techniques of observations for the assessment of radiation and chemical status, unsystematic implementation of other measures of radiation and chemical protection depending on the current situation	Uncertainty requires additional neural network training
	0.51–1	High level of detection and assessment of radiation and chemical status, high level of organization and implementation of dosimetric and chemical control, high level of development and implementation of standard modes of radiation protection, high level of use of collective protection means, high level use of personal protective equipment, radiation and chemical reconnaissance devices, dosimetric and chemical control by emergency rescue services, formations and specialized civil protection services involved in carrying out emergency rescue and other urgent works, extinguishing fires	Included

Continuation of table E.31

1	2	3	4
		in the centers of radiation and chemical hazards and population living in areas of dangerous contamination, high level of iodine prophylaxis of rescuers involved in the elimination of radiation accidents, personnel of radiation-hazardous objects and the population living in areas of possible contamination, radioactive isotopes of iodine to prevent irradiation of the thyroid gland glands, a high level of providing the population with the opportunity to purchase personal protective equipment for personal use,dosimetric and chemical control devices, high level of sanitation of the population and special treatment of clothing, property and transport, high the level of development of general criteria, methods and techniques of observations for the assessment of radiation and chemical status, high the level of implementation of other measures of radiation and chemical protection, depending on the situation	

Table E.32

Quantitative basis for selection of factors of the level of medical protection, ensuring sanitary and epidemic welfare of the population (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Level of organization and provision of medical protection, sanitary and epidemic well-being	0–0.49	Low level of medical care for victims of emergencies, rescuers and other persons involved in emergency rescue and other emergency work, firefighting, medical and psychological rehabilitation, low level of timely use of preventive drugs and timely sanitary and anti-epidemic measures, low level of control over the quality and safety of food and food raw materials, drinking water and water supply sources, low level of early establishment and training of special medical units, low level of formation in emergency situations of the required number of additional temporary mobile medical units or involvement of additional health facilities , low level of accumulation of medical and special property and equipment, low level of training and retraining of medical workers in emergency medical care, low level of education of the population on methods of home care and personal hygiene, low level of implementation of measures to	Not included

Continuation of tableE.32

1	2	3	4
		prevent negative health effects I population of harmful environmental factors and the consequences of emergencies,as well as conditions for the emergence and spread of infectious diseases, low level of organization and monitoring of the environment, sanitary and epidemiological situation, low level of sanitary protection of territories and economic entities in the emergency zone, low level of other measures, related to medical protection of the population, depending on the situation	
	0.5	Unsystematic provision of medical care to victims of emergencies, rescuers and other persons involved in emergency and other emergency work, firefighting, their medical and psychological rehabilitation, unsystematic level of timely use of preventive drugs and timely anti-sanitary measures, low level of control over the quality and safety of food and food raw materials, drinking water and water supply sources, low level of early creation and training of special medical units, unsystematic level of formation in emergency situations of the required number of additional temporary mobile medical units or involvement of additional health facilities unsystematic level of accumulation of medical and special property and equipment, low level of training and retraining of medical workers in emergency medical care, unsystematic level of education of the population on methods of home care and personal hygiene, low level of implementation of measures to prevent adverse health effects population of harmful environmental factors and consequences of emergencies, as well as conditions for the emergence and spread of infectious diseases, unsystematic organization and monitoring of the environment, sanitary and epidemiological situation, low level of sanitary protection of territories and businesses in the area emergency situation, unsystematic level of implementation of other measures,related to medical protection of the population, depending on the situation	Uncertainty requires additional neural network training
	0.51–1	High level of medical care for victims of emergencies, rescuers and other persons involved in emergency and other emergency work, firefighting, their medical and psychological rehabilitation, high level of timely use of preventive drugs and timely sanitation. measures, a high level of control over the quality and safety of food and food raw materials, drinking water and water supply sources, a high level of early creation and training of special medical	Included

Continuation of tableE.32

1	2	3	4
		units, a high level of formation in emergency situations of the required number of additional temporary mobile medical units or involvement of additional security facilities health,high level of accumulation of medical and special property and equipment, high level of training and retraining of medical workers to provide emergency medical care, high level of education of the population on methods of home care and rules of personal hygiene, high level of implementation of measures to prevent negative health effects harmful population environmental factors and the consequences of emergencies, as well as conditions for the emergence and spread of infectious diseases, a high level of organization and monitoring of the environment, sanitary and epidemiological situation, a high level of sanitary protection of territories and businesses in the emergency zone situation, high level of implementation of other measures related to medical protection of the population, depending on the current situation	

Table E.33

Quantitative basis for selection of factors of the level of biological protection of the population, animals and plants (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of timeliness of detection of biological infection and the possibility of counteracting	0–0.49	Low level of timely detection of factors and foci of biological infection, its localization and elimination, low level of forecasting the scale and consequences of biological infection, development and implementation of timely anti-epidemic, prophylactic, anti-epizootic, anti-epiphytic and therapeutic measures, low level of prevention of emergency biological specialty, low level of timely use of personal and collective protection, low level of introduction of restrictive anti-epidemic measures, observation and quarantine, low level of disinfection measures in the center of infection, disinfection of business entities, animals and sanitation, low level of emergency medical care affected by biological pathogens, low level of implementation of other biological protection measures depending on the current situation, low level of establishment of anti-epidemic, anti-epizootic and anti-epiphytic regimes and their observance by business entities, health care	Not included

Continuation of table E.33

1	2	3	4
		institutions and the population	
	0.5	Inconsistency of timely detection of factorsand foci of biological infection, its localization and elimination, low level of forecasting the scale and consequences of biological infection, development and implementation of timely anti-epidemic, prophylactic, anti-epizootic, anti-epiphytic and therapeutic measures, unsystematic emergency nonspecific and non-specific use of population prevention. and collective protection, inconsistency of introduction of restrictive anti-epidemic measures, observation and quarantine, low level of disinfection measures in the center of infection, disinfection of economic entities, animals and sanitation, inconsistency of emergency medical care affected by biological pathogens,unsystematic implementation of other biological protection measures depending on the current situation, unsystematic establishment of anti-epidemic, anti-epizootic and anti-epiphytic regimes and their observance by business entities, health care institutions and the population	Not determined to require additional neural network training
	0.51–1	High level of timely detection of factors and foci of biological infection, its localization and elimination, high level of forecasting the scale and consequences of biological infection, development and implementation of timely anti-epidemic, prophylactic, anti-epizootic, anti-epiphytic and therapeutic measures, high level of emergency biopsy, high level of timely use of individual and collective protection, high level of introduction of restrictive anti-epidemic measures, observation and quarantine, high level of disinfection measures in the center of infection, disinfection of business entities, animals and sanitation of the population, high the level of emergency medical care affected by biological pathogens, the high level of implementation of other biological protection measures depending on the situation, the high level of anti-epidemic, anti-epizootic and antiepiphytic regimens and their observance by business entities, health care institutions and the population	Included

Table E.34

Quantitative basis for the selection of factors of the level of psychological protection of the population in the system of territorial development of land use in regions (developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
The level of psychological protection of the population in the system of territorial development of land use in regions	0–0.49	Low level of planning activities related to psychological protection, timely use of licensed and permitted in Ukraine informational, psychoprophylactic and psychocorrective methods of influencing the individual, low level of detection of psychological methods of factors that contribute to socio-psychological tension, low level the use of modern psychological technologies to neutralize the negative impact of emergency factors on the population, the low level of implementation of other measures of psychological protection, depending on the situation	Not included
	0.5	Unsystematic planning of activities related to psychological protection, timely use of licensed and permitted in Ukraine informational, psychoprophylactic and psychocorrectional methods of influencing the individual, unsystematic detection by means of psychological methods of the factors promoting emergence of social and psychological tension, unsystematic use of modern psychological technologies for neutralization of negative influence of factors of emergency situations on the population, unsystematic implementation of other measures of psychological protection depending on the current situation	Uncertainty requires additional neural network training
	0.51–1	High level of planning activities related to psychological protection, timely use of licensed and permitted for use in Ukraine informational, psychoprophylactic and psychocorrective methods of influencing the personality, a high level of detection by psychological methods of factors that contribute to the emergence of socio-psychological tension, a high level use of modern psychological technologies to neutralize the negative impact of emergency factors on the population, a high level of implementation of other measures of psychological protection, depending	Included

Table E.35

Quantitative basis for the selection of factors of the level of technological safety

(developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
Level of definition and maintenance of technological safety	0–0.49	Low level of identification of potentially dangerous objects and objects of increased danger; buildings and structures with violation of operating conditions, low level of opportunities to identify business entities with critical condition of production assets and violation of operating conditions, low level of opportunities to identify nuclear facilities with violation of operating conditions, high level of terrorist activity, low level of technological safety of hydraulic structures, high level of uncontrolled import, storage and use on the territory of Ukraine of technogenic hazardous technologies, substances, materials, high level of excessive and unregulated accumulation of household and industrial waste, unsuitable for use of plant protection products; consequences of military and other environmentally hazardous activities, automated system for early detection of the threat of emergencies and notification of the population in case of their occurrence (at high-risk facilities in order to timely detect the threat of emergencies and alert personnel and the population that falls into the zone of possible damage, automated and created automated systems for early detection of the threat of emergencies and notification of the population in case of their occurrence)	Not included
	0.5	Non-systematic determination of potentially dangerous objects and objects of increased danger; buildings and structures with violation of operating conditions, low level of opportunities to identify economic entities with critical condition of production assets and violation of operating conditions, low level of opportunities to identify nuclear facilities with violation of operating conditions, high level of terrorist development, unsystematic technological safety of hydraulic structures, high level of uncontrolled import, storage and use on the territory of Ukraine of technogenic hazardous technologies, substances, materials, high level of excessive and unregulated accumulation of household and industrial waste, unsuitable for use of plant protection products; consequences of military and other environmentally hazardous activities, systems for early detection of the threat of emergencies and notification of the population in case of their occurrence)	Uncer-tainty requires additio-nal neural network training
	0.51–1	High level of identification of potentially dangerous objects and objects of increased danger; buildings and structures with violation of operating conditions, low level of opportunities to identify business entities with critical condition of	Included

Continuation of table E.35

1	2	3	4
		production assets and violation of operating conditions, high level of opportunities to identify nuclear facilities with violation of operating conditions, low level of terrorist activity, high level of technological safety of hydraulic structures, low level of uncontrolled import, storage and use on the territory of Ukraine of technogenic hazardous technologies, substances, materials, low level of excessive and unregulated accumulation of household and industrial waste, unsuitable for use of plant protection products; consequences of military and other environmentally hazardous activities, the level of occurrence of life support facilities in violation of operating conditions, the low level of occurrence of other facilities that may pose a risk of accident, the high level of ensuring the formation and implementation of an automated system for early detection of emergencies and alerting the population in case of their occurrence (high-risk facilities for the purpose of timely detection of the threat of emergencies and notification of personnel and the population that falls into the zone of possible damage, automated systems for early detection of the threat of emergencies and notification of the population in case of their occurrence are created and operate)	

Table E.36

Quantitative basis for the selection of factors of the level of fire safety in the system of territorial development of land use in regions

(developed by the authors)

Selection criteria	Value	Rationale for selection	Selection decisions
1	2	3	4
The level of fire safety in the system of territorial development of land use in regions	0–0.49	Low level of fire safety in Ukraine, regulation of relations in this area by public authorities, local governments and businesses and citizens, low level of fire safety by businesses, low level of authority in the field of fire safety associations, corporations, concerns, other business associations	Not included
	0.5	Unsystematic provision of fire safety on the territory of Ukraine, regulation of relations in this area by public authorities, local governments and business entities and citizens, unsystematic ensuring fire safety by business entities, low level of authority in the field of fire safety of associations, corporations, concerns and other business associations	Uncertainty requires additional neural network training
	0.51–1	High level of fire safety in Ukraine, regulation of relations in this area by public authorities, local governments and businesses and citizens, high level	Included

Continuation of table E.36

1	2	3	4
		of fire safety by businesses, high level of authority in the field of fire safety associations, corporations, concerns, other business associations	
The level of implementation of fire safety measures in the system of territorial development of land use in regions	0–0.49	The low level of fulfillment of responsibilities for fire safety during the design and construction of settlements, construction of buildings and structures is entrusted to the bodies of architecture, customers, developers, design and construction organizations, low the level of fire safety responsibilities in residential premises of state, communal, public housing stock, housing cooperatives fund is entrusted to tenants and apartment owners, and in residential premises of private housing stock and other buildings, private residential houses of manorial type, country and garden houses with outbuildings and buildings to their owners or tenants, if stipulated in the lease agreement	Not included
	0.5	Non-systemic performance of responsibilities for fire safety during the design and construction of settlements, construction of buildings and structures is entrusted to the bodies of architecture, customers, developers, design and construction organizations, non-systemic. Responsibilities for fire safety in residential premises of state, communal, public housing, housing cooperatives fund is entrusted to tenants and apartment owners, and in residential premises of private housing and other structures, private homesteads, country and garden houses with outbuildings and buildings for their owners or tenants, if it is stipulated by the lease agreement	Uncertainty requires additional neural network training
	0.51–1	The high level of fulfillment of responsibilities for fire safety during the design and construction of settlements, construction of buildings and structures is entrusted to the bodies of architecture, customers, developers, design and construction organizations, high the level of fire safety responsibilities in residential premises of state, communal, public housing stock, housing cooperatives fund is entrusted to tenants and apartment owners, and in residential premises of private housing stock and other buildings, private homesteads, country houses and garden houses with outbuildings and buildings for their owners or tenants, if stipulated in the lease agreement	Included

Table E.37

Compliance with the criteria for the selection of factors of territorial development of land use in regions (developed by the authors)

№ s / n	Name of factors	Factors	The name of the criterion	Criteria
1	2	3	4	5
1. Spatial				
1.1	Territorial	f^3_{111}, f^3_{112}, f^3_{113}, f^3_{114}, f^3_{115}, f^3_{116}, f^3_{117}	The level of stimulation and financing of the region's development	ktr_1
		f^3_{118}, f^3_{119}, f^3_{1110}, f^3_{1111}	The level of formation and development of united territorial communities	ktr_2
		f^3_{1112}, f^3_{1113}, f^3_{1114}, f^3_{1115}, f^3_{1116}, f^3_{1117}	The level of implementation of areas of territorial development in regions	ktr_3
1.2	Functional	f^3_{121}, f^3_{122}, f^3_{123}, f^3_{124}, f^3_{125}, f^3_{126}, f^3_{127}, f^3_{128}, f^3_{129}, f^3_{1245}	The level of land use in regions	ktr_4
		f^3_{1210}, f^3_{1211}, f^3_{1212}, f^3_{1213}, f_{1214}, f^3_{1215}, f^3_{1216}, f^3_{1217}, f^3_{1218}, f^3_{1219}, f^3_{1220}, f^3_{1221}, f^3_{1222}, f^3_{1223}, f^3_{1224}, f^3_{1225}, f^3_{1226}, f^3_{1227}, f^3_{1228}, f^3_{1229}, f^3_{1230}, f^3_{1231}, f^3_{1232}, f^3_{1233}, f^3_{1234}, f^3_{1235}, f^3_{1236}, f^3_{1237}, f^3_{1238}, f^3_{1239}, f^3_{1240}, f^3_{1241}, f^3_{1242}, f^3_{1243}, f^3_{1244}	The level of spatial support for land use in regions	ktr_5
1.3	Social	f^3_{131}, f^3_{132}, f^3_{133}, f^3_{134}, f^3_{135}, f^3_{136}, f^3_{137}, f^3_{138}	The level of provision of social infrastructure	ktr_6

Continuation of table E.37

1	2	3	4	5
1.4	Political	$f^3_{141}, f^3_{142}, f^3_{143}, f^3_{144}, f^3_{145}, f^3_{146}, f^3_{147}, f^3_{148}, f^3_{149}$	The level of determining the directions of formation and implementation of land use policy in regions	ktr_7
		$f^3_{1410}, f^3_{1411}, f^3_{1412}, f^3_{1413}, f^3_{1414}, f^3_{1415}, f^3_{1416}, f^3_{1417}, f^3_{1418}, f^3_{1419}, f^3_{1420}, f^3_{1421}, f^3_{1422}$	The level of influence of political conditions on the directions of land use in regions	ktr_8
1.5	Level of cartographic and geodetic support of land use of regions	$f^3_{151}, f^3_{155}, f^3_{156}, f^3_{157}, f^3_{158}, f^3_{1510}, f^3_{1511}, f^3_{1513}, f^3_{1514}, f^3_{1515}, f^3_{1517}, f^3_{1519}, f^3_{1521}, f^3_{1526}$	The level of completeness of cartographic and geodetic support of land use in regions	ktr_9
		$f^3_{152}, f^3_{153}, f^3_{154}, f^3_{159}, f^3_{1512}, f^3_{1516}, f^3_{1518}, f^3_{1520}$	The level of application of modern tools in the field of cartographic and geodetic support of land use in regions	ktr_{10}
		$f^3_{1522}, f^3_{1523}, f^3_{1524}, f^3_{1525}, f^3_{1527}, f^3_{1528}, f^3_{1529}$	The level of interaction of subjects in the field of formation of cartographic and geodetic support of land use in regions	ktr_{11}
2. Urban planning				
2.1	Zonal	*f 3211*, f 3212, f 3213, f 3214, f 3215, f 3216, *f 3217*, f 3218, f 3219	The level of formation and determination of zonal urban planning factors	ktr_{12}

Continuation of table E.37

1	2	3	4	5
2.2	Functional and planning	$f^3_{221}, f^3_{222}, f^3_{223}, f^3_{224}, f^3_{225}, f^3_{226}, f^3_{227}, f^3_{228}, f^3_{229}, f^3_{2210}, f^3_{2211},$	The level of provision and implementation of urban conditions that affect the use of land in regions	ktr_{13}
		$f^3_{2212}, f^3_{2213}, f^3_{2214}, f^3_{2215}, f^3_{2216}, f^3_{2217}, f^3_{2218}, f^3_{2219}, f^3_{2220}, f^3_{2221}, f^3_{2222}$	The level of reliability and completeness of planning decisions that affect the use of land in regions	ktr_{14}
2.3	Structural and planning	$f^3_{231}, f^3_{232}, f^3_{233}, f^3_{234}, f^3_{235}, f^3_{236}, f^3_{237}, f^3_{238}, f^3_{239}$	The level of provision of territories with structural and planning components that affect the formation of urban areas in territorial development of land use	ktr_{15}
2.4	Planning and restrictive	$f^3_{241}, f^3_{242}, f^3_{243}, f^3_{244}, f^3_{245}, f^3_{246}, f^3_{247}, f^3_{248}, f^3_{249}, f^3_{2410}, f^3_{2411}$	The level of completeness and reliability of information support on the formation and application of planning and limiting factors that shape the urban areas of territorial development of land use in regions	ktr_{16}
2.5	Engineering training and equipment of territories	$f^3_{251}, f^3_{2511}, f^3_{2512}, f^3_{2513}$	The level of engineering support of territories in urban development in regions	ktr_{17}
		$f^3_{252}, f^3_{253}, f^3_{254}, f^3_{255}, f^3_{256}, f^3_{257}, f^3_{258}, f^3_{259}, f^3_{2510}$	The level of implementation of measures for the formation of engineering support of territories in the urban development in regions	ktr_{18}

Continuation of table E.37

1	2	3	4	5
2.6	Transportation	$f^3_{261}, f^3_{262}, f^3_{263}, f^3_{264}$	The level of transport provision during the implementation of urban policy in the system of territorial development of land use in regions	ktr_{19}
		$f^3_{265}, f^3_{266}, f^3_{267}$	The level of implementation of transport support measures during the implementation of urban policy in the system of territorial development of land use in regions	ktr_{20}
2.7	Historical and architectural	$f^3_{271}, f^3_{272}, f^3_{273}, f^3_{274}, f^3_{275}, f^3_{276}, f^3_{277}, f^3_{278}, f^3_{279}, f^3_{2710}, f^3_{2711}, f^3_{2712}, f^3_{2719}$	The level of availability of historical and cultural objects and their impact on the territorial development of land use in regions	ktr_{21}
		$f^3_{2713}, f^3_{2714}, f^3_{2715}, f^3_{2716}, f^3_{2717}, f^3_{2718}$	The level of formation of historical and cultural objects in the territorial development of land use in regions	ktr_{22}
2.8	Functioning of the construction industry in the regions	$f^3_{281}, f^3_{282}, f^3_{283}, f^3_{284}, f^3_{285}$	The level of development of the construction industry	ktr_{23}
2.9	Level of development of territories	–	–	–
2.10	Density of territories	–	–	–
2.11	The level of application of spatial information in urban planning	$f^3_{2111}, f^3_{2112}, f^3_{2113}, f^3_{2114}, f^3_{2115}, f^3_{2116}$	The level of completeness and reliability of spatial information in the urban development of land use in regions	ktr_{24}

Continuation of table E.37

1	2	3	4	5
2.12	The level of formation of cadastral information in the field of land use in regions for urban planning	$f^3_{2121}, f^3_{2122}, f^3_{2123}, f^3_{2124}, f^3_{2125}, f^3_{2126}, f^3_{2127}, f^3_{2128}, f^3_{2129}, f^3_{21210}, f^3_{21211}, f^3_{21212}, f^3_{21213}, f^3_{21214}, f^3_{21215}, f^3_{21216}, f^3_{21217}, f^3_{21218}, f^3_{21219}, f^3_{21220}, f^3_{21221}, f^3_{21222}, f^3_{21223}, f^3_{21224}, f^3_{21225}, f^3_{21226}, f^3_{21227}, f^3_{21228}, f^3_{21229}, f^3_{21230}, f^3_{21231}, f^3_{21232}, f^3_{21233}, f^3_{21234}, f^3_{21235}, f^3_{21236}, f^3_{21237}, f^3_{21238}, f^3_{21239}$	The level of completeness of cadastral information in the field of land use in regions for urban planning	ktr_{25}
3. Investment				
3.1	Evaluate	$f^3_{311}, f^3_{312}, f^3_{313}, f^3_{314}, f^3_{315}, f^3_{316}$	The level of completeness of information support of indicators of investment attractiveness of lands in regions	ktr_{26}
3.2	Level of use of funds, property and property rights	$f^3_{321}, f^3_{322}, f^3_{323}, f^3_{324}$	The level of use of funds, property and property rights that affect the formation of investment attractiveness in the system of territorial development of land use in regions	ktr_{27}
3.3	Intelligent	$f^3_{331}, f^3_{332}, f^3_{333}, f^3_{334}$	The level of use of structural components of intellectual capital that affect the investment attractiveness in the system of territorial development of land use in regions	ktr_{28}

Continuation of table E.37

1	2	3	4	5
3.4	Stakeholders	$f^3_{341}, f^3_{342}, f^3_{343}, f^3_{344}, f^3_{345}, f^3_{346}, f^3_{347}, f^3_{348}, f^3_{349}, f^3_{3410}, f^3_{3411}, f^3_{3412}, f^3_{3413}, f^3_{3414}, f^3_{3415}, f^3_{3416}, f^3_{3417}, f^3_{3418}, f^3_{3419}, f^3_{3420}, f^3_{3421}, f^3_{3422}, f^3_{3423}, f^3_{3424}, f^3_{3425}, f^3_{3426}, f^3_{3427}, f^3_{3428}, f^3_{3429}, f^3_{3430}, f^3_{3431}$	The level of interaction of stakeholders operating in the system of territorial development of land use in regions	ktr_{29}
3.5	Innovative	$f^3_{351}, f^3_{352}, f^3_{353}, f^3_{354}, f^3_{355}, f^3_{356}, f^3_{357}, f^3_{358}, f^3_{359}, f^3_{3510}, f^3_{3511}$	The level of formation and use of innovative factors that form the investment attractiveness in the system of territorial development of land use in regions	ktr_{30}
3.6	Territorial development in regions	$f^3_{361}, f^3_{362}, f^3_{363}, f^3_{364}, f^3_{365}, f^3_{366}$	The level of completeness of information support of investment factors that shape the territorial development in regions	ktr_{31}
3.7	Attracting foreign investment in the field of land relations in regions	$f^3_{371}, f^3_{372}, f^3_{373}, f^3_{374}, f^3_{375}, f^3_{376}, f^3_{377}, f^3_{378}, f^3_{379}, f^3_{3710}, f^3_{3711}, f^3_{3712}, f^3_{3713}, f^3_{3714}, f^3_{3715}$	The level of foreign investment in land relations in regions	ktr_{32}
3.8	Public-private partnership	$f^3_{381}, f^3_{382}, f^3_{383}, f^3_{384}, f^3_{385}, f^3_{386}, f^3_{387}, f^3_{388}, f^3_{389}, f^3_{3810}, f^3_{3811}, f^3_{3812}, f^3_{3813}, f^3_{3814}, f^3_{3815}, f^3_{3816}, f^3_{3817}, f^3_{3818}, f^3_{3819}$	The level of public-private partnership, which affects the formation of investment in land use in regions	ktr_{33}

Continuation of table E.37

1	2	3	4	5
3.9	The level of investment activity in the field of land use in regions by domestic investors	$f^3_{391}, f^3_{392}, f^3_{393}, f^3_{394}, f^3_{395}, f^3_{396}, f^3_{397}, f^3_{398}$	The level of investment activity in the field of land use in regions by domestic investors	*ktr34*
		f^3_{399}	The level of implementation of investment activities in the field of land use in regions by domestic investors	*ktr35*
3.10	The level of formation of special economic zones to ensure investment in the use in regional lands	$f^3_{3101}, f^3_{3102}, f^3_{3103}, f^3_{3104}, f^3_{3105}, f^3_{3106}$	The level of provision of special economic zones in accordance with the investment in the field of land use in regions	ktr_{36}
3.11	The level of providing a special regime of innovation activities of technology parks in the field of land use of the regions	$f^3_{3111}, f^3_{3112}, f^3_{3113}, f^3_{3114}, f^3_{3115}, f^3_{3116}, f^3_{3117}, f^3_{3118}, f^3_{3119}, f^3_{31110}$	The level of formation and implementation of a special regime of innovative activity of technology parks in the field of land use of regions	ktr_{37}
3.12	Implementation of investment projects in the field of land use of the regions on the principle of "single window"	$f^3_{3121}, f^3_{3122}, f^3_{3123}, f^3_{3124}, f^3_{3125}$	Level of provision of investment projects carried out on the principle of "single window"	ktr_{38}
4. Environmental				
4.1	Level of ecological development	$f^3_{411}, f^3_{412}, f^3_{413}, f^3_{414}, f^3_{415}, f^3_{416}, f^3_{417}, f^3_{418}, f^3_{419}$	The level of environmental development	ktr_{39}

Continuation of table E.37

1	2	3	4	5
4.2	Level of waste management	$f^3_{421}, f^3_{422}, f^3_{423}, f^3_{424}, f^3_{425}, f^3_{426}, f^3_{427}, f^3_{428}, f^3_{429}, f^3_{4210}, f^3_{4211}, f^3_{4212}, f^3_{4213}, f^3_{4214}, f^3_{4215}, f^3_{4216}$	The level of ensuring the directions of waste management in the system of territorial development of land use in regions	ktr_{40}
4.3	The level of rationing and accounting of waste management	$f^3_{431}, f^3_{432}, f^3_{433}$	The level of rationing of waste management	ktr_{41}
		$f^3_{434}, f^3_{435}, f^3_{436}, f^3_{437}$	The level of accounting for waste management	ktr_{42}
4.4	Functional factors to reduce or prevent waste generation	$f^3_{441}, f^3_{442}, f^3_{443}, f^3_{444}, f^3_{445}, f^3_{446}, f^3_{447}, f^3_{448}, f^3_{449}, f^3_{4410}, f^3_{4411}, f^3_{4412}, f^3_{4413}, f^3_{4414}, f^3_{4415}, f^3_{4416}, f^3_{4417}, f^3_{4418}, f^3_{4419}, f^3_{4420}, f^3_{4421}, f^3_{4422}, f^3_{4423}, f^3_{4424}, f^3_{4425}, f^3_{4426}, f^3_{4427}, f^3_{4428}, f^3_{4429}, f^3_{4430}, f^3_{4431}, f^3_{4432}, f^3_{4433}, f^3_{4434}, f^3_{4435}, f^3_{4436}, f^3_{4437}, f^3_{4438}, f^3_{4439}, f^3_{4440}.$	The level of ensuring the process of reducing or preventing waste generation	ktr_{43}
4.5	The level of notification of the threat or occurrence of emergencies	$f^3_{451}, f^3_{452}, f^3_{453}, f^3_{454}, f^3_{455}$	The level of provision of notification of the threat or occurrence of emergencies	ktr_{44}
4.6	Level of information on the occurrence and prevention of emergencies	$f^3_{461}, f^3_{462}, f^3_{463}, f^3_{464}$	The level of completeness of information on the occurrence and prevention of emergencies	ktr_{45}
4.7	The level of shelter of the population in protective structures of civil defense	$f^3_{471}, f^3_{472}, f^3_{473}, f^3_{474}, f^3_{475}$	Level of observance and control over the shelter of the population in protective structures of civil defense	ktr_{46}
4.8	Level of implementation of evacuation measures	$f^3_{481}, f^3_{482}, f^3_{483}, f^3_{484}, f^3_{485}, f^3_{486}, f^3_{487}$	The level of ensuring the implementation of evacuation measures	ktr_{47}

Continuation of table E.37

1	2	3	4	5
4.9	Level of engineering protection of territories	$f^3_{491}, f^3_{492}, f^3_{493}, f^3_{494}, f^3_{495}, f^3_{496}, f^3_{497}, f^3_{498}, f^3_{499}$	The level of engineering protection of territories	ktr_{48}
4.10	The level of radiation and chemical protection of the population and territories	$f^3_{4101}, f^3_{4102}, f^3_{4103}, f^3_{4104}, f^3_{4105}, f^3_{4106}, f^3_{4107}, f^3_{4108}, f^3_{4109}, f^3_{41010}$	The level of formation and implementation of radiation and chemical protection of the population and territories	ktr_{49}
4.11	The level of medical protection, sanitation and epidemic welfare of the population	$f^3_{4111}, f^3_{4112}, f^3_{4113}, f^3_{4114}, f^3_{4115}, f^3_{4116}, f^3_{4117}, f^3_{4118}, f^3_{4119}, f^3_{41110}, f^3_{41111}, f^3_{41112}$	The level of organization and provision of medical protection, sanitary and epidemic welfare of the population	ktr_{50}
4.12	Level of biological protection of the population, animals and plants	$f^3_{4121}, f^3_{4122}, f^3_{4123}, f^3_{4124}, f^3_{4125}, f^3_{4126}, f^3_{4127}, f^3_{4128}, f^3_{4129}$	The level of timeliness of detection of biological infection and the possibility of counteracting it	ktr_{51}
4.13	The level of psychological protection of the population	$f^3_{4131}, f^3_{4132}, f^3_{4133}, f^3_{4134}$	The level of psychological protection of the population in the system of territorial development of land use in regions	ktr_{52}
4.14	Level of technological security	$f^3_{4141}, f^3_{4142}, f^3_{4143}, f^3_{4144}, f^3_{4145}, f^3_{4146}, f^3_{4147}, f^3_{4148}, f^3_{4149}, f^3_{41410}, f^3_{41411}$	Level of definition and maintenance of technological safety	ktr_{53}
4.15	Level of fire safety	f^3_{4151}, f^3_{4152}	The level of fire safety in the system of territorial development of land use in regions	ktr_{54}
		$f^3_{4153}, f^3_{4154}, f^3_{4155}$	The level of implementation of fire safety measures in the system of territorial development of land use in regions	ktr_{55}

Table E.38

Characteristics of the low level of selection of factors of territorial development of land use in regions (developed by the authors)

Level	Level characteristics
1	2
Low	The formation and influence of factors on the territorial development of land use at regional level is determined by the absence of these trends, there is no strengthening of spatial support, modern technologies are not used and modern technological processes are not implemented, no spatial information is formed. Urban planning activity is characterized by uncontrolled construction, implementation of the master plan is not ensured, principles of planning and spatial organization of construction are not implemented and implemented, established red lines and building regulation lines are not provided, determination of modes and parameters of construction of one or several land plots is not provided. with building norms, state standards and rules, fulfillment of town-planning conditions and restrictions is not provided, building or other types of use, the formation of the boundaries of the territories of priority development and placement of construction objects at the projected stage 7 is not carried out–10 years, no design, organizational and engineering measures to improve the environmental condition of areas (including suburban), preparing them for construction, no proposals are developed for the location of construction sites, urban development at the forecast stage 7–10 years. Proportions are not provided or violated in relation to: the proportion of residential areas (homestead, low-rise, medium-rise, multi-storey buildings, multifunctional, public housing), green areas of public use, green areas of special purpose, protected areas, landscaped , nurseries and flower greenhouses), industrial, communal and warehouse areas, resort areas, landscape and recreational areas, in particular territories of horticultural societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories history and culture of national and local significance. Planning and limiting factors are not determined (seismic zones and zones of earth surface destruction, landslides, flooding and inundation, tectonic faults and other dangerous natural and anthropogenic processes, zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, landslides, area of occurrence). Sanitary-protective zones industrial enterprises, cemeteries and others utilities about'projects, zones limitation buildings in areas airports with conditions security flights,, counties and zones sanitary protection resorts, zones sanitary protection sources water supply water treatment buildings, protective zones car'era dumps pipelines and others about projects water protection zones and coastal protective stripes reservoirs and watercourses

Continuation of table E.38

1	2
	territory and security zones natural reserves, memory nature architecture stories and culture and zones regulation buildings landscapes which are protected especially valuable productive land), not carried out measures of theirhimdetection. Not are determined, not are realized or are performed only separate measures of engineering, transport software territories for implementation urban planning policy. Not are taken into account directions state and development historical and cultural heritage. There is no increase in the index of construction products, the index of the volume of construction work, the standardized value of the rate of commissioning of housing, standardized value indicator adoption in operation apartments in residential houses by place construction, standardized value general area accepted in operation buildings. Missing directions development spatial software for urban planning activities. Not is provided interaction with basic sub'objects urban planning cadastre and constant receiving from them information, what subject to registration in urban planning cadastre not implemented primary processing,, input control and systematization received data and documents and introduction their inbase data information systems urban planning cadastre not are realized directions growth efficiency formation and using cadastral information and institutions what him provide absence or separately financing works andwith carrying out measures defined program of creation urban planning cadastre and him maintenance formation and maintenance Services urban planning cadastre on state levels, which carried out by score funds state budget on regional and basic (administrative area city) levels – by score funds relevant local budgets or others sources not prohibited by law absence interaction or solution only individual issues authorized bodies urban planning and architecture, bodies technical inventory, land resources, state statistics, management and order state property, state sanitary-epidemiological control, protection surrounding natural environment, control by using and protection cultural heritage, enterprises andwith implementation cartographer-geodetic works and engineering-construction research, others structural units relevant bodies executive authorities and bodies local municipality, what lead your registers and bases data of creation and using urban planning cadastre, absence interaction or solution individual issues in sphere urban planning activities between different groups stakeholders, not is provided level completeness and reliability cadastral information of using lands in urban planning activities. There are no works on soil quality assessment or only certain areas are implemented, economic valuation of lands is not provided, changes in the normative monetary valuation of

Continuation of table E.38

1	2
	lands per hectare of the region are not taken into account, the results are not applied. Expert assessment in the system of monetary valuation of land, does not take into account the coefficients that determine regional differences in the formation of rental income and are determined for land for industry, transport, communications, energy, defense and other purposes, used in the field of land relations, reducing the level of use of all technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular type of production, but not patented («know-how») , rights to use land, buildings, structures, equipment, as well as other property rights, other values. Reducing the level and effectiveness of cooperation on the formation and use of investments in land relations between: houses, buildings, equipment, as well as other property rights and other valuables. Reducing the level and effectiveness of cooperation on the formation and use of investments in land relations between: houses, buildings, equipment, as well as other property rights and other valuables. Reducing the level and effectiveness of cooperation on the formation and use of investments in land relations between: bodies of state power, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local self-government bodies in the system of land use; legal entities and individuals in settlements in the system of land use of regions; landowners and land users; united territorial communities; customers of construction products engaged in building territories; construction companies that provide development of territories; design organizations that ensure the creation of construction projects; research organizations that form materials and data of conducted engineering-geodetic,, engineering-geological others exploratory works and information about installed limitation using territory in approved projects; economic entities of appraisal activity, which carry out cooperation in the field of land use of the regions and which are registered in the manner prescribed by law (individuals – sub'objects entrepreneurial activities, and also legal persons regardless from theirherorganizationally-legal forms and forms property, which carry out economic activity, in warehouse whose working although b one appraiser, and which received certificate sub'project evaluation activities); agricultural enterprises, institutions and organizations,

Continuation of table E.38

1	2
	personal farms and farms; subjects of territorial development on the formation and distribution and use of lands of the nature reserve fund, which are determined by land and water areas with natural complexes and objects of special environmental, ecological, scientific, aesthetic, recreational and other value, which respectively the law provides the status of territories and objects of the nature reserve fund; subjects of territorial development on the formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people; subjects of territorial development on the formation, distribution and use of recreational lands, which are used for recreation, tourism and sporting events; subjects of territorial development on the formation, distribution and use of lands of historical and cultural purpose, which are cultural heritage sites, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums , memorial museums-estates; subjects of territorial development for the formation, distribution and use of forest lands, which are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands, which are provided and used for forestry needs; subjects of territorial development on the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, others water management facilities and canals, as well as land allocated for drainage strips for them; coastal waterways; artificially created land plots within the waters of seaports; subjects of territorial development on the formation, distribution and use of industrial lands, which are provided for the placement and operation of main, auxiliary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, utilities, office buildings, other buildings; subjects of territorial development on the formation, distribution and use of transport lands, which include lands provided to enterprises, institutions and organizations of railway, road and road transport, sea, river, aviation, pipeline transport and urban electric transport to perform their tasks concerning operation, repair and development of transport objects; subjects of territorial development on the formation, distribution and use of communication lands, which are

Continuation of table E.38

1	2
	provided for overhead and cable telephone and telegraph lines and satellite communications; subjects of territorial development on the formation, distribution and use of lands of the energy system, which are provided for power generating facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation to the user; subjects of territorial development for the formation, distribution and use of defense lands provided for the location and permanent operation of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military formations formed in accordance with Ukrainian legislation; public organizations of disabled people of Ukraine, their enterprises (associations), institutions and organizations; religious organizations of Ukraine, the statutes (provisions) of which are registered in the manner prescribed by law, exclusively for the construction and maintenance of religious and other buildings necessary to ensure their activities; educational institutions regardless of the form of ownership for the formation, distribution and use of land in the region; co-owners of an apartment building to maintain such a building and meet the housing, social and household needs of owners (co-owners) and tenants (tenants) of apartments and non-residential premises located in an apartment building; organizations and companies that provide information support for the processes of formation, distribution and use of land in regions; subjects of territorial development on substantiation and maintenance of achievement of rational land use; protection of agricultural lands, forest lands and bushes from their unjustified withdrawal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands; organizations that guarantee security in the field of formation, distribution and use of lands in regions; financial organizations and institutions that provide funding for land use in regions; foreign investors and other subjects of foreign economic activity carrying out activities in the field of land relations in regions;

Continuation of table E.38

1	2
	domestic investors operating in the field of land relations in regions. Absence or realization individual directions formation and implementation innovative programs and projects in sphere using lands in regions, formation and implementation new knowledge and intellectual products in sphere using lands in regions, application modern production equipment and processes formation infrastructure production and entrepreneurship in sphere using lands in regions, implementation organizationally-technical solutions production, administrative, commercial or another character, what substantially improve structure andquality using lands regions, formation and implementation legislative bases for spheres innovative activities, which applies for using lands regions, formation and implementation strategic priority directions innovative activities in sphere using lands in regions, formation and using appropriations for financial support innovative activities in sphere using lands regions, formation innovative product in sphere using lands regions, which is the result implementation innovative project and scientifically-experimental and (or) experimentally-design development new technology (in particularinformation) or products with manufacturing experimental sample or experimental party and meets appropriate requirements, level formation and efficiency functioning innovative enterprises in sphere using lands in regions, which are created in be-which form property, if more than 70 percent volume him products (in monetary measurement) by reporting tax period is innovative products and (or) innovative product and maybe function in in the form of innovative center, business-incubator, technopolis, technopark etc., complete interest-free lending (on conditions inflationary indexing) priority innovative projects by score funds State budget Of Ukraine, funds budget Autonomous Republic Crimea and funds local budgets; partial (to 50%) interest-free lending (on conditions inflationary indexing) innovative projects by score funds State budget Of Ukraine, funds budget Autonomous Republic Crimea and funds local budgets by conditions involvement to financing project the rest necessary funds performer project and (or) others sub'projects innovative activities; complete or partial compensation (by score funds State budget Of Ukraine, funds budget Autonomous Republic Crimea and funds local budgets) percent, paid sub'objects innovative activities commercial banks and others financially-credit establish by lending innovative projects; granting public guarantees commercial banks, what carry out lending priority innovative projects; property insurance implementation innovative projects in insurers in accordance to Of the Law Of Ukraine «About insurance» in sphere using lands regions. It is determined absence or formation and implementation

Continuation of table E.38

1	2
	individual directions creation and using foreign and domestic investment in sphere land relations in regions, not carried out or are realized separate projects public-private partnership. Special economic zones, technology parks are not created, the principle of «single window» is not implemented. Deterioration of the environment or its objects – land, water, subsoil, atmospheric air, flora and fauna and their levels of pollution, the negative impact of territorial development factors on the formed biological diversity and its components, together with genetically modified organisms and their interaction with objects of the natural environment, the negative level of influence of factors, materials, substances, products, energy, physical factors (noise, vibration, electromagnetic radiation, radiation) on the environment and human health, increasing the level of threats and causes of emergencies environmental situations, the results of the elimination of these phenomena, the absence or reduction of the implementation of recommendations for measures to reduce their negative impact on natural objects and human health, the absence or reduction of the use of environmental forecasts, plans and programs, measures, including administrative , which affect the state environmental policy, legislation on environmental protection, reducing the level of implementation of costs,related to the implementation of environmental measures through environmental funds, other sources of funding, the absence or reduction of the application of the results of economic analysis conducted in the decision-making process on environmental issues, reducing the ecological value of water bodies, reducing the level ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; reducing the level of ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules in their management; reducing the level of ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules in their management; summary to minimum formation waste and reduction theirherdanger,, decrease equal software complex using materially-raw materials resources, decrease equal assistance maximum possible disposal waste by direct re or alternative using resource-valuable waste, decrease equal software safe removal waste, what not subject to disposal, by development relevant technologies, environmentally friendly safe methods and funds handling with waste, absence organizations or decrease control by in places or about'objects placing waste for prevention harmful impact their on surrounding natural environment and healthy man, absence or decrease equal implementation complex scientifically-

Continuation of table E.38

1	2
	technical and marketing research for detection and definition resource values waste with purpose their effective using, decrease equal assistance creation about'projects handling with waste, absence software or decrease equal social protection employees, busy in sphere handling with waste, absence software or equal obov'language accounting waste on basis their classification and certification, non-creation conditions for implementation separate collection household waste by introduction socially-economic mechanisms, directed on promotion creators these waste to theirhimseparate collection, absence or decrease equal assistance involvement non-state investment and others extra-budgetary sources financing in sphere handling with waste, absence organizations formation waste on regions, incineration and removal in specially allotted places or objects and the average population, lack of organization for the formation and use of environmental costs that affect the territorial development of land use of regions, lack of organization of formation and use of capital investment for environmental protection by region, lack of organization or reduction standardization and accounting of waste management, reduction of directions of development and implementation of scientifically substantiated standards of waste generation per unit of output (raw materials and energy), lack of directions or reduction of the level of performance of works and provision of services regulating their quantitative and qualitative storage, in accordance to advanced technological achievements, not is provided level periodic viewing installed standards formation waste, directional on reduction theirthemvolumes, with taking into account advanced domestic and foreign experience and economic opportunities, not carried out development and implementation systems handling with packing materials and container, decrease implementation directions formation and implementation systems collection, removal, disposal and disposal spent ink (olive), decrease implementation directions formation systems collection, blanks and disposal worn tire, rubber products and waste rubber production,, decrease implementation directions formation systems blanks and disposal unusable to using transport funds, decrease directions implementation formation systems collection and disposal electric and electronic equipment, decrease implementation directions formation systems collection, removal, disposal, disposal waste, what are formed in process medical service, veterinary practices, related with them experimental works, decrease equal using development common requirements of handling with household waste, absence or decrease efficiency formation and implementation systems information, scientifically-methodical software manufacturers waste information about technological and others opportunities reduction volumes formation and disposal waste, decrease

Continuation of table E.38

1	2
	equal proceedings be-which economic activities, related with education waste, without obtaining from local bodies executive authorities permission on implementation operations in sphere handling with waste in accordance to requirements Of the Law, decrease equal using results scientific research, implementation in practice inventions, application new equipment,, imported equipment, technologies and systems, if they not provide prevention or minimization volumes formation waste on all stages technological process, theirnudedisposal and safe removal, discrepancy ecological norms places placing enterprises, installations, landfills, complexes, storages and others about'projects handling with waste, design and build regional and interregional complexes processing, disposal, disposal and removal waste, if they not meet ecological and sanitary-hygienic requirements, decrease equal efficiency adoption decision about placing and development bridge and others populated items without definition technical and others measures of creation conditions for disposal or removal household waste, abbreviation intensity introduction in action new and reconstructed enterprises and others about'projects, what provided equipment and technologies for safe handling with waste, and in case absence data, necessary for evaluation their impact on surrounding natural environment and healthy'I man, according to with established order, growth equal transmission or sales dangerous waste citizens, enterprises, establish and organizations, if they not provide disposal or removal these waste environmentally friendly safe way, decrease organizations involvement children and teenagers to organized collection waste (as secondary raw materials), dangerous for healthy, permanently violation terms processing waste, imported in Ukraine in accordance to installed quotas conditions, violation installed quotas on import in Ukraine waste as secondary raw materials, growth equal import in Ukraine, by with the exception transit transportation, be-whose waste with purpose theirhimstorage or removal, decrease equal organizations storage and removal waste carried out in accordance to requirements environmental security and ways, what provide maximum using waste or transfer their others consumers (by with the exception burial), decrease implementation directions removal waste, whatcarried out in accordance to installed legislation requirements environmental security with security opportunities disposal or burial residual products by agreement with central body executive authorities, what implements state policy in sphere sanitary and epidemic well-being people, ecrease implementation directions storage and removal waste, which carried out in places, defined authorities local municipality with taking into account requirements land and environmental legislation, by

Continuation of table E.38

1	2
	availability permission on implementation operations in sphere handling with waste, inwhich identified see and number waste, common technical requirements, measures security, data of formation, appointment, methods processing waste in accordance to installed conditions theirhimstorage, decrease implementation directions formation and definition for storage and removal waste places or about'objects, which should to be used only for waste, declared on obtaining permission on implementation operations in sphere handling with waste, decrease organizations burial waste, for disposal whose in Ukraine exist appropriate technology, absence organizations occurrence unauthorized dropping and placing waste, in particularhousehold, in underground horizons, on territory bridge and others populated items, on territories naturally-protected fund, on lands environmental, health, recreational and historically-cultural appointment, inwithin water protection zones and zones sanitary protection aquatic about'projects, in others places, what maybe create danger for surrounding natural environment and healthy'I man, absence implementation directions burial waste in subsoil, which allowed in exceptional cases by results special research andwith compliance standards, norms and rules, provided legislation Of Ukraine, absence software or growth equal prevention pollution them surrounding natural environment, absence organizations directions use measures, directed on prevention accidents, limitation and liquidation theirthemconsequences and protection people and surrounding natural environment from theirhimimpact, absence systems informing about accident, what happened on specified about'project, and about measures, taken for liquidation her consequences,, authorities executive authorities, authorities local municipality and people, decrease directions software operation specified about'projects and transportation dangerous waste andwith compliance requirements environmental legislation,, not implementation or permanently failure licensed conditions on implementation operations in sphere handling with dangerous waste (not subject to licensing storage (accumulation) subject management formed him dangerous waste, if for year with of the day formation dangerous waste are transmitted subjects management, what have license on implementation operations in sphere handling with dangerous waste), absence software identification about'projects handling with dangerous waste in accordance to Of the Law Of Ukraine «About about'objects increased dangers»; planning localization and liquidation accidents on about'project, absence systems formation security measures, absence systems installation reasonable pond environmental tax, what refers toplacing waste, from differentiation depending from equal danger waste and values territory, absence organizations granting sub'objects entrepreneurial

Continuation of table E.38

1	2
	activities, which disposed of, reduce volumes formation waste and implement in production low-waste technology, in accordance to legislation tax, credit and others benefits, non-provision in established legislation order tax, credit and others benefits sub'objects entrepreneurial activities, which rent waste as secondary raw materials and engaged collecting and billet such waste, absence or uncertainty priorities of financing by state contract enterprises, what implement low-waste technology, processed and disposed of waste, absence organizations target financing scientifically-experimental works andwith specific problems disposal waste and reduction theirhimformation, absence organizations of creation funds for target financing measures of disposal waste by score voluntary contributions manufacturers waste, theirthemowners, domestic and foreign sub'projects economic activities, individual citizens, environmental insurance, software formation state bank data of implementation in Ukraine technologies disposal waste etc. Absence or decrease efficiency formation and using systems notification about threat or occurrence emergency situations, informing. Reducing the level of implementation of measures for the creation of protective structures, design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the rules, compliance with the requirements for maintenance and operation of protective structures are determined by the central executive body, which ensures the formation and implementation of state policy in the field of civil protection, maintenance of protective structures of civil protection in readiness for its intended use is carried out by entities management, on the balance of which they are in particular, buildings that are not included in their authorized capital in the process of privatization (corporatization), at their own expense, control over the readiness of civil defense structures for use as intended by the central executive body, which carries out state supervision in the field of man-made and fire safety, together with the relevant bodies and units of civil protection, local state administrations. Reducing the level of formation and efficiency of regional, local and object bodies for evacuation, evacuation planning, identification of safe areas suitable for accommodation of evacuated population and property, organization of notification of business entities and the population about the beginning of evacuation, evacuation management, life support population in their places of safe accommodation, training of the population to act during the evacuation. Reducing the level of zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and

Continuation of table E.38

1	2
	processes, as well as the risk of emergencies related to them; assignment of cities to the relevant groups of civil defense and assignment of business entities to the appropriate categories of civil defense, the level of development and inclusion of requirements for engineering and technical measures of civil defense to the relevant types of urban planning and design documentation and their implementation during construction and operation. dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, Reducing the formation of the organization of measures and the system of engineering protection of territories, medical protection, ensuring sanitary and epidemic welfare of the population, biological protection of the population, animals and plants, psychological protection of the population. Reducing the formation of the system of organization and counteraction of potentially dangerous objects and objects of increased danger, buildings and structures with violation of operating conditions, opportunities for economic entities with critical condition of production assets and violation of operating conditions, opportunities for nuclear installations with violation of conditions operation, development of counteraction to terrorist activity, technological safety of hydraulic structures, uncontrolled import, storage and use on the territory of Ukraine of technogenic dangerous technologies, substances, materials, excessive and unregulated accumulation of household and industrial waste, unsuitable for the use of plant protection products; consequences of military and other environmentally hazardous activities, the formation and efficiency of economic entities at the facilities where the production, storage and disposal of explosives, the emergence of life support facilities in violation of operating conditions, the emergence of other facilities that may create a threat of an accident, reduce the formation and implementation of an automated system for early detection of emergencies and notification of the population in case of their occurrence (at high risk facilities in order to timely identify emergencies and alert staff and the public, which falls into the zone of possible damage, automated systems for early detection of the threat of emergencies and notification of the population in case of their occurrence are created and function). Reducing the efficiency of the system of organization and functioning of fire safety

Table E.39

Characteristics of the level of non-determination, which requires additional training of the neural network for the selection of factors of territorial development of land use in regions (developed by the authors)

Level	Level characteristics
1	2
The level is not a definition that requires additional neural network training	The formation and influence of factors on the territorial development of land use at the regional level is determined by the unsystematic nature of these trends, there is no strengthening of spatial support, modern technologies and modern technological processes are used systematically, spatial information is formed. Urban planning activity is characterized by controlled construction, implementation of certain directions of the general plan is ensured, principles of planning and spatial organization of construction are not systematically implemented and implemented, established red lines and lines of building regulation are provided, modes and parameters of building of one or several land plots are determined. with building codes, state standards and regulations, no the fulfillment of town-planning conditions and restrictions is ensured, the level of provision of the system of engineering networks is substantiated, the formation and organization of transport provision must create conditions for town-planning development, separate projects related to landscaping and landscaping are carried out, the need for eco-network formation is not provided. The formation of ecological and urban characteristics of the planned urban development is not provided with the definition of planning measures to improve the environment, the architectural and spatial composition is not systematically formed, the directions of formation of areas of green public areas, general greening of the inhabited territory, main streets, roads and roads are not systematically implemented. determination of directions of construction (reconstruction) of main streets, use of underground space, construction of bridges, tunnels, transport interchanges, bicycle paths and pedestrian zones, density of street network (with allocation of this indicator for each category of main streets separately), engineering equipment by types (water supply, drainage, gas, electricity,heat supply) and the principles of their development taking into account the outpacing pace of construction in relation to housing, unsystematically performed engineering measures for the development of the territory, including suburban, for development or other uses, unsystematically forming the boundaries of priority areas development and placement of construction projects at the projected stage 7–10 years, unsystematically implemented design, organizational and engineering measures to improve the ecological condition of territories (including suburban), preparing them for

Continuation of table E.39

1	2
	construction, do not develop proposals for the location of construction sites, urban development for the forecast stage 7–10 years. Proportions are provided in relation to: the share of residential areas (homestead, low-rise, medium-rise, multi-storey buildings, multifunctional, public-residential buildings), green areas of common use, green areas of special purpose (protected areas, landscaped flower greenhouses), industrial, communal and warehouse areas, resort areas, landscape and recreational areas, in particular: territories of horticultural societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs, watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories history and culture of national and local significance. history and culture and areas of regulation of buildings, landscapes, which are protected especially valuable productive lands), measures are taken to identify them. Unsystematically determined, implemented or implemented measures for engineering, transport support of territories for the implementation of urban policy. The directions of the state and development of historicalcultural heritage. There is no increase in the index of construction products, the volume of construction work, the standardized value of the commissioning of housing, the standardized value of the commissioning of apartments in residential buildings at the construction site, the standardized value of the total area of commissioned buildings. There are no directions for the development of spatial support for urban planning. Interaction with basic subjects of town-planning cadastre and constant reception from them of the information which is subject to registration in the town-planning cadastre is carried out unsystematically, primary processing, entrance control and systematization of the received data and documents and their entering into a database of information system of town-planning cadastre is not realized–at the expense of the relevant local budgets or other sources not prohibited by law, unsystematic interaction or resolution of issues of authorized bodies of urban planning and architecture, bodies of technical inventory, land resources, state statistics, management and disposal of state property, state sanitary and epidemiological control, environmental protection environment, control over the use and protection of cultural heritage, enterprises for cartographic and geodetic works and civil engineering surveys, other structural units of the relevant executive authorities and local governments that maintain their registers and databases for the creation and use of urban cadastre,inconsistency of interaction or solution of issues in

Continuation of table E.39

1	2
	the field of urban planning activities between different groups of stakeholders, the level of completeness and reliability of cadastral information on land use in urban planning activities is not provided. Non-systemic works on soil quality are carried out or only certain areas are implemented, economic valuation of lands is carried out, changes in the normative monetary valuation of lands per one hectare of the region are taken into account, results are applied unsystematically. Expert assessment in the system of monetary valuation of land, non-systematically take into account the coefficients that determine regional differences in the formation of rental income and are determined for land for industry, transport, communications, energy, defense and other purposes, reduction of the share of the number of settlements that have a normative monetary value in their total number, the use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations is carried out only for individual projects, use movable and immovable property (buildings, structures, equipment and other tangible assets) at the disposal of regional authorities is characterized by efficiency, there is an increase in the formation and use of capital investment aimed at the creation, reconstruction and technical re-equipment of fixed assets used in land relations, an increase in the index of capital investment by region, the effectiveness of intellectual property rights used in land relations, unsystematic the level of use of a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular type of production, but not patented («know-how»), land use rights, buildings, structures , equipment, as well as other property rights, other valuables. Increasing the level and effectiveness of cooperation on the formation and use of investments in the field of land relations, which are non-systemic in nature, between: bodies of state power, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local self-government bodies in the system of land use; legal entities and individuals in settlements in the system of land use in regions; landowners and land users; united territorial communities; customers of construction products engaged in building territories; construction companies that provide development of territories; design organizations that ensure the creation of construction

Continuation of table E.39

1	2
	projects; exploration organizations that generate materials and data on engineering and geodetic, engineering and geological other exploration works and information on the established restrictions on the use of the territory in the approved projects; economic entities of appraisal activity, which carry out cooperation in the field of land use of the regions and which are registered in the manner prescribed by law (individuals – business entities, as well as legal entities, regardless of their organizational and legal form and form of ownership, which carry out economic activities, which include at least one appraiser, and who have received a certificate of the subject of appraisal activities); agricultural enterprises, institutions and organizations, personal farms and farms; subjects of territorial development on the formation and distribution and use of lands of the nature reserve fund, which are determined by land and water areas with natural complexes and objects of special environmental, ecological, scientific, aesthetic, recreational and other value, which respectively the status of territories and objects of the nature reserve fund is granted to the Law; subjects of territorial development on the formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people; subjects of territorial development on the formation, distribution and use of recreational lands, which are used for recreation, tourism and sporting events and subjects of territorial development on the formation, distribution and use of lands of historical and cultural purpose, which are cultural heritage sites, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums , memorial museums-estates andsubjects of territorial development for the formation, distribution and use of forest lands, which are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands, which are provided and used for forestry needs; subjects of territorial development on the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, other water management structures and canals, as well as land allocated for drainage strips for them; coastal waterways; artificially created land plots within the waters of seaports; subjects of territorial development on the formation,

Continuation of table E.39

1	2
	distribution and use of industrial lands, which are provided for the placement and operation of main, auxiliary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their access roads, utilities, office buildings, other buildings; subjects of territorial development on the formation, distribution and use of transport lands, which include lands provided to enterprises, institutions and organizations of railway, road and road transport, sea, river, aviation, pipeline transport and urban electric transport to perform their tasks concerning operation, repair and development of transport objects; subjects of territorial development on the formation, distribution and use of communication lands, which are provided for overhead and cable telephone and telegraph lines and satellite communications; subjects of territorial development on the formation, distribution and use of lands of the energy system, which are provided for power generating facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation to the user; subjects of territorial development for the formation, distribution and use of defense lands provided for the location and permanent operation of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military formations formed in accordance with Ukrainian legislation; public organizations of disabled people of Ukraine, their enterprises (associations), institutions and organizations; religious organizations of Ukraine, the statutes (provisions) of which are registered in the manner prescribed by law, exclusively for the construction and maintenance of religious and other buildings necessary to ensure their activities; educational institutions regardless of the form of ownership for the formation, distribution and use of land in the region; co-owners of an apartment building to maintain such a building and provide satisfaction of residential, social and household needs of owners (co-owners) and tenants (tenants) of apartments and non-residential premises located in an apartment building; organizations and companies that provide information support for the processes of formation, distribution and use of land in regions; subjects of territorial development on substantiation and maintenance of achievement of rational land use; protection of agricultural lands, forest lands and bushes from their unjustified withdrawal for other needs; protection of lands from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by

Continuation of table E.39

1	2
	industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands; organizations that guarantee security in the field of formation, distribution and use of lands in regions; financial organizations and institutions that provide funding for land use in regions; foreign investors and other subjects of foreign economic activity carrying out activities in the field of land relations in regions; domestic investors operating in the field of land relations in regions. Unsystematic implementation of directions of formation and implementation of innovative programs and projects in the field of land use oin regions, formation and implementation of new knowledge and intellectual products in the field of land use in regions, application of modern production equipment and processes of formation of infrastructure of production and entrepreneurship in the field of land use of regions, implementation of organizational and technical solutions of production, administrative, commercial or other nature. The quality of land use in the regions, the formation and implementation of the legal framework for innovation, which is used for the use of land in the regions, the formation and implementation of strategic priorities for innovation in the use of land in the regions, the formation and use of appropriations full interest-free lending (on the terms of inflation indexation) of priority innovation projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets; partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other subprojects of innovative activity; full or partial compensation (at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets), paid by subjects of innovation activity to commercial banks and other financial and credit institutions for crediting of innovative projects; providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use of the regions.

Continuation of table E.39

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	It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in the region, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented. providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use in regions. It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in regions, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented. providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use in regions. It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in regions, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented. property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use of the regions. It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in the region, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented. property insurance for the implementation of innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use of the regions. It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in the region, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented.

Continuation of table E.39

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	Unsystematic improvement of the environment or its objects in some regions – land, water, subsoil, atmospheric air, flora and fauna and their levels affecting the state environmental policy, environmental legislation, reducing the level of costs associated with the implementation of environmental measures through environmental funds, other sources of funding, the absence or reduction of the application of the results of economic analysis conducted in the process decision-making on environmental issues, reducing the ecological significance of water bodies, reducing the level of ensuring the complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules in their management; minimizing waste generation and reducing its hazard, related to the implementation of environmental measures through environmental funds, other sources of funding, the absence or reduction of the application of the results of economic analysis conducted in the decision-making process on environmental issues, reducing the ecological value of water bodies, reducing the level ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; minimizing waste generation and reducing its hazard, related to the implementation of environmental measures through environmental funds, other sources of funding, the absence or reduction of the application of the results of economic analysis conducted in the decision-making process on environmental issues, reducing the ecological value of water bodies, reducing the level ensuring complete collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; minimizing waste generation and reducing its hazard, concerning the environment, reduction of ecological value of water objects, decrease in level of maintenance of full collection and timely neutralization and removal of waste, and also observance of rules of ecological safety at their handling; minimizing waste generation and reducing its hazard, concerning the environment, reduction of ecological value of water objects, decrease in level of maintenance of full collection and timely neutralization and removal of waste, and also observance of rules of ecological safety at their handling; minimizing waste generation and reducing its hazard, reducing the level of ensuring the integrated use of material and raw material resources, reducing the level of promoting the maximum possible disposal of waste through direct re-use or alternative use of resource-valuable waste, reducing the level of safe disposal of non-recyclable waste by developing appropriate technologies, environmentally friendly methods and means of waste management, lack of organization or reduction of control over waste disposal sites

Continuation of table E.39

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	or facilities to prevent their harmful effects on the environment and health identification of opportunities and application of a set of scientific, technical and marketing research to identify and determine the resource value of waste in order to effectively use it, promote the creation of waste management facilities, identified and implemented social protection of workers employed in the fieldwaste management, lack of provision or level of mandatory accounting of waste on the basis of their classification and certification, creation of conditions for separate collection of household waste by introducing socio-economic mechanisms aimed at encouraging generators of this waste to separate collection, lack or reduction of promotion of non-state investments and other extra-budgetary sources of financing in the field of waste management, lack of organization of waste generation by regions, incineration and disposal in specially designated places or facilities and the average population, lack of organization for formation and use of environmental costs, which affect the territorial development of land use in the regions,organized interaction of stakeholders on the formation and use of capital investment in environmental protection by region, lack of organization or reduction of regulation and accounting of waste management, reduction of development and implementation of scientifically sound standards for waste generation per unit of production (raw materials and energy), lack of directions or reducing the level of work and services that regulate their quantitative and qualitative composition, in accordance with advanced technological advances,reduction of directions of development and introduction of scientifically substantiated standards of waste generation per unit of production (raw materials and energy), lack of directions or reduction of the level of performance of works and provision of services regulating their quantitative and qualitative composition, in accordance with advanced technological achievements,reduction of directions of development and introduction of scientifically substantiated standards of waste generation per unit of production (raw materials and energy), lack of directions or reduction of the level of work performance and provision of services regulating their quantitative and qualitative composition, in accordance with advanced technological achievements, the level of periodic revision of the established standards of waste generation, aimed at reducing their volume, taking into account the best domestic and foreign experience and economic opportunities, does not develop and implement a system for handling packaging materials and packaging, reducing the implementation of areas formation and implementation of the system of collection, removal, disposal and utilization of waste oils (oils), reducing the implementation of the formation of the

Continuation of table E.39

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	system of collection, procurement and disposal of worn tires, rubber products and waste rubber production, reducing the implementation of the system of procurement and disposal of unusable vehicles , reduction of directions of realization of formation of system of collecting and utilization of electric and electronic equipment, reduction of realization of directions of formation of system of collecting, removal, neutralization, utilization of the waste generated in the course of medical service, veterinary practice, the research works connected with them, decrease in level of use of development of the general requirements concerning treatment of householdwaste, lack or reduction of efficiency of formation and realization of system of information, scientific and methodical maintenance of producers of waste with information on technological and other possibilities of reduction of volumes of formation and utilization of waste, increasing the level of any economic activity related to waste generation without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements of the Law, reducing the level of use of research results, implementation of inventions, application of new equipment, imported equipment, technologies and systems, if they do not provide prevention or minimization of waste generation at all stages of the technological process, their utilization and safe disposal, non-compliance with environmental standards enterprises, installations, landfills, complexes, storages and other objects of waste management, to design and build regional and interregional complexes of processing, neutralization, utilization and removal of waste if they do not meet ecological and sanitary and hygienic requirements,reducing the efficiency of decision-making on the location and development of cities and other settlements without defining technical and other measures to create conditions for disposal or disposal of household waste, reducing the intensity of commissioning of new and reconstructed enterprises and other facilities equipped with equipment and technology for the safe management of waste, and in the absence of data necessary to assess their impact on the environment and human health, in accordance with the established procedure, increase the level of transfer or sale of hazardous waste to citizens, enterprises, institutions and organizations, if they are not ensure the disposal or disposal of this waste in an environmentally safe way, reduce the organization of the involvement of children and adolescents in the organized collection of waste (as a secondary raw material),dangerous to health, permanent violation of the terms of processing of waste imported into Ukraine in accordance with the conditions established by quotas, violation of the established quotas for import of waste into

Continuation of table E.39

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	Ukraine as a secondary raw material, increase in the level of import to Ukraine, except for transit transportation, of any waste for the purpose of their storage or disposal, decrease in the level of organization of storage and disposal of waste are carried out in accordance with environmental safety requirements and methods that ensure maximum use of waste ortransfer them to other consumers (except for disposal), organized the implementation of waste disposal, which is carried out in accordance with statutory environmental safety requirements with mandatory provision of disposal or disposal of residual products in consultation with the central executive body implementing state policy in the field sanitary and epidemic welfare of the population, organized the implementation of areas of storage and disposal of waste, which is carried out in places designated by local governments, taking into account the requirements of land and environmental legislation, with a permit for operations in the field of waste management. , general technical requirements, safety measures, information on education, purpose,methods of waste treatment in accordance with the established conditions of their storage, organized implementation of directions of formation and definition for storage and disposal of waste places or objects that should be used only for waste, applied for a permit for operations in the field of waste management, growth of the organization waste disposal, for the disposal of which in Ukraine there is a corresponding technology, organized the emergence of unauthorized dumping and disposal of waste, including household, in underground horizons, in cities and other settlements, in nature reserves, on lands of conservation, health, recreation and historical and cultural purpose, within water protection zones and zones of sanitary protection of water objects, in other places,which can create a danger to the environment and human health, organized implementation of areas waste disposal in the subsoil, which is allowed in exceptional cases based on the results of special studies in compliance with the standards, norms and rules provided by the legislation of Ukraine, the absence ensuring or increasing the level of prevention of environmental pollution, organized ways to take measures to prevent accidents, limit and eliminate their consequences and protect people and the environment from their impact, developed a system of information about the accident that occurred at the site , and on the measures taken to eliminate its consequences, the executive authorities, local governments and the population, but there is a decrease in the level of its use, reducing the areas of operation of these facilities and transportation of hazardous waste in compliance with environmental legislation, unsystematic non-compliance with licensing conditions for operations in the field of

Continuation of table E.39

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	hazardous waste management (not subject to licensing storage (accumulation) of hazardous waste generated by the business entity, if within a year from the date of hazardous waste economic entities that have a license to carry out operations in the field of hazardous waste management), organized the identification of hazardous waste management facilities in accordance with the Law of Ukraine «On high-hazard facilities»; planning of localization and liquidation of accident on object, lack of a system of security measures, developed a system for setting reasonable rates of environmental tax, relating to waste disposal, with differentiation depending on the level of danger waste and territory values, unsystematic organization of providing business entities that recycle, reduce waste and introduce low-waste technologies into production, in accordance with the legislation of tax, credit and other benefits, failure to provide tax, credit and other benefits to business entities in the manner prescribed by law, who hand over waste as a secondary raw material and are engaged in the collection and procurement of such waste, identified priorities for financing under the state contract of enterprises implementing low-waste technologies, waste treatment and disposal, formed a system of targeted funding for research on specific waste disposal and generation. ,,Organized and unsystematically implemented areas for the creation of funds for targeted financing of waste disposal activities through voluntary contributions of waste producers, their owners, domestic and foreign economic entities, individuals, environmental insurance, ensuring the formation of a state data bank on the introduction of technologies in Ukraine waste disposal, etc. Unsystematic formation and use of the system of notification of the threat or occurrence of emergencies, information. Unsystematic implementation of measures for the creation of protective structures, design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the rules, compliance with maintenance and operation requirements protective structures are determined by the central executive body, which ensures the formation and implementation of state policy in the field of civil protection, maintenance of civil protection structures ready for use for their intended purpose is carried out by economic entities on whose balance they are (including buildings not included in their authorized capital in the process of privatization (corporatization), at their own expense, control over the readiness of protective structures of civil defense for use as provided by the central executive body, which carries out state supervision in the field of man-made and fire safety, together with relevant authorities and civil defense units, local state administrations.

Continuation of table E.39

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	Unsystematic formation and ensuring the effectiveness of regional, local and object bodies for evacuation, evacuation planning, identification of safe areas suitable for accommodation of evacuated population and property, organization of notification of business leaders and the population about the beginning of evacuation, evacuation management, life support population in their places of safe accommodation, training of the population to act during the evacuation. Unsystematic zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergencies related to them; assignment of cities to the relevant groups of civil defense and assignment of business entities to the appropriate categories of civil defense, the level of development and inclusion of requirements for engineering and technical measures of civil defense to the relevant types of urban planning and design documentation and their implementation during construction and operation. dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, special purpose buildings, their maintenance in functional condition, the level of completeness and regularity of inspection of buildings, structures, utilities and transport communications, development and implementation of measures for their safe operation, implementation of other measures of engineering protection of territories depending on the situation. Unsystematic formation of the organization of measures and system of engineering protection of territories, medical protection, ensuring sanitary and epidemic well-being of the population, biological protection of the population, animals and plants, psychological protection of the population. Reducing the formation of the system of organization and counteraction of potentially dangerous objects and objects of increased danger, buildings and structures with violation of operating conditions, opportunities for economic entities with critical condition of production assets and violation of operating conditions, opportunities for nuclear installations with violation of conditions operation, development of counteraction to terrorist activity, technological safety of hydraulic structures, uncontrolled import, storage and use on the territory of Ukraine of technogenic dangerous technologies, substances, materials, excessive and unregulated accumulation of household and industrial waste, unsuitable for the use of plant protection products; consequences of military and other environmentally hazardous activities, the formation and efficiency of economic entities at the facilities where the production, storage and disposal of explosives, the emergence

Continuation of table E.39

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	of life support facilities in violation of operating conditions, the emergence of other facilities that may create a threat of an accident, unsystematic formation and implementation of an automated system for early detection of emergencies and notification of the population in case of their occurrence (at high risk facilities in order to timely identify emergencies and alert personnel and the population, which falls into the zone of possible damage, automated systems for early detection of the threat of emergencies and notification of the population in case of their occurrence are created and function). The system of the organization and functioning of fire safety is formed, efficiency of its functioning for separate actions is provided

Table E.40

Characteristics of the level of inclusion of factors of territorial development of land use in regions (developed by the authors)

Level	Level characteristics
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The level of inclusion of factors of territorial development of land use in regions	The formation and influence of factors on the territorial development of land use at the regional level is determined by the systemic nature of these trends, there is a strengthening of spatial support, systematically applied modern technologies and modern technological processes, the formation of spatial information. Urban planning activity is characterized by controlled construction, implementation of all directions of the general plan is ensured, principles of planning and spatial organization of construction are systematically implemented and realized, established red lines and lines of building regulation, definition of modes and parameters of building of one or several land plots is provided. norms, state standards and rules, ensures the implementation of urban conditions and restrictions,–10 years, systematically project, organizational and engineering-technical measures on improvement of an ecological condition of territories (in particular suburban), their preparation for building are realized, offers concerning placement of objects of construction, maintenance of town-planning development on a forecast stage 7 are developed–10 years. Proportions are provided in relation to: the share of residential areas (homestead, low-rise, medium-rise, multi-storey buildings, multifunctional, public-residential buildings), green areas of common use, green areas of special purpose (protected areas, landscaped flower greenhouses), industrial, communal and warehouse areas, resort areas, landscape and recreational areas, in particular: territories of horticultural societies, country houses, recreation and leisure establishments, resort hotels, forests, forest parks, meadow parks, botanical parks, landscape parks, reservoirs,

Continuation of table E.40

1	2
	watercourses, objects of nature reserve fund, agricultural territories, territories of engineering infrastructure, territories history and culture of national and local significance. Planning and limiting factors are systematically determined (seismic zones and zones of earth surface destruction, landslides, flooding and inundation, tectonic faults and other dangerous natural and anthropogenic processes, zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, corrosion, area). Sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitaryprotection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection zones of reservoirs and watercourses, territories and protection zones of nature reserves, monuments of nature, architecture, history and culture and zones of regulation of buildings, landscapes protected by especially valuable productive lands) are carried out). measures to identify them. Systematically defined, implemented or implemented measures for engineering, transport support of territories for the implementation of urban policy. The directions of the state and development of historical and cultural heritage are taken into account. There is an increase in the index of construction products, the index of the volume of construction work, standardized value of the indicator of commissioning of housing, standardized value of the indicator of commissioning of apartments in residential buildings at the place of construction, standardized value of the total area of commissioned buildings. The directions of development of spatial support for town-planning activity are observed. Systematically interacts with the basic subjects of urban cadastre and constant receipt of information from them, which is subject to registration in the urban cadastre, primary processing, input control and systematization of data and documents and their entry into the database of information system of urban cadastre, systematically implemented areas increasing the efficiency of the formation and use of cadastral information and institutions that provide it,–at the expense of the relevant local budgets or other sources not prohibited by law, systematic interaction or resolution of authorized bodies of urban planning and architecture, bodies of technical inventory, land resources, state statistics, management and disposal of state property, state sanitary and epidemiological control, environmental protection environment, control over the use and protection of cultural heritage, enterprises for cartographic and geodetic works and civil engineering

Continuation of table E.40

1	2
	surveys, other structural units of the relevant executive authorities and local governments that maintain their registers and databases for the creation and use of urban cadastre,inconsistency of interaction or solution of issues in the field of urban planning activities between different groups of stakeholders, the level of completeness and reliability of cadastral information on land use in urban planning activities is not provided. Systematically, soil evaluation works are carried out or only certain areas are implemented, economic valuation of lands is carried out, changes in the normative monetary valuation of lands per hectare of the region are taken into account, the results of expert evaluation in the land monetary valuation system are systematically applied, the determining factors are systematically taken into accountregional differences in the formation of rental income and are determined for land for industry, transport, communications, energy, defense and other purposes, increase in the share of settlements that have a normative monetary value in their total number, the use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations is carried out for projects, use of movable and real estate (buildings, structures, equipment and other tangible assets), which is at the disposal of regional authorities, is characterized by efficiency, there is an increase in the formation and use of capital investment aimed at the creation, reconstruction and technical re-equipment of fixed assets used in land relations, an increase in the index of capital investment by region, the effectiveness of intellectual property rights used in land relations, systemic the level of use of a set of technical, technological, commercial and other knowledge, designed in the form of technical documentation, skills and production experience required for the organization of a particular type of production, but not patented ("know-how"), land use rights, buildings, structures , equipment, as well as other property rights, other valuables. Increasing the level and effectiveness of cooperation on the formation and use of investments in the field of land relations, which are non-systemic in nature, between: bodies of state power, the Verkhovna Rada of the Autonomous Republic of Crimea, the Council of Ministers of the Autonomous Republic of Crimea and local self-government bodies in the system of land use; legal entities and individuals in settlements in the system of land use in regions; landowners and land users; united territorial communities; customers of construction products engaged in building territories; construction companies that provide development of

Continuation of table E.40

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	territories; design organizations that ensure the creation of construction projects; survey organizations that form materials and data on the conducted engineering and geodetic, engineering and geological other survey works and information on the established restrictions on the use of the territory in the approved projects; business entities of valuation activities thatcarry out cooperation in the field of land use of regions and which are registered in the manner prescribed by law (individuals – business entities, as well as legal entities, regardless of their organizational and legal form and form of ownership, which carry out economic activities, which include at least one appraiser, and who have received a certificate of the subject of appraisal activities); agricultural enterprises, institutions and organizations, personal farms and farms; subjects of territorial development on the formation and distribution and use of lands of the nature reserve fund, which are determined by land and water areas with natural complexes and objects of special environmental, ecological, scientific, aesthetic, recreational and other value, which respectively the law provides the status of territories and objects of the nature reserve fund; subjects of territorial development on the formation, distribution and use of health lands that have natural medicinal properties, which are used or can be used for disease prevention and treatment of people; subjects of territorial development on the formation, distribution and use of recreational lands, which are used for recreation, tourism and sporting events; subjects of territorial development on the formation, distribution and use of lands of historical and cultural purpose, which are cultural heritage sites, their complexes (ensembles), historical and cultural reserves, historical and cultural protected areas, protected archaeological sites, open-air museums , memorial museums-estates; subjects of territorial development for the formation, distribution and use of forest lands, which are covered with forest vegetation, as well as not covered with forest vegetation, non-forest lands, which are provided and used for forestry needs; subjects of territorial development on the formation, distribution and use of water fund lands, which are determined by seas, rivers, lakes, reservoirs, other water bodies, swamps, as well as islands not occupied by forests; coastal protection strips along seas, rivers and around water bodies, except for lands occupied by forests; hydraulic, other water management

Continuation of table E.40

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	structures and canals, as well as land allocated for drainage strips for them; coastal strips of waterways; artificially created land plots within the seaports, subjects of territorial development for the formation, distribution and use of industrial lands, which are provided for the placement and operation of main, auxiliary and auxiliary buildings and structures of industrial, mining, transport and other enterprises, their subdivisions. roads, engineering networks, administrative and household buildings, other structures; subjects of territorial development on the formation, distribution and use of transport lands, which include lands provided to enterprises, institutions and organizations of railway, road and road transport, sea, river, aviation, pipeline transport and urban electric transport to perform their tasks regarding operation, subjects of territorial development on the formation, distribution and use of communication lands, which are provided for overhead and cable telephone and telegraph lines and satellite communications; subjects of territorial development on the formation, distribution and use of lands of the energy system, which are provided for power generating facilities (nuclear, thermal, hydroelectric power plants, power plants using wind and solar energy and other sources), for electricity transportation to the user; subjects of territorial development for the formation, distribution and use of defense lands provided for the location and permanent operation of military units, institutions, military educational institutions, enterprises and organizations of the Armed Forces of Ukraine, other military formations formed in accordance with Ukrainian legislation; public organizations of disabled people of Ukraine, their enterprises (associations), institutions and organizations; religious organizations of Ukraine, the statutes (provisions) of which are registered in the manner prescribed by law, exclusively for the construction and maintenance of religious and other buildings necessary to ensure their activities; educational institutions regardless of the form of ownership for the formation, distribution and use of land in the region; co-owners of an apartment building to maintain such a building and ensure the satisfaction of residential, social and household needs of owners (co-owners) and tenants (tenants) of apartments and non-residential premises located in an apartment building; organizations and companies that provide information support for the processes of formation, distribution and use of land in the regions; subjects of territorial development on substantiation and maintenance of achievement of rational land use; protection of agricultural lands, forest lands and bushes from their unjustified withdrawal for other needs; protection of lands

Continuation of table E.40

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	from erosion, mudslides, flooding, waterlogging, secondary salinization, overdrying, compaction, contamination by industrial waste, chemical and radioactive substances and from other adverse natural and man-made processes; conservation of natural wetlands; prevention of deterioration of aesthetic condition and ecological role of anthropogenic landscapes; conservation of degraded and unproductive agricultural lands; standardization and rationing in the field of land protection and soil fertility reproduction; use of man-made contaminated lands; organizations that guarantee security in the field of formation, distribution and use of lands in regions; financial organizations and institutions that provide funding for land use in regions; foreign investors and other subjects of foreign economic activity carrying out activities in the field of land relations in regions; domestic investors operating in the field of land relations in regions. Systematic implementation of directions of formation and implementation of innovative programs and projects in the field of land use in regions, formation and implementation of new knowledge and intellectual products in the field of land use in regions, application of modern production equipment and processes of formation of infrastructure of production and entrepreneurship in the field of land use in regions, implementation of organizational and technical solutions of production, administrative, commercial or other nature. quality of land use in regions, formation and implementation of the legal framework for innovation, which is used for the use of land in the regions, systematic formation and implementation of strategic priorities for innovation in the use of regional lands, systematic formation and use of allocations for financial support of innovation lands of regions,systematic formation of an innovative product in the field of land use in regions, which is the result funds from the budget of the Autonomous Republic of Crimea and funds from local budgets; partial (up to 50%) interest-free lending (on terms of inflation indexation) of innovative projects at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets provided that other necessary funds of the project executor and (or) other subprojects of innovative activity; full or partial compensation (at the expense of the State Budget of Ukraine, the budget of the Autonomous Republic of Crimea and local budgets) of interest paid by the subjects of innovation to commercial banks and other financial institutions for lending to innovative projects; providing state guarantees to commercial banks lending to priority innovation projects; property insurance for the implementation of

Continuation of table E.40

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	innovative projects by insurers in accordance with the Law of Ukraine «On Insurance» in the field of land use in regions. It is determined by the absence or formation and implementation of certain areas of creation and use of foreign and domestic investments in the field of land relations in regions, no individual public-private partnership projects are implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual in regions is being implemented. individual public-private partnership projects are not implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a "single window" for individual in regions is being implemented. individual public-private partnership projects are not implemented or implemented. Special economic zones and technology parks are being systematically created, and the principle of a «single window» for individual regions is being implemented. Systematic improvement of the environment or its objects in certain regions – land, water, subsoil, atmospheric air, flora and fauna and their levels of pollution, the positive impact of territorial development factors on the formed biological diversity and its components, together with genetically modified organisms and their interaction with related to the implementation of environmental measures at the expense of environmental protection funds, other sources of funding, systematic implementation of the results of economic analysis conducted in the decision-making process on environmental issues, reducing the ecological value of water bodies, systematic full collection and timely disposal and disposal of waste, as well as compliance with environmental safety rules when handling them; minimizing waste generation and reducing its hazard, systematic provision of complete collection and timely disposal and removal of waste, as well as compliance with environmental safety rules in their management; minimizing waste generation and reducing its hazard, systematic provision of complete collection and timely disposal and removal of waste, as well as compliance with environmental safety rules in their management; minimizing waste generation and reducing its hazard, systematic provision of integrated use of material and raw material resources, increasing the promotion of the maximum possible utilization of waste through direct reuse or alternative use of resource and valuable waste, ensuring the safe disposal of non-recyclable waste through the development of appropriate technologies, environmentally sound methods and means of waste management, lack of organization or reduced control over waste disposal sites or facilities to prevent adverse effects on the environment and

Continuation of table E.40

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	health. human identification, systematic identification of opportunities and application of a set of scientific, technical and marketing research to identify and determine the resource value of waste for their effective use, systematic assistance to the creation of waste management facilities, identified and implemented social protection of employees with waste, system support or level of obligatory accounting of waste on the basis of their classification and certification,creating conditions for the implementation of separate collection of household waste by introducing socio-economic mechanisms aimed at encouraging the generators of these wastes to collect them separately, systematically promoting non-state investments and other extrabudgetary sources of funding in the field of waste management, systematic organization of waste generation by region, incineration and disposal in designated areas or and average population, systemic organization for the formation and use of environmental costs that affect the territorial development of land use of regions, systematic organized interaction of stakeholders for the formation and use of capital investment in environmental protection by region, systemic organization or growth rationing and accounting of waste management,growth of directions of development and introduction of scientifically substantiated norms of waste generation per unit of production (raw materials and energy), systematic realization of directions or growth of level of performance of works and rendering of services regulating their quantitative and qualitative structure, according to advanced technological achievements, the level of periodic revision of the established standards of waste generation, aimed at reducing their volume, taking into account the best domestic and foreign experience and economic opportunities, systematization and implementation of the system of handling packaging materials and packaging, increasing the implementation of areas formation and implementation of the system of collection, removal, disposal and utilization of waste oils, growth of sales of the system of collection, procurement and disposal of worn tires, rubber products and waste rubber production, reducing the implementation of the formation of the system of procurement and disposal of unusable vehicles , reduction of directions of realization of formation of system of collecting and utilization of electric and electronic equipment, growth of realization of directions of formation of system of collecting, removal, neutralization, utilization of the waste generated in the course of medical service, veterinary practice, the research works connected with them, growth of level of use of development of the general requirements for household waste management, growth of efficiency of formation and realization of system informational, scientific and methodological support of waste producers with information about technological and other opportunities to reduce

Continuation of table E.40

1	2
	volumes waste generation and disposal, systematic growth of the level of any economic activity related to waste generation, without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements of the Law, increasing the level of use of research results, implementation of inventions, application of new equipment, imported equipment, technologies and systems, if they do not provide prevention or minimization of waste generation at all stages of the technological process, their utilization and safe disposal, compliance with environmental standards enterprises, installations, landfills, complexes, storages and other objects of waste management, to design and build regional and interregional complexes of processing, neutralization, utilization and removal of waste if they do not meet ecological and sanitary and hygienic requirements,increasing the level of efficiency of decision-making on the location and development of cities and other settlements without defining technical and other measures to create conditions for disposal or disposal of household waste, increasing the intensity of commissioning of new and reconstructed enterprises and other facilities equipped with equipment and technology for safe waste management, and in the absence of data necessary to assess their impact on the environment and human health, in accordance with the established procedure, reduce the level of transfer or sale of hazardous waste to citizens, enterprises, institutions and organizations, if they are not ensure the disposal or disposal of this waste in an environmentally friendly way, increase the organization of involvement of children and adolescents in organized waste collection (as a secondary raw material),dangerous to health, permanent violation of the terms of processing of waste imported into Ukraine in accordance with the conditions established by the quotas, the absence of violations of the established quotas for the import of waste into Ukraine as a secondary raw material, reduction of the level of import to Ukraine, except for transit transportation, of any waste for storage or disposal, increase of the level of organization of storage and disposal of waste are carried out in accordance with environmental safety requirements and methods that ensure maximum use of waste or transfer to other consumers. except for landfilling), systematically organized implementation of waste disposal areas, which is carried out in accordance with the requirements of environmental safety established by law. Mandatory provision of the possibility of disposal or disposal of residual products in coordination with the central executive body implementing the state policy in the field of sanitary and epidemiological welfare of the population, systematically organized implementation of storage and disposal of waste, carried out in places designated by local governments

Continuation of table E.40

1	2
	requirements of land and environmental legislation, in the presence of a permit for operations in the field of waste management, which defines the types and quantities of waste, general technical requirements, safety measures, information on generation, purpose, methods of waste treatment in accordance with established storage conditions, system organized implementation of areas of formation and definition for storage and disposal of waste sites or facilities,which should be used only for waste declared for obtaining a permit for operations in the field of waste management, growth of waste disposal, for the disposal of which in Ukraine there is a technology, systematically organized unauthorized dumping and disposal of waste, including household, in underground horizons , on the territory of cities and other settlements, on the territories of nature reserve fund, on lands of nature protection, health-improving, recreational and historical-cultural purpose, within water protection zones and zones of sanitary protection of water objects, in other places, which may create danger for the environment and human health, systematically organized implementation of waste disposal in the subsoil,which is allowed in exceptional cases based on the results of special studies in compliance with the standards, norms and rules provided by the legislation of Ukraine, ensuring or increasing the level of prevention of environmental pollution, organized directions of measures aimed at preventing accidents, limiting and eliminating their consequences and protecting people and the environment from their impact, developed a system of information about the accident that occurred at the site , and on the measures taken to eliminate its consequences, executive authorities, local governments and the population, there is a decrease in its use, growth of areas of operation of these facilities and transportation of hazardous waste in compliance with environmental legislation, systematic implementation of licensing conditions for carrying out operations in the field hazardous waste management (not subject to licensing of storage (accumulation) of hazardous waste generated by the business entity, if within a year from the date of generation hazardous waste is transferred to business entities licensed to carry out operations in the field of hazardous waste management), systemically organized the identification of hazardous waste management facilities in accordance with the Law of Ukraine «On high-risk facilities»; planning of localization and liquidation of accident on object, systems of formation of safety measures are developed and implemented, the system of establishment of the reasonable rates of the ecological tax is developedrelating to waste disposal, with differentiation depending on the level of danger waste and values of the territory, systemic organization of providing business entities that utilize, reduce waste generation and

Continuation of table E.40

1	2
	introduce into production low-waste technologies, in accordance with the legislation of tax, credit and other benefits, failure to provide tax, credit and other benefits in accordance with law business entities that hand over waste as a secondary raw material and are engaged in the collection and procurement of such waste, identified priorities for financing under the state contract of enterprises that implement low-waste technologies, process and dispose of waste, formed and implemented a system of targeted funding for research problems of waste utilization and reduction of their generation,Organized and systematically implemented areas for the creation of funds for targeted financing of waste disposal activities through voluntary contributions of waste producers, their owners, domestic and foreign economic entities, individuals, environmental insurance, ensuring the formation of a state data bank on the introduction of technologies in Ukraine waste disposal, etc. Systematic formation and use of the system of notification of the threat or occurrence of emergencies, information. Systematic implementation of measures for the creation of protective structures, design, construction, adaptation and placement of protective structures and dual-use facilities are carried out in accordance with the rules, compliance with the requirements for the maintenance and operation of protective structures are determined by the central executive body, which ensures the formation and implementation of state policy in the field of civil protection, maintenance protective structures of civil protection in readiness for intended use is carried out by business entities on the balance of which they are (in particular, structures that are not included in their authorized capital in the process of privatization (corporatization), at their own expense, control over the readiness of civil protection structures protection for use for its intended purpose, provided by the central body of executive power, which carries out state supervision in the field of man-made and fire safety, together with the relevant bodies and units of civil protection, local state administrations. Systematic formation and ensuring the effectiveness of regional, local and object bodies for evacuation, evacuation planning, identification of safe areas suitable for accommodation of evacuated population and property, organization of notification of business leaders and the population about the beginning of evacuation, evacuation management, life support population in their places of safe accommodation, training of the population to act during the evacuation. Systematic zoning of territories in the presence of potentially dangerous objects and dangerous geological, hydrogeological and meteorological phenomena and processes, as well as the risk of emergencies related to them; assignment of cities to the

Continuation of table E.40

1	2
	relevant groups of civil defense and assignment of business entities to the appropriate categories of civil defense, the level of development and inclusion of requirements for engineering and technical measures of civil defense to the relevant types of urban planning and design documentation and their implementation during construction and operation. dangerous geological, hydrogeological and meteorological phenomena and processes and negative consequences of accidents during the development of general plans of settlements and urban planning, measures for their safe operation, implementation of other measures of engineering protection of territories depending on the current situation. Systematic formation of the organization of measures and system of engineering protection of territories, medical protection, maintenance of sanitary and epidemic well-being of the population, biological protection of the population, animals and plants, psychological protection of the population. Growth of directions of formation of the system of the organization and maintenance of counteraction of potentially dangerous objects and objects of the increased danger , buildings and constructions with infringement of conditions of operation, possibilities of occurrence of subjects of managing with a critical condition of industrial assets and infringement of conditions of operation. violation of operating conditions, development of counteraction to terrorist activity, ensuring technological safety of hydraulic structures, uncontrolled import, storage and use on the territory of Ukraine of technogenic dangerous technologies, substances, materials, excessive and unregulated accumulation of household and industrial waste, unsuitable for the use of plant protection products; consequences of military and other environmentally hazardous activities, the formation and efficiency of economic entities at the facilities where the production, storage and disposal of explosives, the emergence of life support facilities in violation of operating conditions, the emergence of other facilities that may create a threat of an accident, systematic formation and implementation of an automated system for early detection of the threat of emergencies and notification of the population in case of their occurrence (at high risk facilities in order to timely detect the threat of emergencies and alert staff and the public, which falls into the zone of possible damage, automated systems for early detection of the threat of emergencies and notification of the population in case of their occurrence are created and function). The system of the organization and functioning of fire safety is formed and introduced, efficiency of its functioning for separate actions is provided

Annex F

Criteria for assessing the indicators of territorial development of land use in regions

Table F.1

Scoring criteria determined by experts for indicators of the level of stimulation and financing of regional development (developed by the authors)

The value of points	Characteristics by which points are determined
1	2
0	There are no programs to stimulate the development of the region, no relevant areas are funded, no strategy for the development of the region is developed, no ways to overcome the crisis are identified, no system of spatial information is provided to ensure regional development, no spatial development in regions
1	Programs have been developed to stimulate the development of the region, but there is no funding for them, relevant areas of development are not funded, a strategy for region's development has not been implemented, ways to overcome crises have not been identified, spatial information has been formed to ensure regional development in regions, spatial proportions are not provided, there are no directions of development of settlements
2	Programs of stimulation of development in regions are developed, financing of separate stimulating directions is carried out, the corresponding directions of development are not financed, the strategy of development of the region is developed, separate strategic directions are realized, ways of overcoming of the crisis phenomena are not defined. use of lands of the region, spatial proportions are not provided, there are no directions of development of settlements
3	Programs of stimulation of development of the region are developed, financing of separate stimulating directions is carried out, the corresponding directions of development are not financed, the strategy of development in regions is developed, separate strategic directions are realized, ways of overcoming of the crisis phenomena are not defined, information technologies are applied to increase the efficiency of land use in the region, spatial proportions are not provided, there are no directions of development of settlements
4	Programs of stimulation of development of the region are developed, financing of separate stimulating directions is carried out, the corresponding directions of development are not financed, the strategy of development of the region is developed, separate strategic directions are realized, ways of overcoming of the crisis phenomena are not defined, information technologies are applied. increasing the efficiency of land use in regions, spatial proportions are not provided, there are no directions of development of settlements
5	Programs of stimulation of development of the region are developed, non-systemic financing of stimulating directions is carried out, the corresponding directions of development are unsystematically financed, the strategy of development in regions is developed, separate strategic directions are realized, ways of overcoming crisis phenomena are defined, information technologies are applied lands in regions, spatial proportions are not provided

Continuation of table F.1

1	2
6	Programs of stimulation of development in regions are developed, system financing of stimulating directions is carried out, the corresponding directions of development are systematically financed, the strategy of development in regions is developed, separate strategic directions are realized, ways of overcoming of the crisis phenomena are defined, information technologies for formation of spatial information are applied regions, spatial proportions are provided
7	Programs for stimulating the development of the region have been developed, systematic financing of stimulating directions is carried out, relevant directions of development are systematically financed, the strategy of the region development is developed, separate strategic directions are implemented, ways of overcoming crisis phenomena are determined, information technologies are used to form spatial information regions, spatial proportions are provided, the development of settlements is observed
8	Programs of stimulation of development of the region are developed, systematic financing of stimulating directions is carried out, the corresponding directions of development are systematically financed, the strategy of development of the region is developed, strategic directions are systematically realized, ways of overcoming crisis phenomena are defined, information technologies are applied regions, spatial proportions are provided, the development of settlements is observed
9	Programs to stimulate the development of the region have been developed and implemented, systematic financing of stimulating directions is carried out, relevant directions of development are systematically financed, the strategy in regions development is developed and implemented, strategic directions are systematically implemented, timely response to crisis phenomena is carried out. , the efficiency of land use in regions increases, spatial proportions are provided, the development of settlements is observed
10	Developed and implemented programs to stimulate the development in regions, systematically finance stimulating areas, systematically finance the relevant areas of development, developed and implemented a strategy for the development in regions, systematically implemented strategic areas, timely response to crises, information technology for spatial information, formed and applied the system of information provision with spatial information on the use of lands in regions, the relevant institutions have been established and are functioning effectively, the efficiency of use is growing and in regions, spatial proportions are provided, the development of settlements is observed

Table F.2

Criteria ballroom evaluation,, what are determined experts for indicators equal implementation directions territorial development in regions

(developed by the authors)

The value of points	Characteristics by which points are determined
1	2
0	Areas of territorial development of the region are absent and not implemented, there is no spatial information on the territories in regions, no information

Continuation of table F.2

1	2
	system has been created to ensure territorial development, a system of territorial management to ensure development is functioning at a low level
1	Directions of territorial development in regions have been developed, but are not implemented, there is no spatial information on the territories in regions, no information system has been created to ensure territorial development, a system of territorial management to ensure development is functioning at a low level
2	Certain directions of territorial development in regions have been developed and are being implemented, there is no spatial information on the territories in regions, no information system has been created to ensure territorial development, a system of territorial management to ensure development is functioning at a low level
3	Separate directions of territorial development in regions have been developed and are being implemented, separate spatial information on the territories in regions is available, an information system providing territorial development has not been created, a system of territorial management providing development is functioning at a low level
4	Separate directions of territorial development in regions have been developed and are being implemented, separate spatial information on the territories of the region is available, an information system providing territorial development has not been created, a system of territorial management providing development is functioning, institutions providing territorial development have been created
5	Separate directions of territorial development in regions have been developed and are being implemented, separate spatial information on the territories in regions is available, an information system providing territorial development has been created, a management system of territories providing development is functioning, institutions providing territorial development have been created and function
6	Directions of territorial development in regions are developed and implemented, separate spatial information on territories in regions is available, the information system providing territorial development is created, the system of management of territories providing development functions, the institutions providing territorial development are created and function
7	Areas of territorial development in regions have been developed and are being implemented, spatial information on the territories of the region is available, an information system has been created to ensure territorial development, a territory management system to ensure development has been established, institutions providing to territorial development have been established and are functioning.
8	The directions of territorial development in regions are developed and realized, the available spatial information concerning the territories in regions, the information system providing territorial development is created and functions, the system of management of the territories providing development functions, institutions for territorial development have been established and are functioning
9	Directions of territorial development in regions are developed and systematically implemented, spatial information on the territories in regions is available, the information system providing territorial development is created and functions, the management system of territories providing development functions, the institutions providing territorial development are created and function

Continuation of table F.2

1	2
10	Directions of territorial development in regions are developed and systematically implemented, complete spatial information on the territories in regions is available, the information system providing territorial development is created and functions, the system of management of territories providing development functions, the institutions providing territorial development are created and function

Table F.3

Scoring criteria determined by experts for indicators of the level of spatial support of land use in regions in the system of functional indicators

(developed by the authors)

The value of points	Characteristics by which points are determined
1	2
0	There are no areas for sustainable development of territories, not implemented state support of territories, social infrastructure is not developed, directions of development of engineering and transport infrastructure are not realized, formation of national ecological infrastructure is not provided, low level of organization and planning of land management, implementation and formation of information support of land management implementation of topographic and geodetic and cartographic works during land management, are not implemented areas of land inventory during land management, soil, geobotanical and other land surveys during land management, implementation works on soil quality assessment during land management, land assessment works during land management, natural-agricultural zoning of lands during land management, technical and technological support of land management, low level of consulting services on land management,quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of land management jointly owned by territorial communities, there is no information system for approval of national land use and protection programs, participation in their implementation in the relevant territory, lack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, not coordinatedquality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of disposal of lands jointly owned by territorial communities, no information system for approval of national land use and protection programs, participation in their implementation in the territory, lack partnership relations on the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, is not coordinatedquality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of disposal of lands jointly owned by territorial communities, no information system

Continuation of table F.3

1	2
	for approval of national land use and protection programs, participation in their implementation in the territory, lack partnership relations on the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, is not coordinatedlack of partnership relations on the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, not coordinatedlack of partnership relations on the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, not coordinated activity of local land resources bodies, low level of establishment and change of boundaries of villages, settlements that are not part of the relevant district, or if the district council is not formed, low level of land dispute resolution, low level of resolution of other issues in the field of land relations to the law, no work is being done to establish the boundaries in regions
1	There are no directions for ensuring sustainable development of territories state support of territories in certain areas, social infrastructure is not developed, directions of engineering and transport infrastructure development are not implemented, formation of national ecological infrastructure in certain directions is provided, low level of organization and planning of land management, implementation and formation of information support of topographic-geodetic and cartographic works during the implementation of land management, certain areas of land inventory during the implementation of land management, soil, geobotanical and other surveys of land during the implementation of land management, soil quality assessment during the implementation of land management, land valuation works during the implementation of land management,carrying out natural-agricultural zoning of lands during land management, implementation of technical and technological support of land management, low level of consulting services on land management, quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of disposal of lands that are jointly owned by territorial communities, there is no information system for approval of national programs of land use and protection, participation in their implementation in the territory,lack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, uncoordinated activities of local land authorities, low level of establishment and change of boundaries of villages, settlements that are not part of the district or if the district council is not formed, low level of settlement of land disputes, low level of resolution of other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionlow level of resolving land disputes, low level of resolving other issues in the field of land relations in accordance with the law, no work is being done to establish the boundaries of the regionlow level of settlement of land disputes, low level of resolution of other issues in the field of land relations in accordance with the law, no work is being done to establish the boundaries in regions
2	Developed areas for sustainable development of territories, is carried out state support of territories in certain areas, developing social infrastructure in certain areas, implementing certain areas of engineering and transport infrastructure, providing the formation of national environmental infrastructure in certain areas, low level of organization and planning of land management, implementation and

Continuation of table F.3

1	2
	formation of information support of land management topographic and geodetic and cartographic works during land management, certain areas of land inventory during land management, soil, geobotanical and other surveys of lands during land management, soil quality assessment during land management, land assessment works during land management, natural-agricultural zoning of lands during land management, implementation of technical and technological support of land management, provision of consulting services on land management in full, low quality and completeness of development of land management schemes and technical and economic substantiation of use and protection of lands of administrative-territorial units, quality and intensity of development of land management projects on establishment (change) of borders of administrative-territorial formations, low level of disposal of lands in common ownership of territorial communities, no information system of coordination of national programs of land use and protection , participation in their implementation in the relevant territory,lack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, uncoordinated activities of local land authorities, low level of establishment and change of boundaries of villages, settlements that are not part of the district or if the district council is not formed, low level of settlement of land disputes, low level of resolution of other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionthat are not part of the relevant district, or if the district council is not formed, low level of settlement of land disputes, low level of resolution of other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionthat are not part of the relevant district, or if the district council is not formed, low level of settlement of land disputes, low level of resolution of other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries in regions
3	Developed areas for sustainable development of territories, is carried out state support of territories in certain areas, developing social infrastructure in certain areas, implementing certain areas of engineering and transport infrastructure, providing the formation of national environmental infrastructure in certain areas, low level of organization and planning of land management, implementation and formation of information support of land management topographic and geodetic and cartographic works during land management, certain areas of land inventory during land management, soil, geobotanical and other land surveys during land management, soil grading works during land management, land assessment works during land management, carrying out natural-agricultural zoning of lands during land management, implementation of technical and technological support of land management, provision of consulting services on land management in full, low quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of disposal of lands jointly owned by territorial communities, no information system for approval of national land use and protection programs, participation in their implementation in the territory, lack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, coordinated activities of local land authorities, low level of establishment and change of boundaries of villages, settlements that are not part of

Continuation of table F.3

1	2
	the district, or, if the district council is not formed, a high level of resolution of land disputes and other issues in the industry land relations in accordance with the law, no work is being done to establish the boundaries in regions
4	Areas of ensuring sustainable development of territories have been developed and are being implemented, state support of territories in certain areas is being implemented, social infrastructure is being developed in certain areas, certain directions of engineering and transport infrastructure development are being implemented, national ecological infrastructure is being formed in certain areas. and legislation, low level of implementation and formation of information support of land management, implementation of topographic, geodetic and cartographic works during land management, implemented certain areas of land inventory during land management, soil, geobotanical and other land surveys during land management, implementation of works on soil quality assessment during land management, land assessment works during land management, natural-agricultural zoning of lands during land management, technical and technological support of land management, provision of consulting services on land management in full, high level of quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of land management jointly owned by territorial communities, there is no information system for approval of national land use and protection programs, participation in their implementation in the relevant territory, lack of partnerships for regional authorities in the implementation of regional land use programs, soil fertility, land protection, coordinated activities of local land resources, low level establishing and changing the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionlack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, coordinated activities of local land authorities, low level of establishment and change of boundaries of villages, settlements that are not part of the district, or , if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionlack of partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, coordinated activities of local land authorities, low level of establishment and change of boundaries of villages, settlements that are not part of the district, or , if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, no work is carried out to establish the boundaries of the regionother issues in the field of land relations in accordance with the law, no work is being done to establish the boundaries of the regionother issues in the field of land relations in accordance with the law, no work is being done to establish the boundaries in regions
5	Areas of ensuring sustainable development of territories have been developed and are being implemented, state support of territories in certain areas is being carried out, social infrastructure is being developed in certain areas, certain directions of engineering and transport infrastructure development are being implemented,

Continuation of table F.3

1	2
	national ecological infrastructure is being formed in certain areas, land management is being organized and planned. and legislative acts, a high level of implementation and formation of information support of land management, implementation of topographic and geodetic and cartographic works during land management, systematically implemented land inventory during land management, soil, geobotanical and other land surveys during land management, low level of soil quality assessment works, high level of land assessment works during land management, natural-agricultural zoning of lands during land management, implementation of technical and technological support of land management, provision of consulting services on land management in full, high level of quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects) boundaries of administrative-territorial entities, low level of disposal of lands jointly owned by territorial communities, information system for coordination of national programs introduced and functioning, ensuring land use and protection, participation in their implementation in the respective territory, low level of partnership for participation regional authorities in the implementation of regional land use programs,increasing soil fertility, land protection, coordinating the activities of local land resources, low level of establishment and change of boundaries of villages, settlements that are not part of the district, or if the district council is not formed, high level of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries in regions
6	Areas of ensuring sustainable development of territories are developed and implemented, systemic state support of territories is carried out, social infrastructure is systematically developed, separate directions of engineering and transport infrastructure development are implemented, formation of national ecological infrastructure is provided, separate organization and planning of land management is established. high level of implementation and formation of information support of land management, relevant information institutions function, topographic and geodetic and cartographic works in the land management system are systematically carried out, works on land inventory during land management, soil, geobotanical and other land surveys during land management are systematically implemented ,,separate works on soil quality assessment, high level of land assessment works during land management, natural and agricultural zoning of lands during land management, technical and technological support of land management, provision of consulting services on land management in full, high level quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, low level of land management jointly owned by territorial communities, the information system of coordination of national programs is introduced and functions,ensuring the use and protection of land, participation in their implementation in the relevant territory, low level of partnership on the participation of regional authorities in the implementation of regional land use programs, soil fertility, land protection, coordinates the activities of local land authorities, low level of establishment and change boundaries of villages, settlements that are not part of the relevant district, or if the district council is not formed, highlow level of establishment and change of boundaries of villages,

Continuation of table F.3

1	2
	settlements that are not part of the relevant district, or if the district council is not formed, highlow level of establishment and change of boundaries of villages, settlements that are not part of the relevant district, or if the district council is not formed, high level of settlement of land disputes, other issues in the field of land relations in accordance with the law, separate works are being carried out to establish the boundaries in regions
7	Areas of ensuring sustainable development of territories are developed and implemented, systemic state support of territories is carried out, social infrastructure is systematically developed, directions of engineering and transport infrastructure development are systematically implemented, formation of national ecological infrastructure in separate directions is systematically provided, organization and planning of land management according to established norms and legislation, a high level of implementation and formation of information support of land management, the relevant information institutions function, systematically carried out topographic, geodetic and cartographic works in the land management system, systematically implemented works on land inventory during land management, soil,geobotanical and other surveys of lands during land management, separate works on soil quality assessment, high level of land assessment works during land management, natural-agricultural zoning of lands during land management, technical and technological support of land management, consulting services on land management in full, high level of quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, high level of land management, which are jointly owned by territorial communities,introduced and operates an information system for approval of national programs that ensures the use and protection of land, participation in their implementation in the relevant territory, provides partnerships for regional authorities in the implementation of regional programs of land use, soil fertility, land protection, coordinates local authorities land resources, separate work is carried out to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with the law, separate works on establishing the borders of the regionparticipation in their implementation in the relevant territory, partnerships are provided for the participation of regional authorities in the implementation of regional land use programs, soil fertility, land protection, coordinates the activities of local land authorities, carried out separate work to establish and change the boundaries of villages, settlements. are not part of the relevant district, or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries of the regionparticipation in their implementation in the relevant territory, partnerships are provided for the participation of regional authorities in the implementation of regional land use programs, soil fertility, land protection, coordinates the activities of local land authorities, carried out separate work to establish and change the boundaries of villages, settlements. are not part of the relevant district, or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries of the regionthe activities of local bodies of land resources are coordinated, separate works are carried out to

Continuation of table F.3

1	2
	establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in land relations, respectively to the law, separate works on establishment of borders of region are carried outthe activities of local bodies of land resources are coordinated, separate works are carried out to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in land relations, respectively to the law, separate works on establishment of borders of region are carried out
8	Areas of ensuring sustainable development of territories are developed and systematically implemented, systemic state support of territories is carried out, social infrastructure is systematically developed, directions of engineering and transport infrastructure development are systematically implemented, formation of national ecological infrastructure in separate directions is systematically provided, organization and planning of land management are provided. acts, a high level of implementation and formation of information support of land management, relevant information institutions, systematically carried out topographic, geodetic and cartographic works in the land management system, systematically implemented work on land inventory during land management, soil, geobotanical and other land surveys during land management, separate works on soil quality assessment, high level of land assessment works during land management, natural-agricultural zoning of lands during land management, technical and technological support of land management, provision of consulting services on land management in full, high level of quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, high level of land management jointly owned by territorial communities,introduced and operates an information system for approval of national programs that ensures the use and protection of land, participation in their implementation in the relevant territory, provides partnerships for regional authorities in the implementation of regional programs of land use, soil fertility, land protection, coordinates local authorities land resources, work is carried out systematically to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with the law separate works on establishing the borders of the regionparticipation in their implementation in the relevant territory, partnerships are provided for the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, coordinates the activities of local land resources, systematically works to establish and change the boundaries of villages, settlements. are not part of the relevant district, or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries of the regionparticipation in their implementation in the relevant territory, partnerships are provided for the participation of regional authorities in the implementation of regional programs of land use, soil fertility, land protection, coordinates the activities of local land authorities, systematically works to establish and change the boundaries of villages, settlements. are not part of the relevant district, or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries of the regioncoordinates

Continuation of table F.3

1	2
	the activities of local land authorities, systematically works to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations, respectively to the law, separate works on establishment of borders of region are carried outcoordinates the activities of local land authorities, systematically works to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations, respectively to the law, separate works on establishment of borders of region are carried out
9	Areas of ensuring sustainable development of territories are developed and systematically implemented, systemic state support of territories is carried out, social infrastructure is systematically developed, directions of engineering and transport infrastructure development are systematically implemented, formation of national ecological infrastructure is systematically provided, organization and planning of land management according to established norms and legislative acts. the level of implementation and formation of information support of land management, relevant information institutions, systematically carried out topographic, geodetic and cartographic works in the land management system, systematically implemented work on land inventory during land management, soil, geobotanical and other land surveys during land management,systematic work on soil quality assessment, high level of land assessment works during land management, natural-agricultural zoning of lands during land management, technical and technological support of land management, provision of consulting services on land management in full, high level quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, high level of land management jointly owned by territorial communities, the information system of coordination of national programs is introduced and functions,ensuring the use and protection of land, participation in their implementation in the relevant territory, provides partnerships for the participation of regional authorities in the implementation of regional land use programs, increasing soil fertility, land protection, coordinating the activities of local bodies of land resources, systematically working to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level resolution of land disputes, other issues in the field of land relations in accordance with the law, some work is being done to establish the boundaries in regions
10	Areas of ensuring sustainable development of territories are developed and systematically implemented, systemic state support of territories is carried out, social infrastructure is systematically developed, directions of engineering and transport infrastructure development are systematically implemented, formation of national ecological infrastructure is systematically provided, organization and planning of land management are systematically provided. high level of implementation and formation of information support of land management, the relevant information institutions function, systematically carried out topographic, geodetic and cartographic works in the land management system, systematically implemented works on land inventory during land management, soil,geobotanical and other surveys of lands during land management, systematic works on soil

Continuation of table F.3

1	2
	quality assessment, high level of land assessment works during land management, natural-agricultural zoning of lands during land management, implementation of technical and technological support of land management, consulting services on land management in full, high level of quality and completeness of development of land management schemes and feasibility study of land use and protection of administrative-territorial units, quality and intensity of development of land management projects to establish (change) the boundaries of administrative-territorial entities, high level of disposal lands jointly owned by territorial communities,introduced and operates an information system for approval of national programs that ensures the use and protection of land, participation in their implementation in the relevant territory, systematically provides partnerships for regional authorities in the implementation of regional programs of land use, soil fertility, land protection, systematically coordinated activities local bodies of land resources, work is carried out systematically to establish and change the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with law, work is being carried out systematically to establish the boundaries of the regionensuring the use and protection of land, participation in their implementation in the relevant territory, systematically provides partnerships for the participation of regional authorities in the implementation of regional land use programs, soil fertility, land protection, systematically coordinates the activities of local land authorities, systematically establishing and changing the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with the law, systematically work to establish the boundaries of the regionensuring the use and protection of land, participation in their implementation in the relevant territory, systematically provides partnerships for the participation of regional authorities in the implementation of regional land use programs, soil fertility, land protection, systematically coordinates the activities of local land authorities, systematically establishing and changing the boundaries of villages, settlements that are not part of the district, or if the district council is not formed, a high level of land disputes, other issues in the field of land relations in accordance with the law, systematically work to establish the boundaries of the regionpartnership relations on participation of regional authorities in realization of regional programs of land use, increase of soil fertility, protection of lands are systematically provided, activity of local bodies of land resources is systematically coordinated, works on establishment and change of borders of villages, settlements which are not a part of the corresponding area , or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, systematic work is carried out to establish the boundaries of the regionpartnership relations on participation of regional authorities in realization of regional programs of land use, increase of soil fertility, protection of lands are systematically provided, activity of local bodies of land resources is systematically coordinated, works on establishment and change of borders of villages, settlements which are not a part of the corresponding area , or if the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, systematic work is carried out to establish the boundaries of the regionif the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, work is carried out systematically to establish the

Continuation of table F.3

1	2
	boundaries of the regionif the district council is not formed, a high level of resolution of land disputes, other issues in the field of land relations in accordance with the law, work is carried out systematically to establish the boundaries in regions

Table F.4

Scoring criteria determined by experts for policy indicators influencing the formation of spatial support for territorial development of land use in regions (developed by the authors)

The value of points	Characteristics by which points are determined
1	2
0	The protection of national interests in the regions is not carried out, the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, equality of all subjects of property before the law, protection of competition sphere of economic activity, the openness and transparency of the processes of preparation and decision-making by public authorities and local governments are not ensured, there are no directions of sustainable development of the economy on a market basis and its social orientation, there is an imbalance of national, regional and local interests, lack of freedom, social justice and creative self-realization, participation of citizens in the management of state and public affairs, no social partnership and civic solidarity, there are processes that negatively affect the territorial integrity of the state, no directions, ensuring the timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, conditions for establishing local self-government as the foundation of democracy, expanding the powers of local councils by decentralizing the functions of public authorities, no reform of intergovernmental relations in favor of local municipality, creation of conditions for development of economic independence of regions, improvement of system of administrative-territorial system on principles of economic self-sufficiency and availability of administrative (managerial) and social services to consumers of these services is not provided, strengthening of material base of local governments and increase of their resource provision is not observed. strengthening the responsibility of representatives of local governments, village, town, city mayors to the territorial communities that elected them, projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development are not developed and implemented, directions of strengthening economic integration of regions using the benefits of territorial division and labor cooperation are not implemented, effective mechanisms for ensuring the active participation of territorial communities and local governments in the formation and implementation of state regional policy are not developed, there are no areas for achieving high functional capacity of human resources in the regions, primarily by creating a system and technologies for attracting investment to train highly professional

Continuation of table F.4

1	2
	managers, the establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and land use of regions, lack of vital interests of man and citizen, society and state, timely detection, prevention and neutralization of real and potential threats to national interests in the field of land relations of regions, not formed land market infrastructure, ensuring registration of title documents for land ownership
1	Low level of protection of national interests in the regions, ensuring the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects of property rights before the law. in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, ensuring sustainable development of the economy on a market basis and its social orientation, low level of balance of national, regional and local interests, freedom, social justice and creative self-realization , citizen participation in the management of state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, the establishment of local self-government as the foundation of democracy, expanding the powers of local councils by decentralizing public authorities, low level of reforming inter-budgetary relations in favor of local self-government, creating conditions for the development of economic independence of regions, improving the system of administrative-territorial organization on the principles of economic self-sufficiency and accessibility of administrative (managerial) and social services to consumers of these services, strengthening local self-government their resource provision, strengthening the responsibility of representatives of local self-government bodies, village, settlement, city mayors to the territorial communities that elected them, development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, creating effective mechanisms for active participation of local communities and local authorities formation and implementation of state regional policy, achieving high functional capacity of human resources of regions, primarily by creating a system and technologies for attracting investment to train highly professional managers, establishing civil society as a guarantee of democratic development and its impact on the formation and use of regional lands,ensuring the vital interests of man and citizen, society and the state, timely detection, prevention and neutralization of real and potential threats to national interests in the field of land relations
2	land market infrastructure, ensuring the registration of title documents to land ownership. Some areas of protection of national interests in the regions, ensuring the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all property rights before the law, protection of competition in the field of economic activity, openness and transparency of the processes of preparation and decision-making by public authorities and local governments, ensuring sustainable development of the economy on a market basis and its social orientation, implemented certain areas to ensure the balance of national, regional and local interests, freedom, social justice and creative self-

Continuation of table F.4

1	2
	realization, citizen participation in public and public affairs, social partnership and civic solidarity, assistance in ensuring territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, approval of local self-government as the foundation of democracy, expanding the powers of local councils by decentralizing the functions of public authorities, implementing certain areas of reforming intergovernmental relations in favor of local self-government, creating conditions for economic independence of regions, improving the system of administrative-territorial organization (managerial) and social services to consumers of these services, strengthening the material base of local governments and increasing their level of resource provision, strengthening the responsibility of representatives of local governments, village, town, city mayors to the territorial communities that elected them, development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, creating effective mechanisms for active participation of local communities and local authorities formation and implementation of the state regional policy, achievement of high functional capacity of personnel potential of regions, first of all by creation of system and technologies of attraction of investments for preparation of highly professional administrative shots, establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and use of regional lands, ensuring the vital interests of man and citizen, society and the state, timely detection, prevention and neutralization of real and potential threats to national interests in the field of land relations of the regions, formation of the land market infrastructure, ensuring the registration of title documents for land ownership
3	Unsystematic level of protection of national interests in the regions, ensuring the rule of law, realization of human and civil rights and freedoms, respect for dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects of property rights before the law, protection of competition in economic activity, openness and transparency of preparation and decision-making processes of state authorities and local governments, ensuring sustainable development of the market economy and its social orientation, unsystematic level of ensuring the balance of national, regional and local interests, freedom, social justice and creative self-realization, citizen participation in the management of state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, approval of local self-government as the foundation of democracy, expanding the powers of local councils by decentralizing the functions of public authorities, unsystematic reform of intergovernmental relations in favor of local self-government, creating conditions for economic independence of regions, improving the system of administrative-territorial organization on the principles of economic self-sufficiency and economic self-sufficiency) and social services to consumers of these services, strengthening the material base of local governments and increasing their level of resource provision, strengthening the responsibility of representatives of local governments, village, town, city mayors to the territorial communities that elected them, development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing

Continuation of table F.4

1	2
	the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, creating effective mechanisms for active participation of local communities and local authorities formation and implementation of the state regional policy, achievement of high functional capacity of personnel potential of regions, first of all by creation of system and technologies of attraction of investments for preparation of highly professional administrative shots, establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and use of regional lands, ensuring the vital interests of man and citizen, society and the state, timely detection, prevention and neutralization of real and potential threats to national interests in the field of land relations of the regions, formation of the land market infrastructure, ensuring the registration of title documents for land ownership
4	Ensuring the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects of property rights before the law, protection of competition in economic activity, openness and transparency preparation and decision-making by public authorities and local authorities self-government, ensuring sustainable economic development on a market basis and its social orientation, programs are implemented to ensure the balance of national, regional and local interests, freedom, social justice and creative self-realization, citizen participation in public and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, approval of local self-government as the foundation of democracy, expanding the powers of local councils by decentralizing the functions of public authorities, implementing programs to reform intergovernmental relations in favor of local self-government, creating conditions for economic independence of regions, improving the administrative system based on economic self-sufficiency and access management) and social services to consumers of these services, strengthening the material base of local governments and increasing their level of resource provision, strengthening the responsibility of representatives of local governments, village, town, city mayors to the territorial communities that elected them, development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, creating effective mechanisms for active participation of local communities and local authorities formation and implementation of the state regional policy, achievement of high functional capacity of personnel potential of regions, first of all by creation of system and technologies of attraction of investments for preparation of highly professional administrative shots, establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and use of regional lands, ensuring the vital interests of man and citizen, society and the state, timely detection, prevention and neutralization of real and potential threats to national interests in the field of land relations of the regions, formation of the land market infrastructure, ensuring the registration of title documents for land ownership

Continuation of table F.4

1	2
5	Strategic programs for the protection of national interests in regions, a high level of rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, special care for the child and realization of his rights, equality of all subjects of property before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, ensuring sustainable development of the economy on a market basis and its social orientation, strategic programs to balance national, regional and local interests, freedom, social justice and creative self-realization, citizen participation in the management of state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, approval of local self-government as the foundation of democracy, a wide level of expansion of local councils by decentralizing the functions of public authorities, implementing programs to reform intergovernmental relations in favor of local self-government, a high level of creating conditions for economic independence of regions, improving the system of administrative and accessibility of administrative (managerial) and social services to consumers of these services, a significant level of strengthening the material base of local governments and increasing their level of resource provision, significantly strengthening the responsibility of local governments, village, town, city mayors to elected territorial communities, development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, creating effective mechanisms for active participation of local communities and local authorities formation and implementation of the state regional policy, achievement of constant high functional capacity of personnel potential of regions, first of all by creation of system and technologies of attraction of investments for preparation of highly professional administrative shots, constant establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and use of regional lands, high level of vital interests of man and citizen, society and state, timely detection, prevention and neutralization of real and potential threats to national interests in land relations, formation of the land market infrastructure, ensuring the registration of title documents for land ownership A set of strategic and tactical programs to protect national interests in the regions, a high level of permanent rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects of law. Property before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, ensuring sustainable economic development on a market basis and its social orientation, strategic programs to ensure balance of national, regional and local interests, freedom, social justice and creative self-realization,citizen participation in the management of state and public affairs, social partnership and civil solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, establishment of local self-government as the foundation of democracy, wide and high level of expansion of powers of local councils by decentralization of

Continuation of table F.4

1	2
	functions of public authorities, programs of reforming intergovernmental relations in favor of local self-government, high level of constant creation of conditions for development of economic independence of regions; on the principles of economic self-sufficiency and accessibility of administrative (managerial) and social services to consumers of these services, a significant level of strengthening the material base of local governments and increasing the level of their resources, significantly strengthening the responsibility of local governments, village, town, city mayors, that they were elected, high level of development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, strengthening economic integration of regions using the benefits of territorial division and labor cooperation, high level of effective mechanisms for active participation local governments in the formation and implementation of state regional policy, achieving a constant high quality functional capacity of the human resources of the regions, primarily by creating a system and technologies for attracting investment for the training of highly professional managers,high level of permanent establishment of civil society as a guarantee of democratic development of the state and its influence on the formation and use of lands of regions, high level of constant provision of vital interests of man and citizen, society and state, timely detection, constant prevention and neutralization of real and potential threats to national interests. sphere of land relations of regions formation of land market infrastructure, constant provision of registration of title documents for land ownership
7	A set of strategic and tactical programs for the protection of national interests in the regions, a high level of systemic support for the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects are systematically implemented. property rights before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, a high level of sustainable economic development on a market basis and its social orientation, strategic programs to ensure the balance of national, regional and local interests, freedom, social justice and creative self-realization,citizen participation in the management of state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, establishment of local self-government as the foundation of democracy, constant high level of expansion of powers of local councils by decentralization of functions of state authorities, systematically implemented programs of reforming intergovernmental relations in favor of local self-government, high level of systemic creation of conditions for economic independence of regions; on the principles of economic self-sufficiency and accessibility of administrative (management) and social services to consumers of these services, a high level of strengthening the material base of local governments and a constant increase in their resource provision, a high level of strengthening the responsibility of local, rural, settlement,mayors before the territorial communities that elected them, constant provision of a high level of development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, constant strengthening of economic

Continuation of table F.4

1	2
	integration in regions using the benefits of territorial division and labor cooperation. active participation of territorial communities and local governments in the formation and implementation of state regional policy, systematic achievement of high quality functional capacity of the human resources of the regions, primarily by creating a system and technologies for attracting investment to train highly professional managers,systematic approval of civil society as a guarantee of democratic development of the state and its impact on the formation and use of regional lands, systematic support of vital interests of man and citizen, society and state, timely detection, systematic prevention and neutralization of real and potential threats to national interests in land relations formation of land market infrastructure, systematic support of registration of title documents for land ownership
8	A set of strategic and tactical programs for the protection of national interests in the regions, a high level of systemic support for the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects are systematically implemented. property rights before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, a high level of sustainable economic development on a market basis and its social orientation, strategic programs to ensure the balance of national, regional and local interests, freedom, social justice and creative self-realization,citizen participation in the management of state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and the adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, establishment of local self-government as the foundation of democracy, constant high level of expansion of powers of local councils by decentralization of functions of state authorities, systematically implemented programs of reforming intergovernmental relations in favor of local self-government, high level of systemic creation of conditions for economic independence of regions; on the principles of economic self-sufficiency and accessibility of administrative (management) and social services to consumers of these services, a high level of strengthening the material base of local governments and a constant increase in their resource provision, a high level of strengthening the responsibility of local, rural, settlement,mayors before the territorial communities that elected them, constant provision of a high level of development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, constant strengthening of economic integration of regions using the benefits of territorial division and labor cooperation. active participation of territorial communities and local governments in the formation and implementation of state regional policy, systematic achievement of high quality functional capacity of the human resources of the regions, primarily by creating a system and technologies for attracting investment to train highly professional managers,systematic approval of civil society as a guarantee of democratic development of the state and its impact on the formation and use of regional lands, systematic support of vital interests of man and citizen, society and state, timely detection, systematic prevention and neutralization of real and potential threats to national interests in land relations, formation of land market infrastructure, systematic support of registration of title documents for land ownership, which causes qualitative structural changes in the field of land relations

Continuation of table F.4

1	2
	at the regional level
9	A set of strategic and tactical programs for the protection of national interests in the regions, a high level of systemic support for the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects are systematically implemented. property rights before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, a high level of sustainable economic development on a market basis and its social orientation, strategic programs to ensure the balance of national, regional and local interests, freedom, social justice and creative self-realization,citizen participation in the management of state and public affairs, social partnership and civil solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, establishment of local self-government as the foundation of democracy, constant high level of expansion of powers of local councils by decentralization of functions of state authorities, systematically implemented programs of reforming intergovernmental relations in favor of local self-government, high level of systemic creation of conditions for economic independence of regions; on the principles of economic self-sufficiency and accessibility of administrative (management) and social services to consumers of these services, a high level of strengthening the material base of local governments and a constant increase in their resource provision, a high level of strengthening the responsibility of local, rural, settlement,mayors before the territorial communities that elected them, constant provision of a high level of development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, constant strengthening of economic integration of regions using the benefits of territorial division and labor cooperation. active participation of territorial communities and local governments in the formation and implementation of state regional policy, systematic achievement of high quality functional capacity of the human resources of the regions, primarily by creating a system and technologies for attracting investment to train highly professional managers,systematic approval of civil society as a guarantee of democratic development of the state and its impact on the formation and use of regional lands, systematic support of vital interests of man and citizen, society and state, timely detection, systematic prevention and neutralization of real and potential threats to national interests in land relations formation of land market infrastructure, systematic support of registration of title documents for land ownership, which causes qualitative structural changes in the field of land relations at the regional level, created political preconditions for building a system of land administration
10	A set of strategic and tactical programs for the protection of national interests in the regions, a high level of systemic support for the rule of law, realization of human and civil rights and freedoms, respect for the dignity of each person, ensuring special care for the child and realization of his rights, ensuring equality of all subjects are systematically implemented. property rights before the law, protection of competition in the field of economic activity, openness and transparency of preparation and decision-making processes by public authorities and local governments, a high level of sustainable economic development on a market basis

Continuation of table F.4

1	2
10	and its social orientation, strategic programs to ensure the balance of national, regional and local interests, freedom, social justice and creative self-realization,citizen participation in governance state and public affairs, social partnership and civic solidarity, assistance in ensuring the territorial integrity of the state, timeliness and adequacy of measures to protect national interests to real and potential threats to Ukraine, its citizens and legal entities, establishment of local self-government as the foundation of democracy, constant high level of expansion of powers of local councils by decentralization of functions of state authorities, systematically implemented programs of reforming intergovernmental relations in favor of local self-government, high level of systemic creation of conditions for economic independence of regions; on the principles of economic self-sufficiency and accessibility of administrative (management) and social services to consumers of these services, a high level of strengthening the material base of local governments and a constant increase in their resource provision, a high level of strengthening the responsibility of local, rural, settlement,mayors before the territorial communities that elected them, constant provision of a high level of development and implementation of projects of interregional economic relations and cross-border cooperation aimed at increasing the competitiveness of regions as a basis for their dynamic development, constant strengthening of economic integration of regions using the benefits of territorial division and labor cooperation. active participation of territorial communities and local governments in the formation and implementation of state regional policy, systematic achievement of high quality functional capacity of the human resources of the regions, primarily by creating a system and technologies for attracting investment to train highly professional managers,systematic approval of civil society as a guarantee of democratic development of the state and its impact on the formation and use of regional lands, systematic support of vital interests of man and citizen, society and state, timely detection, systematic prevention and neutralization of real and potential threats to national interests in land relations formation of land market infrastructure, systematic support of registration of title documents for land ownership, which causes qualitative structural changes in the field of land relations at the regional level, built a system of land administration

Table F.5

The criteria by which they are determined planning and limiting indicators that form the urban areas of territorial development of land use in regions (developed by the authors)

The value of points	Characteristics by which points are determined
1	2
0	Lack of information on the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of protective deposits zones of industrial enterprises, cemeteries and other communal objects, zones of

Continuation of table F.5

1	2
	restriction of building in areas of airports on conditions of safety of flights, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protective zones of quarries, dumps, pipelines and others objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments, architecture,history and culture and zones of regulation of buildings, protected landscapes, availability of especially valuable productive lands, no measures are taken for the functioning of the presented zones
1	Low level of information support on the presence of seismic zones and zones of destruction of the earth's surface, landslides, inundation and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in areas of airports on conditions of safety of flights, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments, architecture,history and culture and zones of regulation of buildings, protected landscapes, availability of especially valuable productive lands, no measures are taken for the functioning of the presented zones
2	Some measures are being implemented to provide information on the presence of seismic zones and zones of earth surface destruction, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, congestion, pollution areas. Sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, monuments of nature, architecture, history and culture and the zone of regulation of buildings, protected landscapes, the presence of particularly valuable productive lands, no measures are taken for the functioning of the presented zones
3	Some measures are being implemented to provide information on the presence of seismic zones and zones of earth surface destruction, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, congestion, pollution areas. sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments,architecture, history and culture and areas of regulation of buildings, protected landscapes, the presence of particularly valuable productive lands, no measures are taken for the

Continuation of table F.5

1	2
	functioning of the presented areas, the appropriate tools and technologies are used
4	Some measures are being implemented to provide information on the presence of seismic zones and zones of earth surface destruction, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, congestion, pollution areas. Sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of safety of flights, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protective zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves,monuments of nature, architecture, history and culture and building regulation zones, protected landscapes, availability of especially valuable productive lands, no measures are taken for the functioning of the presented zones, appropriate tools and technologies are used, modern directions of formation and functioning of the presented zones are identified
5	Measures to provide information on the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and inundation, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, pollution, sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of safety of flights, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protective zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, monuments of nature, architecture, history and culture and building regulation zones, protected landscapes, availability of especially valuable productive lands, no measures are taken for the functioning of the presented zones, appropriate tools and technologies are used, modern directions of formation and functioning of the presented zones are identified
6	Systematically implemented measures to provide information on the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution, areas sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of safety of flights, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protective zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments,architecture, history and culture and zones of regulation of buildings, protected landscapes, the presence of particularly valuable productive lands, no measures are taken for the functioning of the presented zones, appropriate tools and technologies are used, modern directions of formation and functioning of the presented zones are identified
7	Measures are being systematically implemented to provide information on the

Continuation of table F.5

1	2
7	presence of seismic and destruction zones of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution. Sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments,architecture, history and culture and areas of regulation of buildings, protected landscapes, the presence of particularly valuable productive lands, measures are taken for the functioning of the presented areas, appropriate tools and technologies are used, modern areas of formation and operation of the presented areas are identified
8	Measures are being systematically implemented to provide information on the presence of seismic and destruction zones of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution. sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other facilities, water protection zones and coastal protective strips of reservoirs and watercourses, territories and protection zones of nature reserves, monuments of nature, architecture, history and culture and zones of regulation of buildings, protected landscapes, availability of especially valuable productive lands, systematic measures on functioning of the presented zones are applied. and technologies, defined modern directions of formation and functioning of the presented zones
9	Measures are being systematically implemented to provide information on the presence of seismic and destruction zones of the earth's surface, landslides, flooding and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of zones of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution. sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments,architecture, history and culture and zones of regulation of buildings, protected landscapes, availability of especially valuable productive lands, systematically carried out measures on functioning of the presented zones, the corresponding tools and technologies are applied, modern directions of formation and functioning of the presented zones are defined and realized
10	Systematically implemented measures to provide information on the presence of seismic zones and zones of destruction of the earth's surface, landslides, flooding

Continuation of table F.5

1	2
10	and flooding, tectonic faults and other dangerous natural and anthropogenic processes, the presence of gassiness, excessive noise, electromagnetic radiation, radiation pollution, areas of pollution, areas sanitary protection zones of industrial enterprises, cemeteries and other communal objects, zones of restriction of building in the areas of airports on conditions of flight safety, districts and zones of sanitary protection of resorts, zones of sanitary protection of water supply sources, water treatment facilities, protection zones of quarries, dumps, pipelines and other objects, water protection zones and coastal protection strips of reservoirs and watercourses, territories and protection zones of nature reserves, natural monuments,architecture, history and culture and zones of regulation of buildings, protected landscapes, availability of especially valuable productive lands, systematically carried out measures on functioning of the presented zones, the corresponding tools and technologies are applied, modern directions of development of the presented zones are defined and realized

Table F.6

Characteristics of the criteria used to determine the urban indicators of transport, affecting the territorial development of land use in regions, resp. from (developed by the authors)

The value of the criterion	Characteristic
0	Areas of development of transport provision in regions are absent and not implemented
1	The directions of development of transport provision in regions are defined, however are not realized
2	Low level of implementation of directions of development of transport provision in regions
3	Some directions of development of transport provision in regions are realized
4	The directions of development of transport provision in regions are not systematically realized
5	Tactical directions of development of transport provision in regions are comprehensively realized
6	The strategic directions of development of transport provision in regions are comprehensively realized
7	Strategic directions of development of transport provision in regions are systematically realized
8	Systematically implemented strategic directions for the development of transport support in regions, which improves the quality of land use in regions
9	Systematically implemented strategic directions of development of transport support of the region, which allows to increase the efficiency of land use in regions
10	Systematic strategic directions of development of transport provision in regions are systematically realized, which causes increase of efficiency of land use in regions

Table F.7

Characteristics of criteria for determining indicators of the level of application of spatial information in urban development of land use in regions, resp. from (developed by the authors)

The value of the criterion	Characteristic
0	There are no directions of formation and application of spatial information that provide urban development of land use in regions
1	Areas of formation and application of spatial information that ensure urban development of land use in regions are being developed but not implemented.
2	Low level of implementation of directions of formation and application of spatial information, which provide urban development of land use in regions
3	Some directions of formation and application of spatial information which provide town-planning development of use of lands in regions are realized
4	Areas of formation and application of spatial information that provide urban development of land use in regions are not systematically implemented
5	Tactical directions of formation and application of spatial information which provide town-planning development of use of lands in regions are comprehensively realized
6	The strategic directions of formation and application of spatial information which provide town-planning development of use of lands in regions are comprehensively realized
7	Systematically implemented strategic directions for the formation and application of spatial information, which provide urban development of land use in regions
8	Systematically implemented strategic areas of formation and application of spatial information, which provide urban development of land use in regions and the development of settlements
9	Systematically implemented strategic directions of formation and application of spatial information, which ensure the urban development of land use in regions and the effectiveness of interaction between all stakeholders
10	Strategic directions of formation and application of spatial information are systematically realized, which provide town-planning development of land use in regions and efficiency of interaction between all interested persons, growth of interregional relations and creation and realization of the corresponding information system

Table F.8

Characteristics of criteria for determining the indicators of the level of formation of cadastral information in the field of land use in regions for urban planning, resp. from (developed by the authors)

The value of the criterion	Characteristic
0	There are no directions of formation and application of cadastral information, which provide urban development of land use in regions
1	Areas of formation and application of cadastral information that ensure urban development of land use in regions are being developed, but not implemented.
2	Low level of implementation of directions of formation and application of cadastral information, which provide urban development of land use in regions
3	Some directions of formation and application of cadastral information which provide town-planning development of use of lands in regions are realized
4	Unsystematically implemented areas of formation and application of cadastral information that ensure urban development of land use in regions
5	Tactical directions of formation and application of cadastral information which provide town-planning development of use of lands in regions are comprehensively realized
6	The strategic directions of formation and application of the cadastral information which provide town-planning development of use of lands in regions are comprehensively realized
7	Systematically implemented strategic directions of formation and application of cadastral information, which provide urban development of land use in regions
8	Systematically implemented strategic directions of formation and application of cadastral information, which provide urban development of land use in regions and the development of settlements
9	Systematically implemented strategic directions of formation and application of cadastral information, which ensure the urban development of land use in regions and the effectiveness of interaction between all stakeholders
10	The strategic directions of formation and application of cadastral information are systematically realized, which provide town-planning development of land use in regions and efficiency of interaction between all interested persons, growth of interregional relations and creation and realization of the corresponding information system.

Table F.9

Characteristics of the criteria that determine the evaluation factors influencing the formation of investment attractiveness in the system of territorial development of land use in regions: the level of soil valuation (f_{3311}), the level of economic evaluation of land (f_{3312}), the level of expert evaluation in the monetary valuation system f $_{3314}$), rel. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	There is no information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands, no work is carried out in the presented areas
1	At a low level, information support has been formed on soil evaluation, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands, no work is carried out in the presented areas
2	information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands has been formed, but it is not implemented, no work is carried out in the presented areas
3	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands has been formed, information support is being implemented in some areas, no relevant work is being carried out
4	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands has been formed, information support is unsystematically implemented, some relevant works are carried out
5	Information support on soil rating, economic evaluation of lands, expert evaluation in the system of monetary valuation of lands has been formed, information support is systematically implemented, separate relevant works are carried out
6	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary evaluation of lands has been formed, information support is systematically implemented, relevant works are carried out unsystematically
7	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary valuation of lands has been formed, information support is systematically implemented, relevant works are carried out systematically
8	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary valuation of lands has been formed, information support is systematically implemented, relevant works are systematically carried out, an information system is built
9	Information support on soil rating, economic evaluation of lands, expert evaluation in the system of monetary valuation of lands has been formed, information support is systematically implemented, relevant works are carried out systematically, the information system at the regional level is functioning and

Continuation of table F.9

1	2
	implemented
10	Information support on soil quality assessment, economic evaluation of lands, expert evaluation in the system of monetary valuation of lands is formed, information support is systematically implemented, relevant works are carried out systematically, information system is functioning and implemented at the regional level, modern tools and works are used

Table F.10

Characteristics of the criteria used to assess the indicators of the level of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in land relations, the level of use of movable and immovable property (buildings, structures, equipment and other tangible assets) values), which is at the disposal of regional authorities, the level of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations, resp. from

(developed by the authors)

The value of the criterion	Characteristic
1	2
0	There are no areas of use of funds, targeted bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets) held by the authorities regional authorities, there are no directions of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
1	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and use of movable and immovable property (buildings, structures, equipment and other tangible assets) are being developed, but not implemented. is at the disposal of regional authorities, formed directions of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
2	Low level of sales of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and use of movable and immovable property (buildings, structures, equipment and other tangible assets) located in At the disposal of regional authorities, certain areas of formation and use of capital investments are being implemented, aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations.
3	Separate areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use

Continuation of table F.10

1	2
	of movable and immovable property (buildings, structures, equipment and other tangible assets) available regional authorities, certain areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
4	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and use of movable and immovable property (buildings, structures, equipment and other tangible assets) available are not systematically implemented. regional authorities, implemented certain areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
5	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, unsystematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
6	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, systematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations
7	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, systematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations, provides interaction between different groups of stakeholders
8	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, systematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in the field of land relations, provides interaction between different groups of stakeholders, formed an appropriate information system
9	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, systematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in land relations, increases the efficiency of interaction between different groups of stakeholders, formed an appropriate information system

Continuation of table F.10

1	2
10	Areas of use of funds, target bank deposits, shares, stocks and other securities (except promissory notes) used in the field of land relations and the use of movable and immovable property (buildings, structures, equipment and other tangible assets), which are available, are systematically implemented. regional authorities, systematically implemented areas of formation and use of capital investments aimed at the creation, reconstruction and technical re-equipment of fixed assets used in land relations, increases the efficiency of interaction between different groups of stakeholders, formed and operates an appropriate information system

Table F.11

Characteristics of the criteria of stakeholder indicators that affect the investment attractiveness in the system of territorial development of land use in regions, resp. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	There are no areas of interaction between stakeholders operating in the field of land relations in regions, no mechanisms for interaction between stakeholders have been developed, there are no tools and institutions to ensure interaction
1	Areas of interaction between stakeholders operating in the field of land relations in regions have been developed, but they are not implemented, mechanisms of interaction between stakeholders have not been developed, there are no tools and institutions to ensure interaction
2	Separate directions of interaction between stakeholders operating in the field of land relations in regions have been developed and are being implemented, mechanisms of interaction between stakeholders have not been developed, there are no tools and institutions to ensure interaction
3	Some areas of interaction between stakeholders operating in the field of land relations in regions have been developed and are being implemented, mechanisms for interaction between stakeholders have been developed, and there are no tools and institutions to ensure interaction
4	Some areas of interaction between stakeholders operating in the field of land relations in regions have been developed and are being implemented, mechanisms of interaction between stakeholders have been developed, tools have been proposed and the functioning of institutions forming interaction has been ensured
5	Areas of interaction between stakeholders operating in the field of land relations in regions are implemented systematically, mechanisms of interaction between stakeholders are developed, tools are proposed and the functioning of institutions that form interaction is ensured
6	Areas of interaction between stakeholders operating in the field of land relations in regions are implemented unsystematically, mechanisms of interaction between

Continuation of table F.11

1	2
	stakeholders are implemented, tools are proposed and the functioning of institutions that form interaction is ensured
7	Areas of interaction between stakeholders operating in the field of land relations in regions are implemented unsystematically, mechanisms of interaction between stakeholders are implemented, tools are implemented and the functioning of institutionsthat form interaction is ensured
8	Areas of interaction between stakeholders operating in the field of land relations in regions are systematically implemented, mechanisms of interaction between stakeholders are implemented, tools are implemented and the functioning of institutions that form interaction is ensured
9	Areas of interaction between stakeholders operating in the field of land relations in regions are systematically implemented, mechanisms of interaction between stakeholders are implemented, tools are implemented and effective functioning of institutions that form interaction is ensured
10	Areas of interaction between stakeholders operating in the field of land relations in regions are systematically implemented, mechanisms of interaction between stakeholders are implemented, tools are implemented and effective functioning of institutions that form interaction is ensured, which increases the investment attractiveness of the region's lands

Table F.12

Characteristics of the criteria for indicators of attracting foreign investment in the field of land relations in regions, rel. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	There are no areas of support and attraction of foreign investment in the field of land relations in regions
1	Forms of support and attraction of foreign investments in the sphere of land relations in regions are formed, but not realized
2	Some areas of support and attraction of foreign investments in the field of land relations in regions are being implemented
3	Areas of support and attraction of foreign investments in the field of land relations in regions are not systematically implemented
4	Areas of support and attraction of foreign investments in the sphere of land relations in regions are systematically implemented, which ensured the creation of an investment climate
5	Areas of support and attraction of foreign investments in the sphere of land relations in regions are systematically implemented, which has ensured the creation of an investment climate and provides interaction between stakeholders
6	Areas of support and attraction of foreign investments in the field of land relations in regions are implemented unsystematically, which ensured the creation of an investment climate and provides interaction between stakeholders and increases the investment attractiveness in regions lands
7	Areas of support and attraction of foreign investments in the field of land

Continuation of table F.12

1	2
	relations in regions are comprehensively implemented, which has ensured the creation of an investment climate and provides interaction between stakeholders and increases the investment attractiveness in regions lands
8	Areas of support and attraction of foreign investments in the field of land relations of the region are systematically implemented, which ensured the creation of the investment climate and provides interaction between stakeholders and increases the investment attractiveness in regions lands
9	Areas of support and attraction of foreign investments in the field of land relations of the region are systematically implemented, which has ensured the creation of an investment climate and provides interaction between stakeholders and increases the investment attractiveness in regions lands
10	The levels of support for the development of trade, economic, scientific, technical and investment cooperation of Ukraine with foreign countries on the basis of mutual benefit in the field of land relations, expansion of international cooperation in the field of land relations to attract foreign investment, new technologies and management experience in the national economy in the interests of its reform, modernization and innovative development, provision of foreign economic activity of Ukraine by services to foreign economic entities in the field of land relations of the regions, scientific, scientific-technical, scientific-industrial, industrial, educational and other cooperation with foreign sub-economic activity in the field of land relations of the regions,credit and settlement operations between subjects of foreign economic activity and foreign subjects of economic activity in the field of land relations of regions, creation by foreign subjects of economic activity of banking, credit and insurance institutions on the territory of Ukraine to ensure development of land relations in regions, joint business activity between subjects of foreign economic activity and foreign subjects of economic activity, which includes the creation of joint ventures of various types and forms, joint business operations and joint ownership of property both in Ukraine and abroad in the field of land relations, organization and implementation activities in the field of exhibitions, auctions, auctions, conferences, symposia, seminars and other similar events,carried out on a commercial basis, with the participation of foreign economic entities to ensure the development of land relations, the implementation of leases, including leasing, transactions between foreign economic entities and foreign economic entities in the field of land relations, purchase, sale and currency exchange at currency auctions, currency exchanges and the interbank foreign exchange market to ensure land relations of the regions, the implementation of work on a contractual basis of individuals of Ukraineoperations on purchase, sale and exchange of currency at currency auctions, currency exchanges and on the interbank foreign exchange market to ensure land relations of the regions, implementation of works on a contractual basis by individuals of Ukraineoperations on purchase, sale and exchange of currency at currency auctions, currency exchanges and on the interbank foreign exchange market to ensure land relations of the regions, implementation of works on a contractual basis by individuals of Ukrainewith foreign economic entities both on the territory of Ukraine and abroad to ensure the development of land relations, work of foreign individuals on a contractual basis with foreign economic entities both on the territory of Ukraine and abroad in the field of land relations of regions in the field of land relations, other types of foreign economic activity, not prohibited

Continuation of table F.12

1	2
	directly and exclusively by the laws of Ukraine related to the formation, distribution and use of land relations of regions, levels of activity of enterprises wholly owned by foreign investors, branches and others structural units of foreign legal entities or acquisition into full ownership of operating enterprises, acquisition of real estate or movable property not directly prohibited by the laws of Ukraine, together with houses,apartments, premises and other objects of property, by direct receipt of property and property complexes, which are connected with subjects of foreign economic activity, acquisition independently by foreign investors or with the participation of Ukrainian legal entities or individuals of land use rights on the territory of Ukraine

Table F.13

Characteristics of the definition criteria indicators level of formation of special economic zones to ensure investment in the use of land in regions, rel. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	Lack of directions for the formation of special economic zones to ensure investment in land use in regions
1	Directions for the formation of special economic zones to ensure investment in the use in regional lands have been developed but are not being implemented.
2	Some directions of formation of special economic zones for maintenance of investment in sphere of use of lands in regions are realized
3	Areas of formation of special economic zones to ensure investment in the use of land in regions are not systematically implemented
4	Areas of formation of special economic zones to ensure investment in the use of land in the regions are being implemented unsystematically, which leads to increased efficiency of interaction between stakeholders
5	Areas of formation of special economic zones to ensure investment in the use of land in the regions are being implemented unsystematically, which leads to increased efficiency of interaction between stakeholders
6	The directions of formation of special economic zones for ensuring investment in the sphere of land use in regions are systematically realized, which causes increase of investment attractiveness of lands in regions
7	The directions of formation of special economic zones for ensuring investment in the sphere of land use in regions are systematically realized, which leads to growth of investment attractiveness of lands in regions
8	The directions of formation of special economic zones for maintenance of investment in the sphere of use of lands in regions that causes formation of tendencies of development in regions are systematically realized.
9	The directions of formation of special economic zones for maintenance of investment in sphere of use of lands in regions that leads to maintenance of tendencies of development in regions are systematically realized

Continuation of table F.13

1	2
	The directions of formation of special economic zones for investment in the sphere of land use in regions are systematically realized, which leads to a high level of definition of perspective directions of development of special (free) economic zone, operation and construction of transport networks, communication, energy supply and other production infrastructure used in the field of land use in regions, development of a network of communication links with partners outside the special (free) economic zone, streamlining and providing business entities with a special (free) economic zone for the use of land, issuing permits to entities management of a special (free) economic zone for the construction of new economic facilities, registration of economic entities and investments,carried out in a special (free) economic zone in the field of land use of the regions, providing state guarantees of all property and non-property rights

Table F.14

Characteristics of criteria for assessing indicators of environmental development, rel. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	Lack of directions of ecological development in the system of land use in regions
1	Directions of ecological development in the system of land use in regions are developed, but not realized
2	Some directions of ecological development in the system of land use in regions are being implemented
3	The directions of ecological development in the system of land use in regions are not systematically realized
4	The directions of ecological development in the system of land use in regions are systematically implemented, which causes the strengthening of the ecological condition
5	Areas of ecological development in the system of land use in regions are not systematically implemented, which leads to increased efficiency of interaction between stakeholders in the environmental sphere
6	Areas of ecological development in the system of land use in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects
7	Areas of ecological development in the system of land use in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects that have an innovative character
8	The directions of ecological development in the system of land use in regions are systematically realized, which leads to the growth of the innovation and investment component of the ecological development in regions
9	The directions of ecological development in the system of land use, which causes the development in regions, are systematically implemented

Continuation of table F.14

1	2
10	The directions of ecological development in the system of land use in regions are systematically realized, which leads to the increase of the quality of the state of the natural environment or its objects–land, water, subsoil, atmospheric air, flora and fauna and the level of their pollution of the formed biological diversity and its components, together with genetically modified organisms and their interaction with the environment, the influence of factors, materials, substances, products, energy , physical factors (noise, vibration, electromagnetic radiation, radiation) on the environment and human health, reducing the threat and causes of environmental emergencies, the results of the elimination of these phenomena, increasing the quality of implementation of recommendations for measures to reduce their negative impact on natural objects and human health, increasing the quality of implementation of the developed environmental forecasts, plans and programs, measures, including administrative,influencing the state ecological policy, the legislation on environmental protection, implementation of costs associated with the provision of environmental measures at the expense of environmental protection funds, other sources of funding, the quality of application of the results of economic analysis conducted in the decision-making process on environmental issues

Table F.15

Characteristics of criteria for assessing functional indicators to reduce or prevent waste generation, resp. from (developed by the author)

The value of the criterion	Characteristic
1	2
0	Lack of ways to reduce or prevent waste generation in the land use system in regions
1	Directions for reducing or preventing waste generation in regions land use system have been developed but are not being implemented
2	Some directions of reduction or prevention of waste generation in the system of land use in regions are being implemented
3	Areas of reduction or prevention of waste generation in the land use system in regions are not implemented systematically
4	Unsystematically implemented areas for reducing or preventing waste generation in the land use system in regions, which leads to the strengthening of the ecological state
5	Unsystematically implemented areas of reducing or preventing waste generation in the land use system in regions, which leads to increased efficiency of interaction between stakeholders in the environmental sphere
6	Areas of reduction or prevention of waste generation in the land use system in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects
7	Areas of reduction or prevention of waste generation in the land use system in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects that have an innovative

Continuation of table F.15

1	2
	character
8	The directions of reduction or prevention of waste generation in the land use system are systematically implemented, which leads to the growth of the innovation and investment component of the ecological development in regions
9	Areas of reduction or prevention of waste generation in the land use system, which causes the development in regions, are systematically implemented
10	Areas of reduction or prevention of waste generation in the land use system in regions are systematically implemented, which leads to an increase in the level of efficiency of development and implementation of scientifically sound standards for waste generation per unit of output (raw materials and energy), levels of work and services regulating their quantity and quality composition, in accordance with advanced technological advances, providing periodic revision of established standards for waste generation, aimed at reducing their volume, taking into account best domestic and foreign experience and economic opportunities, development and implementation of packaging and packaging, increasing levels of formation and implementation of the system collection, removal, disposal and utilization of used oils, worn tires,rubber products and wastes of rubber production, unsuitable for use of vehicles, electrical and electronic equipment, wastes generated in the process of medical care, veterinary practice, related research, increasing levels of development of general requirements for household waste management, development systems of information, scientific and methodological support of waste producers with information on technological and other possibilities of reducing the volume of waste generation and utilization,increasing the levels of development of general requirements for household waste management, development of a system of information, scientific and methodological support of waste producers with information on technological and other opportunities to reduce the generation and disposal of waste,increasing the levels of development of general requirements for household waste management, development of a system of information, scientific and methodological support of waste producers with information on technological and other opportunities to reduce the generation and disposal of waste, carrying out any economic activity related to waste generation without obtaining permission from local executive authorities to carry out operations in the field of waste management in accordance with the requirements laws on ecology and environmental safety, use of research results, implementation of inventions, application of new equipment, imported equipment, technologies and systems, if they do not provide for the prevention or minimization of waste generation at all stages of the technological process, their utilization and safe disposal, in accordance with the ecological norms of the location of enterprises, installations, landfills, complexes, storage and other facilities for waste management, design and construction of regional and interregional complexes of treatment, disposal, utilization and disposal of waste, if they do not meet environmental and sanitary requirements, the effectiveness of decision-making on the location and development of cities and other settlements without defining technical and other measures to create conditions for disposal or disposal of household waste, the intensity of commissioning of new andreconstructed enterprises and other facilities equipped with equipment and technologies for safe waste management, and in the absence of data necessary for evaluation their impact on the environment and human health, in accordance with the established procedure, transfer or sale of hazardous waste to citizens, enterprises, institutions and organizations, if they do not ensure the disposal

Continuation of table F.15

1	2
	or disposal of this waste in an environmentally friendly way, increasing the involvement of children and adolescents in organized collection of waste (as secondary raw materials), hazardous to health, reducing the levels of violation of the terms of processing of waste imported into Ukraine in accordance with the quotas, violation of established quotas for import of waste into Ukraine as secondary raw material, import to Ukraine, except transit transportation of any waste for the purpose of its storage or disposal, storage and disposal of waste are carried out in accordance with the requirements of environmental safety and methods,ensuring the maximum use of waste or its transfer to other consumers (except for disposal), waste disposal, which is carried out in accordance with statutory environmental safety requirements with mandatory provision for disposal or disposal of residual products in consultation with the central executive body implementing state policy in the field of sanitary and epidemiological welfare of the population, increasing the levels of storage and disposal of waste, which is carried out in places designated by local governments, taking into account the requirements of land and environmental legislation, with permission to conduct operations in the field of waste. Amount of waste, general technical requirements, safety measures, information on generation, purpose, methods of waste treatment in accordance with the established conditions of their storage, formation and determination of places or facilities for storage and disposal of waste, which should be used only for waste, applied for a permit for operations in the field of waste management, waste disposal, for the disposal of which there is a technology in Ukraine, reducing the level of unauthorized dumping and disposal of waste, including household waste, in underground horizons, in cities and other settlements, in the territories of nature reserves, on lands of nature protection, health, recreational and historical-cultural purpose, within water protection zones and sanitary protection zones water bodies, in other places, which may pose a danger to the environment and human health, increasing levels of waste disposal in the subsoil,which is allowed in exceptional cases based on the results of special studies in compliance with standards, norms and rules provided by the legislation of Ukraine, increasing the level of prevention of environmental pollution, taking measures to prevent accidents, limit and eliminate their consequences and protect people and the environment. environment from their impact, informing about the accident that occurred at the specified facility, and about the measures taken to eliminate its consequences, executive authorities, local governments and the population, ensuring the operation of these facilities and transportation of hazardous waste in compliance with the requirements environmental legislation,fulfillment of license conditions for carrying out operations in the field of hazardous waste management (not subject to licensing of storage (accumulation) by a business entity of hazardous waste generated by it, if within a year from the date of generation of hazardous waste waste management of hazardous waste generated by it, if within a year from the date of generation hazardous waste is transferred to economic entities licensed to carry out operations in the field of hazardous waste management), ensuring the identification of hazardous waste management facilities in accordance with the Law of Ukraine «On objects of increased danger»; planning of localization and liquidation of accident on object, growth of levels of formation of safety measures, validity of establishment of rates of ecologicaltax related to waste disposal, with differentiation depending on the level of waste hazard and the value of the territory, the provision of business entities that utilize, reduce waste and introduce into production low-waste technologies, in accordance with the law of tax,

Continuation of table F.15

1	2
	credit and other benefits, providing in the manner prescribed by law tax, credit and other benefits to businesses that hand over waste as a secondary raw material and collect and procurement of such wastes, determination of priorities for financing under the state contract of enterprises implementing low-waste technologies, processing and utilization of wastes, targeted financing of research works on specific problems of waste utilization and reduction of their generation, creation of funds for targeted financing of waste utilization contributions of waste producers, their owners, domestic and foreign economic entities,individual citizens, environmental insurance, ensuring the formation of a state data bank for the introduction of waste disposal technologies in Ukraine, etc.

Table F.16

Characteristics of criteria for assessing the level of shelter of the population in protective structures of civil defense, resp. from (developed by the authors)

The value of the criterion	Characteristic
1	2
0	Absence of directions of shelter of the population in protective constructions of civil protection in the system of use of lands in regions
1	The directions of shelter of the population in protective constructions of civil protection in the system of use of lands in regions are developed, however are not realized
2	Some directions of shelter of the population in protective constructions of civil protection in system of use of lands in regions are realized
3	Areas of shelter of the population in protective structures of civil defense in the system of land use in regions are not systematically implemented
4	Areas of shelter of the population in protective structures of civil protection in the system of land use in regions are systematically implemented, which leads to the strengthening of the ecological condition
5	Areas of shelter of the population in protective structures of civil protection in the system of land use in regions are systematically implemented, which leads to increased efficiency of interaction between stakeholders in the environmental sphere
6	Shelter of the population in protective structures of civil protection in the system of land use in regions is systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects
7	Areas of shelter of the population in protective structures of civil protection in the system of land use in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects that have an innovative character
8	Areas of shelter of the population in protective structures of civil protection in the system of land use in regions are systematically implemented, which leads to the formation of a system of counteraction to all types of emergencies and the emergence of environmental problems
9	Areas of shelter of the population in protective structures of civil protection in the system of land use, which causes the development in regions, are systematically

Continuation of table F.16

1	2
	implemented
10	Areas of shelter of the population in protective structures of civil protection in the system of land use in regions are systematically implemented, which leads to increased efficiency of measures to create protective structures, implementation of design, construction, adaptation and placement of protective structures and dual-use facilities. full compliance with the requirements for maintenance and operation of protective structures are determined by the central executive body, which ensures the formation and implementation of state policy in the field of civil protection, directions of maintenance of protective structures of civil protection in readiness for use by economic entities on whose balance they are (in particular, buildings that were not included in their authorized capital in the process of privatization (corporatization), at its own expense, ensuring full control over the readiness of civil defense structures for use as intended, provided by the central executive body, which carries out state supervision in the field of man-made and fire safety, together with relevant bodies and units of civil defense, local state administrations

Table F.17

Characteristics of criteria for assessing indicators of the level of biological protection of the population, animals and plants, Rel. from

(developed by the authors)

The value of the criterion	Characteristic
1	2
0	Lack of areas of biological protection of the population, animals and plants in the land use system in regions
1	The directions of biological protection of the population, animals and plants in the system of land use in regions are developed, but not realized
2	Some areas of biological protection of the population, animals and plants in the land use system in regions are being implemented
3	Areas of biological protection of the population, animals and plants in the system of land use of the region are not systematically implemented
4	Non-systemic biological protection of the population, animals and plants in the system of land use in regions, which leads to the strengthening of the ecological state
5	Areas of biological protection of the population, animals and plants in the system of land use in regions are not systematically implemented, which leads to an increase in the effectiveness of interaction between stakeholders in the environmental sphere
6	Areas of biological protection of the population, animals and plants in the system of land use in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects
7	Areas of biological protection of the population, animals and plants in the system of land use in regions are systematically implemented, which leads to an increase in the level of implementation of environmental programs and projects that have

Continuation of table F.17

1	2
	an innovative character
8	The biological protection of the population, animals and plants in the system of land use in regions is systematically implemented, which leads to the formation of a system of counteraction to all types of emergencies and the emergence of environmental problems
9	The directions of biological protection of the population, animals and plants in the system of land use, which causes the development in regions, are systematically implemented
10	The directions of biological protection of the population, animals and plants in the system of land use in regions, which leads to growth, are systematically implemented levels of timely detection of factors and foci of biological infection, its localization and elimination, forecasting the scale and consequences of biological infection, development and implementation of timely anti-epidemic, prophylactic, anti-epizootic, anti-epiphytic and therapeutic measures, effectiveness of emergency non-specific population and specific timely use of individual and collective protection, introduction of restrictive anti-epidemic measures, observation and quarantine, implementation of disinfection measures in the center of infection, disinfection of economic entities, animals and sanitary treatment of the population, increase of quality of emergency medical care affected by biological pathogens, implementation of other biological protection measures depending on the situation, quality growth establishment of anti-epidemic, anti-epizootic and anti-epiphytic regimes and their observance by business entities, health care institutions and the population

Annex G

Table G.1

The results of a comparative analysis of the main economic indicators of Russia, China and the United States

Indicator	Russia		China		USA	
	1990	2018	1990	2018	1990	2018
1	2	3	4	5	6	7
Area total, million sq km	17,1	17,1	9,6	9,6	9,8	9,8
General Economic Indicators (IMF, WB, NBS, Росстат, OECD)						
Gross Domestic Product (GDP), bln. Dollars, current prices	1102	1631	390	13407	5980	20494
Gross Domestic Product (GDP), bln. units of national currency, constant prices	59746 (1992)	89467	6548	84893	9366	18566
GDP, Purchasing Ppower Parity (PPP), bln. Dollars	1594 (1992)	4213	1091	25270	5980	20494
GDP, PPP, share in the world, percentages	4,9 (1992)	3,1	4,1	18,7	22,3	15,2
GDP per capita, current prices, USD	-	11327	348,4	9608	23914	62606
Gross Fixed Capital Formation,billion dollars, current prices	-	353	89	5126	1269	3986
FDI inflows, billions of dollars, current prices	-	13,3	3,5	139	48,5	251,8
Total investment as a percentage of GDP	31,9	23	34,4	44,2	21,5	21,1
Consumer Price Index, percent, 1990 – 100	100	~9,3 млн.	100	~300	100	~190
Consumer price index at the end of the year, in percent to the previous year (average for the period 2000 - 2017)	-	110,3	-	102,3	-	102,1

Continuation of table G.1

1	2	3	4	5	6	7
Inflation, percent, 2000 – 100	-	528,1	-	150,4	-	144,6
The refinancing rate at the end of the year, percent.	0,5 - 1	7,75	-	4,35	7	2,5
Average monthly accrued salary, USD (in China - for urban areas)	-	690	-	917 (2017)	2231	5258
Debts and international reserves (WB, CIA)						
International reserves at the end of the year, including gold, $ bn.	-	468,6	34,5	3168	173,1	449,9
Total external debt at the end of the year, billion dollars	-	454,7	55,3	1965	3233	21462
Defense (SIPRI, WB)						
Defense spending, billions of dollars, current prices	7,8 (1993)	61,4	10,1	250	306,2	648,8
Defense spending, % of GDP	4,6 (1993)	3,9	2,5	1,9	5,3	3,2
Military expenditure per capita, dollars	52,3 (1993)	418	8,6	180	1212	1983
Armed forces, mln.	1,9 (1992)	1,45	3,5	2,7	2,18	1,4
Armed forces as a percentage of the labor force	2,5 (1992)	2	0,55	0,3	1,7	0,8
International trade (WTO, WB)						
Export of goods, bln. Dollars, current prices	-	443	62,1	2487	393,6	1666
Export of goods, share of world exports, %	-	2,0	1,8	12,8	11,2	8,7
Export of fuel and energy resources as a percentage of total exports of goods	-	52,7	8,3	1,6	3,2	11,6

Continuation of table G.1

1	2	3	4	5	6	7
Export of machinery and transport equipment, billions of dollars	-	20,6	10,8	1152	182,6	541
Export of office and telecommunication equipment, billions of dollars	-	1,3*	3,1	544,7	51,7	145,5
Agricultural products, export, billions of dollars	-	34,5	10,1	76	59,4	169,8
Import of goods, bln. Dollars, current prices	-	240	53,3	2136	517	2612
Imports of food products, billions of dollars	-	27,8	4,6	113,5	30	146,5
Power Engineering (BP, NBS, IEA, Росстат)						
Primary energy consumption, million tons in oil equivalent	865	721	681	3274	1967	2301
Crude oil production, million tons	516	563,3	138	189,1	417	669,4
Oil consumption, million tons	251,7	146,3	112,9	628	772,5	892,8
Extraction of natural gas, billion cubic meters	590	669,5	15,8	161,5	504,3	831,8
Natural gas consumption, billion cubic meters	407,6	454,5	15,8	283	542,9	817,1
Coal production, million tons	395	441,3	1054	3683	934	685,4
Electricity production, billion kWh	1082	1110,8	621	7111,8	3185	4460,8
Installed capacity of power plants, million kW	213	272	138	1900	734	1077
Industry (WB, NBS, UNdata, OICA, Росстат)						
Industry, value added (incl. construction), billion dollars, current prices	232,5	532	148	5532	1493	3548

Continuation of table G.1

1	2	3	4	5	6	7
Industry, value added (incl. construction), billion dollars, constant 2010 US$	587	508	268	4978	-	3203
Manufacturing, value added, billion dollars, current prices	143	188	-	3227	1043	2180
Steel smelting, million tons	89,6	71,7	70	928	99	86,7
Number of installed industrial robots per 1000 people in industry	-	2	-	49	-	176
Motor Vehicle production (cars, trucks, buses), mln.	1,8	1,77	0,5	27,8	9,8	11,3
Capacity of oil refineries, million barrels per day	7,2	6,6	2,9	15,7	15,7	18,8
Production of sulfuric acid, million tons	12,8	13,1	12	91,3	52,4 (1995)	30 (2011)
Production of mineral fertilizers (100% of nutrients), million tons	16	22,9	18	54,2	23	24,1
Production of chemical yarns and fibers, million tons	0,67	0,19	1,65	50,5	4	2,8 (2015)
Paper and cardboard production, mln. tons	8,3	9,1	13,7	108,4	72	71
Cement production, million tons	83	53,7	209,7	2210	75,5	87,8
Production of personal computers, million pieces	0,3	0,2	0,08	307	-	-
Production of mobile phones, billion pieces	-	-	-	1,8	-	-
Construction (NBS, UNdata, Росстат)						
Value added in construction, billion dollars, current prices	-	106	17	934	242,9	781
Floor Space Completed, million square meters	-	137,3	195,5	4191	-	-
Agriculture (FAO, WB, NBS, USDA, Росстат)						
Agriculture, forest and fishing, value added, billion dollars, current prices	80	63,3	95,9	1006	-	169

Continuation of table G.1

1	2	3	4	5	6	7
Production of cereals, million tons	111,8	109,5	404	619,9	312	440,1
Potato production, million tons	31	22,4	32	99,2	18,2	20
Production of meat of livestock and poultry (carcass weight), million tons	10	10,6	30	86,5	29	45,8
Milk, million tons	55,7	30,6	7	34,9	67	97,8
Eggs, million tons	2,4 (1992)	2,5	8,2	31,3	4	6,3
Fruit production, incl. melons, million tons	4,1 (1992)	5,2	45,1	264,7	29,6	26,5
Production of apples, mln. tons	1,8 (1992)	1,6	4,3	41,4	4,4	5,2
Demographic indicators (NBC, CDC, U.S. Census Bureau, WB, Росстат)						
Population at the end of the year, mln.	148,3	146,8	1143	1396	253	327,2
Density of population, people per sq.km	9	9	120,9	146	27,3	36
Birth rate	13,4	10,9	21,1	10,9	16,7	11,8
Death rate	11,2	12,5	6,7	7,1	8,6	8,6
Life expectancy at birth	69,2	72,9	68,8	76,4	75,2	78,5
Health (WB, NBS)						
Health expenditure per capita, USD	-	469	-	398	-	9870
Health expenditure as a percentage of GDP	-	5,3	-	5,0	-	17,1
Incidence of tuberculosis (per 100,000 population)	50	60	152	63	12	3,1

Annex H

Indicators of the functioning of the economy of Ukraine

Table H.1

Dynamics of total expenditures of Ukrainian households for 2010–2018 according to the data [500]

Total costs	2010	2011	2012	2013	2014	2015	2016	2017	2018	Base index (2018/2010)
1	2	3	4	5	6	7	8	9	10	11
Total costs on average in the development hunk per household donation, UAH	3073.3	3458.0	3592.1	3820.3	4048.9	4952.0	5720.4	7139.4	8308.6	2,703 th most common
The structure of the total household expenditures	percent									
Consumer aggregate costs	89.9	90.1	90.8	90.2	91.6	92.9	93.2	92.9	92.0	1,023 th most common
food and soft drinks	51.6	51.3	50.1	50.1	51.9	53.1	49.8	47.9	47.7	0.924
alcoholic beverages, tobacco products	3.4	3.4	3.5	3.5	3.4	3.3	2.9	3.1	3.4	1,000
non-food goods and services	34.9	35.4	37.2	36.6	36.3	36.5	40.5	41.9	40.9	1,172 th most common
including										
clothes and shoes	6.0	5.7	6.1	5.9	6.0	5.7	5.6	5.5	5.4	0.900
housing, water, electricity, gas and other fuels	9.2	9.6	9.9	9.5	9.4	11.7	16.0	17.0	15.2	1,652 th most common
household items, household appliances and current maintenance of housing	2.3	2.2	2.3	2.3	2.3	2.0	1.7	2.0	2.1	0.913

Continuation of table H.1

1	2	3	4	5	6	7	8	9	10	11
health care	3.2	3.2	3.4	3.4	3.6	3.7	4.2	3.8	4.0	1,250 th most common
transport	3.7	4.0	4.3	4.3	4.3	3.7	3.6	3.7	3.7	1,000
communication	2.7	2.6	2.8	2.8	2.8	2.4	2.3	2.4	2.6	0.963
recreation and culture	1.8	1.9	2.0	2.1	1.8	1.5	1.4	1.6	1.8	1,000
education	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.1	1.0	0.769 th most common
restaurants and hotels	2.4	2.5	2.5	2.5	2.3	2.0	2.2	2.3	2.4	1,000
various goods and services	2.3	2.4	2.6	2.6	2.7	2.7	2.5	2.5	2.7	1,174 th most common
Non-consumer aggregate costs	10.1	9.9	9.2	9.8	8.4	7.1	6.8	7.1	8.0	0.792 th most common
Reference: payment for housing, utilities and services	7.6	8.0	8.3	8.0	8.1	10.2	14.7	15.4	13.9	1,829 th most common

Table H.2

Number of business entities by type of economic activity in 2018 according to the data [500]

Types of economic activity	Total units	Including			
		enterprises		natural persons-entrepreneurs	
		units	as a percentage of the total number of enterprises	units	as a percentage of the total number of individual entrepreneurs
1	2	3	4	5	6
Total	**1839672**	**355956**	**100.0**	**1483716**	**100.0**
including					
agriculture, forestry and fisheries	76328	50504	14.2	25824	1.7
industry	125859	44425	12.5	81434	5.5
construction	52531	29590	8.3	22941	1.6

Continuation of table H.2

1	2	3	4	5	6
wholesale and retail trade; repair of motor vehicles and motorcycles	818217	93590	26.3	724627	48.8
transport, warehousing, postal and courier activities	90591	16085	4.5	74506	5.0
temporary accommodation and catering	61761	7535	2.1	54226	3.7
information and telecommunications	174622	14515	4.1	160107	10.8
financial and insurance activities	9739	4137	1.2	5602	0.4
real estate transactions	93383	36332	10.2	57051	3.8
professional, scientific and technical activities	126100	28709	8.1	97391	6.6
activities in the field of administrative and support services	49206	17290	4.8	31916	2.2
education	13241	2318	0.7	10923	0.7
health care and social assistance	24961	5432	1.5	19529	1.3
art, sports, entertainment and recreation	13797	2135	0.6	11662	0.8
provision of other types of services	109336	3359	0.9	105977	7.1

Table H.3

Dynamics of the volume of sold products (works, services) by types of economic activity for 2010 - 2018, thousand UAH According to [500]

Areas of activity	Years	Volume of sold products (goods, services) of business entities						
		total				including natural persons-entrepreneurs		
		subjects of large business	subjects of medium-sized business	small businesses	from them subjects of micro-enterprise	the subject of the middle of his entrepreneurship	small business entities	from them subjects of microenterprise
1	2	3	4	5	6	7	8	9
Total	2010	1401596805.6	1415851797.7	779197875.7	371958410.7	19487467.0	210930759.6	190055341.7
	2011	1775829049,7	1618849106.0	807777042.2	371496882,8	11221133.3	199994625,1	181697757.0
	2012	1761086007.6	1782445148,8	916287611,4	438100360.4	13014985.8	243634209.5	225449147.6
	2013	1717391283,6	1683344056,5	933717719.7	460657329.6	20778872.6	263459216.4	244545952,7
	2014	1742507894,5	1735894250.1	981300032.3	486635312.8	12742718.8	276299551,8	255905981.9
	2015	2053189492.2	2184376795.5	1318974151.5	665725784.0	15611973.4	381861325.9	358275809.1
	2016	2391454263.0	2683303555,3	1651982037.2	811546392.8	14607847.9	474596794.1	449762372.0
	2017	2929516585,0	3314956081,6	2067799291.6	1052149468.7	18538184.8	585798554.6	554372410.3
	2018	3515839460.5	3954017476.9	2496947692,2	1292430517.4	29957835,7	730797248.2	692804954.8
Base index (2018/2010)		***2,508 th most common***	***2,793 th most common***	***3,205 th most common***	***3,475 th most common***	***1,537 th most common***	***3,465 th most common***	***3,645 th most common***
Agriculture, forestry and fisheries household	2010	11664534.8	65623196.4	26273509.5	13339621.8	69727.0	3600077.7	3354609.1
	2011	12553071.1	79090031.9	38961357.3	14385296.1	25625.9	3617589.2	3377519.6
	2012	19473189.5	94045102.8	53814268.4	19329454.5	65681.4	4655748.1	4401747.7

Continuation of table H.3

1	2	3	4	5	6	7	8	9
	2013	2344059 4.9	8913731 5.9	536999 85.5	188621 70.9	28600 9.7	4861550. 6	442242 2.9
	2014	3158464 5,2	1173327 17.7	712459 66.9	242418 99.9	29145 6.2	5942026. 4	496831 4.4
	2015	6121482 7.8	-	-	430840 56.3	-	-	902654 7.7
	2016	5303375 1.7	2067334 64.4	155032 687.9	560184 34.4	13969 4.8	1101440 6.8	104756 92.8
	2017	3887985 6.5	2381587 22,5	190597 561.8	663073 79.2	17141 1.2	1308462 7.0	120687 21.9
	2018	5475792 1.9	2724336 84,3	213317 765.7	748226 13.6	22353 1.1	1518894 9.4	139684 22.8
Base index (2018/2010)		***4,694 th most common***	***4,151 th most common***	***8,119 th most com-mon***	***5,609 th most com-mon***	***3,206 th most com-mon***	***4,219 th most common***	***4,164 th most com-mon***
Industry	2010	7449923 51.0	3612870 40.9	675224 21.8	242763 91.7	11304 25.7	1343994 0.6	119735 90.0
	2011	9884353 96.9	4151722 12.8	750942 80.3	249500 94.2	10908 76.6	1281889 0.7	111559 92.0
	2012	9700092 93.3	4593151 22.7	882932 17.9	292012 79.3	15648 17.5	1712313 9.3	146901 07.1
	2013	9341350 81.6	4642549 92.6	954599 47.7	330820 19.3	24115 69.4	1834698 4.3	158272 09.5
	2014	9329403 73.4	5332935 83.9	101480 052.7	340343 19.9	17795 71.3	1931953 8.9	168812 98.3
	2015	1078293 139.8	6931028 04.1	145789 648.4	513876 51.2	20014 32.0	2764880 1.4	245229 41.7
	2016	1232220 972.9	9238625 15.8	186916 912.7	645027 74.5	27961 77.1	3450835 0.9	312916 41,5
	2017	1537353 392.4	1094833 402.5	230122 088.9	800383 20.1	27727 52.0	4176722 4,3	379559 37,0
	2018	1790428 808.1	1233890 649.9	278224 223,5	972784 70.8	35886 27.0	5057642 0.4	456248 76.4
Base index (2018/2010)		***2,403 th most common***	***3,415 th most common***	***4,120 th most commo n***	***4,007 th most commo n***	***3,175 th most comm on***	***3,763 th most common***	***3,810 th most commo n***
Construc-tion	2010	6210869. 7	-	-	173108 53.3	-	-	487312 5.4
	2011	1160401 6.6	6762108 6.1	455882 84,1	159067 71.6	29805 1.1	4095854. 7	381911 4.3
	2012	1354806 4.7	-	605890 20.0	201780 97.1	-	-	335859 0.1
	2013	1573072 1.2	-	-	203166 36.2	-	-	339722 1.0

Continuation of table H.3

1	2	3	4	5	6	7	8	9
	2014	1058393 0.6	-	524723 39.3	198159 37.0	-	-	387838 3.3
	2015	1919624 7.1	6039559 0.3	709486 82.2	303514 34.6	20393 .5	7648186. 9	720505 4.0
	2016	-	7606333 8.3	940057 47.8	421150 47.2	-	1124650 1.1	107845 52.5
	2017	1108359 3.5	-	-	537912 99.2	-	-	144524 27,6
	2018	1911952 0.4	1372573 43.5	165719 355.1	682242 14.2	31887 .3	1934630 0.2	185892 64.6
Base index (2018/2010)		***3,078 th most common***	***-***	***-***	***3,941 th most commo n***	***-***	***-***	***3,815 th most commo n***
Transport, warehousin g, postal and courier activities	2010	8762062 9.9	4152713 5.4	310224 57.1	185486 38.5	55790 6.8	1582082 1.8	139166 29.6
	2011	1150442 04.4	4987013 9.6	355632 95,3	193837 78.6	83524 6.5	1487811 9.6	125206 35.2
	2012	1230668 32.7	6166274 8.9	441770 27.0	223266 40.8	78966 6.6	1581712 3.4	133496 10.3
	2013	1184978 38.2	6025240 8.8	457732 14,5	237785 42.8	62895 2.7	1675626 3.0	140251 60.0
	2014	1078336 79.4	6742618 9.1	478085 05.0	252108 85.3	84444 1.9	1866267 2.0	154588 28,4
	2015	1530868 23.3	1015627 56.3	676416 65.4	360699 10.6	64102 4.4	2769079 6.1	225851 47.6
	2016	1888882 36.3	1281408 57.9	818845 71.7	460820 71.7	73832 5.0	3284268 8.2	288734 87.8
	2017	2227119 49.5	1490336 29.2	107268 124.0	572640 16.4	10822 19.5	4070501 7.3	355413 15,2
	2018	2650350 22.4	1536188 22.1	137393 544.8	722741 23.7	15010 97.9	5231766 1.5	448165 02.9
Base index (2018/2010)		***3,025 th most common***	***3,699 th most common***	***4,429 th most com- mon***	***3,896 th most commo n***	***2,691 th most com- mon***	***3,307 th most common***	***3.22***
Temporary accommoda tion and catering	2010	1525841. 4	6516630. 7	853645 9.1	552130 0.0	50384 .6	4915154. 7	445013 5.8
	2011	-	7043719. 0	-	577883 1.7	-	-	456235 3.0
	2012	-	9427707. 9	123154 96.5	809569 4.1	-	-	652597 5.7
	2013	-	1431791 9.6	137176 59.6	923616 5.5	-	8489413. 1	768343 2.6
	2014	-	7635268. 5	126018 87.0	888026 9.2	-	8199383. 2	759892 6.0

Continuation of table H.3

1	2	3	4	5	6	7	8	9
	2015	-	9914696.6	15932351.0	11580398.2	-	10562935.0	9978875.5
	2016	-	12112135.8	21547834.1	15652915.9	-	14275893.9	13378760.4
	2017	-	15195126.4	28397561.7	20489745.1	-	19112481.8	17705823.8
	2018	-	17918129.3	38977489.7	27966933.1	-	26448145.0	24112628.9
Base index (2018/2010)		***-***	***2.7***	***4.6***	***5.1***	***-***	***5.4***	***5.4***
Information and telecommunications	2010	32793533.3	-	-	11780304.1	-	-	6912022.8
	2011	36024582,0	-	-	13539979.9	-	-	8211446.6
	2012	39662404,8	-	27626552.9	16381711.9	-	-	10549745.6
	2013	39236005.4	24261241.9	30780939.2	19669530.3	79544.2	13788275.0	13637360.8
	2014	36411155.2	28801225.8	40477235.4	27889432.8	3684.6	21582374.0	21332277.9
	2015	38495466.2	36229685.7	66754489.2	50062761.5	46414.8	40842848.6	40594070.6
	2016	39808549.3	44269077.4	90973242.7	70898790.1	10741.3	57632948.5	57446144.8
	2017	42601040.6	55567785.8	118635040.2	94334664,1	13154.3	77673659.4	77330567.0
	2018	51259755.5	-	-	129669964.8	-	-	108007242.3
Base index (2018/2010)		***1,563 th most common***	***-***	***-***	***11,007 th most common***	***-***	***-***	***15,626 th most common***
Financial and insurance activities	2010	10263389.7	-	-	5555143.6	-	-	3320704.0
	2011	9403203.7	-	-	5181397.2	-	-	2835107.2
	2012	4662716.0	-	10412472.3	3625017.0	-	-	1667929.0
	2013	4052290.0	-	-	3538730.4	-	-	1453124.1
	2014	-	-	10150395.8	3450989.0	-	1552765.0	1546050.0
	2015	-	-	13946891.6	4375626.4	-	2388675.3	2378399.5
	2016	-	44000444,9	18846453.2	7106751.9	-	2930327.0	2912151.2
	2017	-	45797741.6	21963858.9	7566126.4	-	3188458.2	3160955.3

Continuation of table H.3

1	2	3	4	5	6	7	8	9
	2018	-	-	24246590,6	8322406.6	-	3748679.6	3729416.7
Base index (2018/2010)		***-***	***-***	***-***	***1,498 th most com-mon***	***-***	***-***	***1,123 th most com-mon***
Real estate transactions	2010	-	15200649.4	-	13022470.6	-	-	5622614.4
	2011	-	19182150.0	-	13036057.3	-	-	5214417.9
	2012	1810945.2	23908868.4	37300565.3	20864648.8	173887.0	9741389.0	9570909.6
	2013	2278454.9	18618791.9	40620792.5	24125779.1	171102.3	11128898.4	10881377.9
	2014	-	22384340.9	42716464.9	24877474.3	-	11306554.2	11108203.2
	2015	-	23770482.3	53987470.6	31456012.8	-	15002104.8	14872052.7
	2016	-	30642914.8	-	40392458,3	-	-	17997372.4
	2017	-	31790841.7	-	50447461.4	-	-	21444838.8
	2018	-	42167631,5	97256903.2	62871076.1	-	27012999.9	26456585,0
Base index (2018/2010)		***-***	***2,774 th most common***	***-***	***4,828 th most com-mon***	***-***	***-***	***4,705 th most com-mon***
Professional, scientific and technical activities	2010	92920559.3	26554253.4	32046030.2	16800273.2	24406.6	7559113.6	7327017.8
	2011	110583186.7	31114117.8	29605522,5	14880033.7	23010.2	6237326.2	6099062.6
	2012	101747199.2	45677087.3	39432941.9	22199823.9	35083 6.7	9927597.0	9770554.9
	2013	77974625.2	45501348.7	41261848.8	23991096.6	266737.4	11693898.9	11498658.1
	2014	84620267.2	34003216.4	41129921.3	25230689.7	228477.4	13879380.8	13634975.9
	2015	114089909.0	33969644,2	58628066.2	39181499.8	46141.6	25972816.2	25562571.5	
	2016	-	38967512.6	72319214.1	49339240.4	-	32395630.6	32190704.5
	2017	-	-	86929474.7	62484192.3	-	41762706.7	41433170.7
	2018	-	56960839.6	-	77669462.3	-	-	54088830,0

Continuation of table H.3

1		2	3	4	5	6	7	8
Base index (2018/2010)		-	***2,145 th most common***	***-***	***4,623 th most com-mon***	***-***	***-***	***7,382 th most com-mon***
Activities in the field of administrative and ancillary service	2010	-	12746717.3	15697117.8	8644814.8	-	4948282.5	4839304.5
	2011	1570150.9	16452059.1	16072212.6	8380929.0	13558.9	4219048.0	4128531.9
	2012	-	24128797.7	18537007.3	9184785.5	-	-	3896369.8
	2013	-	21033365.9	19178299.7	9721349.5	-	4412443.8	4186959.5
	2014	4753019.0	22640420.0	19085750.5	9804425.6	31754.3	5158136.1	4675940.4
	2015	-	25535936.5	26689258.8	13916562,5	-	7963883.6	7595902.7
	2016	-	29328895,3	34093807.7	18976875.9	-	10647103.3	10208495.4
	2017	-	37292883.1	43390770.0	25157398.4	-	14024188.5	13311826.9
	2018	-	44393138,3	53205293.0	32344410.4	-	19039869.5	18128438.9
Base index (2018/2010)		***-***	***3,483 th most common***	***3,389 th most com-mon***	***3,741 th most com-mon***	***-***	***3,848 th most common***	***3,746 th most com-mon***
Education	2010	-	947836.5	995111.8	598043.5	-	391628.4	389345.9
	2011	-	884448.9	1171102.5	674347.6	-	390222.3	376189.5
	2012	-	-	1570376.8	924065.6	-	-	552865.9
	2013	-	702097.3	1788337.7	1047499.4	-	703592.1	677897.2
	2014	-	661978.0	1691296.8	1044309.0	-	762229.3	740574.2
	2015	-	845346.7	2256313.1	1503704.1	-	1126102.0	1113508.4
	2016	-	898907.4	2992606.4	2155319.3	-	1638478.9	1612352.4
	2017	-	-	-	3031343.6	-	-	2257222.8
	2018	-	-	-	4273465.1	-	-	3277940.6
Base index (2018/2010)		***-***	***-***	***-***	***7,146 th most com-mon***	***-***	***-***	***8,419 th most com-mon***

Continuation of table H.3

1	2	3	4	5	6	7	8	9
Health care and social assistance	2010	-	4972442.4	2691222.2	1525091.3	-	1140232.4	1121057.1
	2011	-	5345724.0	3162033.6	1755754.4	-	1254305.4	1240633.6
	2012	-	6143669.0	3729684.8	2038686.2	-	1483275.2	1468008.8
	2013	-	6688234.7	4193462.7	2242018.7	-	1688031.1	1672764.0
	2014	-	5219151.0	4137084.7	2371511.4	-	1846815.3	1829260.7
	2015	-	7585671.5	5405354.4	3047662,5	-	2417777.2	2407793.9
	2016	-	9936574.2	6866532.5	3794575.4	-	2998105.3	2973373.0
	2017	-	12412520.3	9112995.3	5022954.7	-	4026223.7	3967309.0
	2018	-	-	-	6138714.6	-	-	5344568.1
Base index (2018/2010)		**-**	**-**	**-**	***4,025 th most com-mon***	**-**	**-**	***4,767 th most com-mon***
Arts, sports, entertainment and recreation	2010	-	1174523.0	-	876074.5	-	-	558378.7
	2011	-	1806733.0	-	1018901.9	-	-	641203.6
	2012	3154213.0	3728652.3	2149726.0	1624928.8	-	1116260.2	1071962.2
	2013	3137779.8	k	-	1976949.5	-	-	1348342.3
	2014	4217973.5	10262698.3	2609046.9	1942586.5	-	1494734.5	1412139.2
	2015	1979403.1	1716812.3	3259333.0	2495194.8	23241.7	1937196.9	1867379.3
	2016	-	2396737.6	-	3494145.0	-	-	2633760.2
	2017	-	3664695.2	-	4815153.9	-	-	3660994.6
	2018	-	4149285.3	-	6373465.2	-	-	5020433.5
Base index (2018/2010)		**-**	***3,533 th most common***	**-**	***7,275 th most commo n***	**-**	**-**	***8,991 th most commo n***
Provision of other types of services	2010	-	984557.4	6848073.4	5879231.8	15706.3	5524370.6	5369118.5
	2011	-	1047245.0	6777725.2	5679658.2	3498.6	5206193.9	5074169.1

Continuation of table H.3

1	2	3	4	5	6	7	8	9
	2012	-	-	7562160.5	6133451.0	-	-	5332971.0
	2013	-	-	-	6580036.2	-	-	5787446.6
	2014	-	-	7189199.1	6253554.9	-	-	5500135.1
	2015	-	-	-	7672697.7	-	-	6889178.0
	2016	-	1744349.4	10991718.2	9600835.0	31964.1	8738667.2	8566122.7
	2017	-	-	-	13082407.8	-	-	11620214.0
	2018	-	1724225.0	19060548.5	16643144.8	5955.5	1590875.4	15306006.4
Base index (2018/2010)		**-**	***1,751 th most common***	***2,783 th most com-mon***	***2,831 th most com-mon***	***0.379 th most com-mon***	***2,878 th most common***	***2,851 th most com-mon***

Table H.4

Dynamics of the amount of value added by production costs of economic entities by areas of activity for 2013–2018, thousand UAH According to [500]

Areas of activity	Years	Value added at production costs in business entities	
		total	of them from individual entrepreneurs
1	2	3	4
Total	2013	1038411303.0	61266261.9
	2014	1293595472.0	59505414.6
	2015	1396286261,2	67021737.6
	2016	1805589105.5	102918629.8
	2017	2257297488.3	157792645.5
	2018	2510656579.2	200075980.3
Base index (2018/2013)		***2,418 th most common***	***3,266 th most common***
Agriculture, forestry and fisheries	2013	71569120.6	1899192.5
	2014	128141786.1	2677699.8
	2015	186086078,3	2211701.3
	2016	190168214,2	3235126.7
	2017	200316298.6	4868455.9
	2018	207576682,2	5638881.3
Base index (2018/2013)		***2.9***	***2,969 th most common***

Continuation of table H.4

1	2	3	4
Industry	2013	383661727.3	5881618.0
	2014	470950526.3	5593499.5
	2015	494556791,5	6300003.5
	2016	661586451.1	9672995.1
	2017	826613717.3	14145214.2
	2018	885109063.2	17039170.3
Base index (2018/2013)		***2,307 th most common***	***2,897 th most common***
Construction	2013	42230603.4	796399.0
	2014	52234085.8	892599.9
	2015	38341630.4	1273400.7
	2016	50341951.2	2074399.3
	2017	61846767.9	3345876.9
	2018	75443918.9	4213297.6
Base index (2018/2013)		**1,786 th most common**	**5.29**
Wholesale and retail trade; repair of motor vehicles and motorcycles	2013	221556205.4	22607324.0
	2014	326986864,6	24218697.8
	2015	322757209.5	23256513.1
	2016	368003372.3	33619359.4
	2017	504230263.0	48959323.5
	2018	582222197.9	57557533.7
Base index (2018/2013)		***2,628 th most common***	***2,546 th most common***
Transport, warehousing, postal and courier activities	2013	109406567.1	6065435.3
	2014	114083165.8	5355499.5
	2015	150809782,5	6032003.4
	2016	195289920.9	8757319.1
	2017	224728794.3	13287562,3
	2018	237535442.6	16791037.8
Base index (2018/2013)		***2,171 th most common***	***2,768 th most common***
Temporary accommodation and catering	2013	6992335.5	3369630.6
	2014	5623543.4	1725699.8
	2015	6427515.7	1876601,1
	2016	10726954.7	2947029.0
	2017	15201013.5	4621356.0
	2018	17558728,2	6143914.3
Base index (2018/2013)		***2,511 th most common***	***1,823 th most common***
Information and telecommunications	2013	45607804.9	4349865.3
	2014	50820995.8	5295999.5
	2015	57080125.1	8444704.7
	2016	77576764.1	14966489.0
	2017	105556968.1	24938905.0
	2018	123696846.8	34546352.2

Continuation of table H.4

1		2	3
Base index (2018/2013)		***2,712 th most common***	***7,942 th most common***
Financial and insurance activities	2013	23886438.7	612668.0
	2014	18735661.3	476000.0
	2015	13100939.4	603200.3
	2016	11816459.7	999123.3
	2017	28739981,5	1353388.6
	2018	45173215,0	1585517.3
Base index (2018/2013)		***1,891 th most common***	***2,588 th most common***
Real estate transactions	2013	36103659.4	5513958.6
	2014	40566674.3	4105899.6
	2015	26824353.6	4758502.7
	2016	59578345.6	7398514.6
	2017	74761345.7	10950048.0
	2018	84892958.9	14980475.7
Base index (2018/2013)		***2,351 th most common***	***2,717 th most common***
Professional, scientific and technical activities	2013	51203536.8	4656197.5
	2014	38471808.3	4224899.6
	2015	59593943.5	6434103.6
	2016	122807564.3	10005501.8
	2017	141571653.2	16017117.5
	2018	151466432,5	20853549.5
Base index (2018/2013)		***2,958 th most common***	***4,479 th most common***
Activities in the field of administrative and ancillary services	2013	23234311.5	1654203.2
	2014	22301915,2	1666099.8
	2015	22973135,1	2345801.3
	2016	34785642.8	3652924.4
	2017	43510254.8	5889391.8
	2018	54268227.1	8062109.2
Base index (2018/2013)		***2,336 th most common***	***4,874 th most common***
Education	2013	1513415.9	306297.1
	2014	1357477.3	297500.0
	2015	1477929.3	335100.2
	2016	2122507.7	661807.0
	2017	2858725.8	1133881.9
	2018	3835756.7	1665025.9
Base index (2018/2013)		***2,535 th most common***	***5,436 th most common***
Health care and social assistance	2013	5018002.1	735174.4
	2014	4636546.3	773599.9
	2015	6615463.0	938300.5
	2016	9428571.9	1434075.4
	2017	12047511.6	2337847.4

Continuation of table H.4

1	2	3	4
	2018	22164007.3	3152439.1
Base index (2018/2013)		***4,417 th most common***	***4,288 th most common***
Arts, sports, entertainment and recreation	2013	13091728.0	612660.9
	2014	15483981.4	476020.1
	2015	6303475.6	536200.3
	2016	6883342.8	924493.7
	2017	8670165.7	1671260.2
	2018	11776930.9	2346791.5
Base index (2018/2013)		***0.9***	***3.83***

Table H.5

Dynamics of the main indicators of functioning of business entities for 2010–2018, depending on their size according to [500]

Years	Total	Including							
		enterprises				natural persons-entrepreneurs			
		large	medium	small	of which micro-enterpri-ses	Total	Subje-cts among it under the recep-tion	subiekti malogo podpri-emnits-tva	of these subiekti mikro-under-pleasa-nt-ion
1	2	3	4	5	6	7	8	9	10
Number of business entities, units									
2010	2183928	586	20983	357241	300445	1805118	360	1804758	1793243
2011	1701620	659	20753	354283	295815	1325925	306	1325619	1313004
2012	1600127	698	20189	344048	286461	1235192	362	1234830	1224315
2013	1722070	659	18859	373809	318477	1328743	351	1328392	1318703
2014	1932161	497	15906	324598	278922	1591160	712	1590448	1580965
2015	1974318	423	15203	327814	284241	1630878	307	1630571	1626589
2016	1865530	383	14832	291154	247695	1559161	281	1558880	1553041
2017	1805059	399	14937	322920	278102	1466803	317	1466486	1458980
2018	1839593	446	16057	339374	292772	1483716	419	1483297	1471965
Base index (2018 / 2010)	0.842 th most com-mon	0.761	0.765 th most com-mon	0.95	0.974 th most common	0.822 th most com-mon	1,164 th most com-mon	0.822 th most com-mon	0.821
Number of business entities per 10 thousand people of the current population, units									
2010	477	-	5	78	66	394	-	394	391
2011	372	-	5	77	65	290	-	290	287
2012	351	-	4	76	63	271	-	271	269
2013	378	-	4	82	70	292	-	292	290
2014	450	-	4	76	65	370	-	370	368
2015	462	-	4	77	66	381	-	381	380
2016	437	-	4	68	58	365	-	365	364

Continuation of table H.5

1	2	3	4	5	6	7	8	9	10
2017	425	-	4	76	65	345	-	345	343
2018	435	-	4	80	69	351	-	351	348
Base index (2018 / 2010)	0.912	-	0.8	1,026 th most com-mon	1,045 th most common	0.891 th most com-mon	-	0.891 th most com-mon	0.89
Number of employees, thousand people									
2010	10772.7	2400.3	3393.3	2164.6	832.6	2814.5	20.5	2794.0	2708.1
2011	10164.5	2449.0	3252.6	2091.5	788.9	2371.4	20.9	2350.5	2241.5
2012	9957.6	2484.2	3144.2	2051.3	788.2	2277.9	44.0	2233.9	2062,8
2013	9729.1	2383.7	3012.1	2010.7	795.3	2322.6	42.1	2280.5	2119.8
2014	8796.7	1915.1	2696.5	1686.9	723.5	2498.2	69.9	2428.3	2253.4
2015	8180.0	1708.6	2604.7	1576.4	691.4	2290.3	28.0	2262.3	2187.2
2016	8108.3	1586.6	2622.8	1591.7	642.7	2307.2	27.1	2280.1	2172.0
2017	8141.0	1560.9	2593.1	1658.9	714.6	2328.1	30.7	2297.4	2160.2
2018	8532.5	1574.3	2744.2	1641.0	704.3	2573.0	40.3	2532.7	2328.7
Base index (2018 / 2010)	0.792 th most com-mon	0.656	0.809	0.758	0.846	0.914	1,966 th most com-mon	0.906	0.86
Number of employees, thousand people									
2010	8845.8	2400.3	3392.4	2043.7	762.0	1009.4	20.1	989.3	914.9
2011	8757.9	2449.0	3251.6	2011.8	757.4	1045.5	20.7	1024.8	928.5
2012	8620.3	2484.1	3141.9	1951.6	736.5	1042.7	43.6	999.1	838.4
2013	8279.4	2383.7	3010.1	1891.8	734.4	993.8	41.7	952.1	801.1
2014	7100.0	1915.1	2694.9	1583.0	626.6	907.0	69.2	837.8	672.5
2015	6 437.6	1708.6	2603.2	1466.3	587.8	659.5	27.7	631.8	560.6
2016	6461.9	1586.6	2621.4	1505.9	565.2	748.0	26.8	721.2	619.0
2017	6575.9	1560.9	2591.3	1562.4	625.4	861.3	30.4	830.9	701.2
2018	6959.9	1574.3	2742.5	1553.8	623.0	1089.3	39.9	1049.4	856.7
Base index (2018 / 2010)	0.787 th most com-mon	0.656	0.808	0.760	0.818	1,079 th most com-mon	1,985 th most com-mon	1,061 th most com-mon	0.936
Volume of sold products (goods, services), UAH mln.									
2010	3596646.4	1401596.8	1396364.3	568267.1	181903.1	230418.2	19487.5	210930.7	190055.3
2011	4202455.2	1775829.0	1607628.0	607782.4	189799.1	211215.8	11221.2	199994.6	181697.8
2012	4459818.8	1761086.0	1769430.2	672653.4	212651.2	256649.2	13015.4	243633.8	225449.1
2013	4334453.1	1717391.3	1662565.2	670258.5	216111.4	284238.1	20778.9	263459.2	244546.0
2014	4459702.2	1742507.9	1723151.5	705000.5	230729.3	289042.3	12742.7	276299.6	255906.0
2015	5556540.4	2053189.5	2168764.8	937112.8	307450.0	397473.3	15612.0	381861.3	358275.8
2016	6726739.8	2391454.3	2668695.7	1177385.2	361784.0	489204.6	14607.8	474596.8	449762.4
2017	8312271.9	2929516.6	3296417.9	1482000.7	497777.1	604336.7	18538.2	585798.5	554372.4

Continuation of table H.5

1	2	3	4	5	6	7	8	9	10
2018	9966804.5	3515839.5	3924059.6	1766150.4	599625.6	760755.0	29957.8	730797.2	692805.0
Base index (2018 / 2010)	2,771 th most com-mon	2,508 th most com-mon	2.81	3,108 th most common	3,296 th most commo n	3,302 th most com-mon	1,537 th most com-mon	3,465 th most com-mon	3,645 th most common

Table H.6

Dynamics of financial results before taxation by areas of activity for 2010–2018 according to [500]

By types of activity	Years	All				
		financial result (balance) before tax, thousand UAH	profitable enterprises		enterprises that suffered losses	
			in% to the total number of enterprises	financial result, thousand UAH	in% to the total number of enterprises	financial result, thousand UAH
1	2	3	4	5	6	7
Total economics	2010	54405659.7	59.0	189640762.4	41.0	135235102.7
	2011	118605574.4	65.1	255545931.6	34.9	136940357.2
	2012	75670252.0	64.5	248035966.0	35.5	172365714.0
	2013	11335680.7	65.9	209864472.8	34.1	198528792.1
	2014	-564376825.3	66.3	233624717,1	33.7	798001542.4
	2015	-348471649.1	73.7	387652306,1	26.3	736123955.2
	2016	69887807.3	73.4	443012121,9	26.6	373124314.6
	2017	236952071.4	72.8	593168150,9	27.2	356216079,5
	2018	369212261.7	74.3	668893496.8	25.7	299681235.1
Base index (2018/2010)		***6,786 th most common***	***1,259 th most common***	***3,527 th most common***	***0.627***	***2,216 th most common***
Agriculture, forestry and fisheries	2010	17291804.6	69.5	22306058,3	30.5	5014253.7
	2011	25565903.1	83.0	30615252.0	17.0	5049348.9
	2012	26992680.1	78.3	33906678.1	21.7	6913998.0
	2013	15147264.7	79.9	26496539.2	20.1	11349274.5
	2014	21677383.5	84.2	52170983.4	15.8	30493599.9
	2015	103137552.7	88.5	128880170.9	11.5	25742618.2
	2016	91109468.3	87.8	103942207.5	12.2	12832739.2
	2017	69344077.3	86.2	89876680.8	13.8	20532603.5
	2018	71478504.8	86.3	94402307.4	13.7	22923802.6

Continuation of table H.6

1		2	3	4	5	6
Base index (2018/2010)		***4,134 th most common***	***1,241 th most common***	***4,232 th most common***	***0.45***	***4,572 th most common***
Industry	2010	31221137,5	58.7	68933065.8	41.3	37711928.3
	2011	58662328.9	62.6	106688209.2	37.4	48025880.3
	2012	21353396.4	62.4	86504058.0	37.6	65150661.6
	2013	13698310.3	63.3	81336894.7	36.7	67638584.4
	2014	-166413955.0	63.3	76253359.3	36.7	242667314.3
	2015	-181360920.7	72.9	90315913.5	27.1	271676834.2
	2016	-7569560.0	72.8	141475317,5	27.2	149044877,5
	2017	87461665.0	71.8	232213111,8	28.2	144751446.8
	2018	154138247,7	72.8	277850449.6	27.2	123712201.9
Base index (2018/2010)		***4,937 th most common***	***1,241 th most common***	***4,031 th most common***	***0.658***	***3.28***
Construction	2010	-4418216.7	55.3	4905069.4	44.7	9323286.1
	2011	-3845769.4	60.5	5373023.5	39.5	9218792.9
	2012	-71117.0	60.5	9139103.6	39.5	9210220.6
	2013	-5126580.4	62.3	5968043.1	37.7	11094623.5
	2014	-27288450.1	62.7	6295632.8	37.3	33584082.9
	2015	-25074075.6	71.1	5648158.5	28.9	30722234.1
	2016	-9342925.0	70.8	8446608.0	29.2	17789533.0
	2017	-3535818.9	71.5	10299947.5	28.5	13835766.4
	2018	6433866.9	72.8	15411816.7	27.2	8977949.8
Base index (2018/2010)		***3,456 th most common***	***1,317 th most common***	***3,142 th most common***	***0.608***	***0.963***
Wholesale and retail trade; repair of motor vehicles and motorcycles	2010	14883439,0	62.5	42655894.6	37.5	27772455,6
	2011	21591546.2	66.7	48487930.6	33.3	26896384.4
	2012	9608010.6	66.0	43877822,0	34.0	34269811,4
	2013	-6047558.3	67.2	36528460.3	32.8	42576018.6
	2014	-128134845.1	66.7	34360861,2	33.3	162495706,3
	2015	-80564311.8	76.1	56898361.1	23.9	137462672.9
	2016	7277004.8	75.8	74418109.6	24.2	67141104.8
	2017	39296292,9	75.2	89285404.7	24.8	49989111.8
	2018	86290522.6	77.2	116641592.1	22.8	30351069.5
Base index (2018/2010)		***5,798 th most common***	***1,236 th most common***	***2,734 th most common***	***0.607***	***1,093 th most common***
Transport, warehousing, postal and courier activities	2010	5058900.3	54.6	10387745.4	45.4	5328845.1
	2011	8741388.2	63.4	15692198.4	36.6	6950810.2
	2012	7524903.1	61.8	13946519.1	38.2	6421616.0
	2013	834270.0	63.1	9429883.5	36.9	8595613.5
	2014	-19703890.5	62.7	12775348.1	37.3	32479238.6
	2015	-13921752.9	70.9	23093705.7	29.1	37015458.6
	2016	12819710.8	71.7	28277970.2	28.3	15458259.4

Continuation of table H.6

1	2	3	4	5	6	7
	2017	-16532602.7	71.5	28509063.3	28.5	45041666,0
	2018	-22661627.1	74.1	31475404.5	25.9	54137031.6
Base index (2018/2010)		***-5.48***	***1,357 th most common***	***3,030 th most common***	***0.570 th most common***	***10,159 th most common***
Temporary accommodation and catering	2010	-548111.4	57.3	619743.5	42.7	1167854.9
	2011	-571639.4	60.3	806046.2	39.7	1377685.6
	2012	-862487.0	58.9	858686.6	41.1	1721173.6
	2013	-1270500.9	59.5	788316.3	40.5	2058817.2
	2014	-6579040.4	59.5	370155.3	40.5	6949195.7
	2015	-7094415.7	71.9	771386.3	28.1	7865802.0
	2016	-1947576.9	71.7	1677972.2	28.3	3625549.1
	2017	1976789.4	69.5	4300418.5	30.5	2323629.1
	2018	2886485.8	71.4	4393249.4	28.6	1506763.6
Base index (2018/2010)		***6,266 th most common***	***1,246 th most common***	***7,089 th most common***	***0.67***	***1.29***
Information and telecommunications	2010	4101416.1	59.0	8168496.4	41.0	4067080.3
	2011	4440635.4	61.1	9774572.0	38.9	5333936.6
	2012	6300086.5	63.6	11641612.8	36.4	5341526.3
	2013	6817595.3	63.4	11668293.9	36.6	4850698.6
	2014	-15373918.1	64.8	11256488.4	35.2	26630406.5
	2015	-10166566.2	71.0	12057294.3	29.0	22223860,5
	2016	4197877.1	68.7	12449988.4	31.3	8252111.3
	2017	15195323.8	68.4	22717347.1	31.6	7522023.3
	2018	18181042.2	70.4	23846740.4	29.6	5665698.2
Base index (2018/2010)		***4,433 th most common***	***1,194 th most common***	***2,919 th most common***	***0.721***	***1,393 th most common***
Financial and insurance activities	2010	11698775.3	58.3	16077449.5	41.7	4378674.2
	2011	8818791.9	58.9	13436798.9	41.1	4618007.0
	2012	11769838.2	59.3	18763805.6	40.7	6993967.4
	2013	6093722.3	59.6	13885092.4	40.4	7791370.1
	2014	-4829179.2	61.5	21244672.4	38.5	26073851.6
	2015	-8516360.9	63.4	15513184.1	36.6	24029545,0
	2016	430974.6	63.0	14336741.4	37.0	13905766.8
	2017	18280227.9	63.5	26638009.8	36.5	8357781.9
	2018	24749993.5	64.2	33292993.8	35.8	8543000.3
Base index (2018/2010)		***2,116 th most common***	***1,101 th most common***	***2,071 th most common***	***0.858***	***1,951 th most common***
Real estate transactions	2010	-6537678.8	49.9	4743710.3	50.1	11281389.1
	2011	-12060820.0	54.2	4824470.7	45.8	16885290.7
	2012	-8539487.2	55.3	6952640.4	44.7	15492127.6
	2013	-9571379.7	57.5	6750066.7	42.5	16321446.4
	2014	-105597630.5	56.1	5281856.4	43.9	110879486.9
	2015	-63470113.4	60.6	39330873.5	39.4	102800986.9

Continuation of table H.6

1	2	3	4	5	6	7
	2016	-42950238.2	60.1	12126198.1	39.9	55076436.3
	2017	-15430767.9	61.6	19372641.1	38.4	34803409.0
	2018	16296.5	63.6	23108903.6	36.4	23092607.1
Base index (2018/2010)		***1,002 th most common***	***1,275 th most common***	***4,871 th most common***	***0.726 th most common***	***2,047 th most common***
Professional, scientific and technical activities	2010	-15110335.3	57.5	8218586.1	42.5	23328921.4
	2011	11167822.6	62.9	17073502.5	37.1	5905679.9
	2012	-165533.3	62.2	14098921.1	37.8	14264454.4
	2013	-6823796.5	63.4	13027212.1	36.6	19851008.6
	2014	-98958104.0	63.3	8873126.3	36.7	107831230.3
	2015	-47964108.0	69.6	10023173.8	30.4	57987281.8
	2016	21079805.2	68.5	38014509.0	31.5	16934703.8
	2017	45611642.9	68.4	61283417.6	31.6	15671774.7
	2018	26147725,7	70.0	34778193.9	30.0	8630468.2
Base index (2018/2010)		***2.73***	***1,218 th most common***	***4,232 th most common***	***0.705***	***0.37***
Activities in the field of administrative and support services	2010	-1578591.1	56.0	1606785.2	44.0	3185376.3
	2011	-2213188.9	61.2	1710122.4	38.8	3923311.3
	2012	3889398.1	60.5	7200735.5	39.5	3311337.4
	2013	-1224799.9	64.3	2580342.4	35.7	3805142.3
	2014	-9219390.1	62.7	2546217.2	37.3	11765607.3
	2015	-9425148.6	69.3	3797750.1	30.7	13222898.7
	2016	-4347713.9	70.0	5054015.3	30.0	9401729.2
	2017	-2967268.8	68.4	6583028.2	31.6	9550297.0
	2018	482466.4	70.3	10398357.5	29.7	9915891.1
Base index (2018/2010)		***1,306 th most common***	***1,256 th most common***	***6,472 th most common***	***0.674 th most common***	***3,113 th most common***
Education	2010	88281.5	64.3	163126.9	35.7	74845.4
	2011	100866.3	68.4	196696.0	31.6	95829.7
	2012	136836.6	68.1	198227.9	31.9	61391.3
	2013	140201.2	69.9	203654.5	30.1	63453.3
	2014	82582.9	67.0	214766.6	33.0	132183.7
	2015	105316.4	71.5	225694.0	28.5	120377.6
	2016	102765.2	67.6	241856.9	32.4	139091.7
	2017	121478.4	65.9	241849.5	34.1	120371.1
	2018	178603.1	70.0	363501.2	30.0	184898.1
Base index (2018/2010)		***2,023 th most common***	***1,089 th most common***	***2,228 th most common***	***0.84***	***2.47***
Health care and social assistance	2010	9780.1	60.7	406480.5	39.3	396700.4
	2011	-119849.3	61.3	388758.7	38.7	508608.0
	2012	30524.1	62.7	416758.6	37.3	386234.5
	2013	-31862.7	64.7	525311.4	35.3	557174.1
	2014	-1110980.0	64.7	377526.6	35.3	1488506.6

Continuation of table H.6

1	2	3	4	5	6	7
	2015	-961111.3	69.8	547652.3	30.2	1508763.6
	2016	311752.1	69.6	913639.3	30.4	601887.2
	2017	320396.5	65.5	1075230.5	34.5	754834.0
	2018	1249306.9	69.4	2204031.0	30.6	954724.1
Base index (2018/2010)		***127,740 th most common***	***1,143 th most common***	***5,422 th most common***	***0.779***	***2,407 th most common***
Arts, sports, entertainment and recreation	2010	-1784574.6	51.3	248247.6	48.7	2032822.2
	2011	-1706151.5	56.2	317017.5	43.8	2023169.0
	2012	-2280374.9	54.3	354609.7	45.7	2634984.6
	2013	-1280395.9	57.3	571711.2	42.7	1852107.1
	2014	-2911355.8	55.6	1415871.3	44.4	4327227.1
	2015	-3489165.1	62.6	109059.3	37.4	3598224.4
	2016	-1512729.4	61.5	1305740.4	38.5	2818469.8
	2017	-2198113.9	61.1	559472.6	38.9	2757586.5
	2018	-496172.6	63.5	468571.6	36.5	964744.2
Base index (2018/2010)		***0.278 th most common***	***1,238 th most common***	***1,888 th most common***	***0.749 th most common***	***0.475***
Provision of other types of services	2010	29633.2	62.1	200302.9	37.9	170669.7
	2011	33710.3	66.3	161333.0	33.7	127622.7
	2012	-16422.3	63.8	175787.0	36.2	192209.3
	2013	-18808.8	68.1	104651.1	31.9	123459.9
	2014	-16052.9	65.5	187851.8	34.5	203904.7
	2015	293532.0	72.5	439928.7	27.5	146396.7
	2016	229192.6	72.3	331248.1	27.7	102055.5
	2017	8749.5	68.2	212527.9	31.8	203778.4
	2018	136999.3	71.7	257384.1	28.3	120384.8
Base index (2018/2010)		***4,623 th most common***	***1,155 th most common***	***1,285 th most common***	***0.746 th most common***	***0.705***

Table H.7

Dynamics of the currency indicator of the balance of enterprises by type of economic activity for 2013 - 2018 according to [500]

Areas of activity	Years	Balance				
		Total	including			
			large enterprises	medium-sized enterprises	small businesses	of which micro-enterprises
1	2	3	4	5	6	7
Total economics	2013	5712274810.1	2048258645.9	2038943789,2	1625072375,0	917380735.3

Continuation of table H.7

1	2	3	4	5	6	7
	2014	5994265571.9	2233062257,5	2057525500.2	1703677814.2	980670470.8
	2015	8073783376.4	3470687313.1	2465718476.2	2137377587.1	1162719516.7
	2016	9991791211.6	3979949955,0	2893450248,5	3118391008.1	1789377754.8
	2017	9961779060.4	4127316578,0	3103750206.2	2730712276.2	1485347366.2
	2018	10878050628.0	4247346089,5	3524045422,4	3106659116.1	1744217070.7
Base index (2018/2013)		***1,904 th most common***	***2,074 th most common***	***1,728 th most common***	***1,912 th most common***	***1,901 th most common***
Agriculture, forestry and fisheries	2013	313096763.9	43349960,0	168073353.1	101673450.8	36713144.6
	2014	390606956.4	60067228.2	199608985,6	130930742.6	43371376.1
	2015	685844895.8	126294277.0	298600518.4	260950100.4	96737674.4
	2016	1537319088,8	149731665,0	444450683.6	943136740.2	571754928.9
	2017	911614091,5	151691427.0	414798787.6	345123876.9	118140604,3
	2018	983593602.4	108002321.0	468616069.2	406975212.2	168915315.1
Base index (2018/2013)		***3,142 th most common***	***2,491 th most common***	***2,788 th most common***	***4,003 th most common***	***4,601 th most common***
Industry	2013	1872235903.6	1245238470,0	493394830,3	133602603.3	52200597.0
	2014	2010917257.6	1344734448,0	537976545.0	128206264.6	54629585,5
	2015	2356486279.6	1460471029.0	733398276.7	162616973.9	58833296.3
	2016	2790399470.7	1703106385.0	897805292.1	189487793.6	72766366.5
	2017	3142639598.1	1920437694,0	980696937.4	241504966.7	100233277.9
	2018	3431936799.7	2088579647,0	1000863795,2	342493357,5	128028725.4
Base index (2018/2013)		***1,833 th most common***	***1,677 th most common***	***2,029 th most common***	***2,564 th most common***	***2,453 th most common***
Construction	2013	293017247,5	31012812.0	95788916.8	166215518.7	88935748.9
	2014	269574641,5	27540991.0	89540964.8	152492685,7	82087576.1
	2015	311761039.9	56004481.0	81349644,0	174406914.9	100508965.9
	2016	319470776.3	-	-	178472806.2	102363615.9
	2017	370445491,0	15589066,0	121379575.3	233476849.7	133852828.1
	2018	463460982,1	24791004.0	160163342.5	278506635.6	151354916.5
Base index (2018/2013)		***1,582 th most common***	***0.799 th most common***	***1,672 th most common***	***1,676 th most common***	***1,702 th most common***
Wholesale and retail trade; repair of motor vehicles and motorcycles	2013	1148632839.7	250280616.9	490978639.9	407373582,9	244080029.8
	2014	1171108083.3	282592120,3	459037626.9	429478336.1	246450377.2
	2015	1397959165.3	369937822.1	519898279.2	508123064,0	293530757.1
	2016	1790317186.4	407108392.0	657374286.6	725834507.8	438354103.1
	2017	1993356889.2	497942841.0	726196230.2	769217818.0	460565018.7
	2018	2313749075.9	591952367.5	884697618.7	837099089.7	508581668.3
Base index (2018/2013)		***2,014 th most common***	***2,365 th most common***	***1,802 th most common***	***2,055 th most common***	***2,084 th most common***
Transport, warehousing, postal and courier activities	2013	374322063.6	236154162.0	95220669.6	42947232.0	14895478.8
	2014	369502029.9	222700264.0	102558690.8	44243075.1	15942092.2
	2015	1072682519,3	895104120.0	116201221.7	61377177.6	22065833.4
	2016	1240024425.4	963316426.0	140057288,3	136650711.1	27500311.6
	2017	1001820884.1	743608443.0	176469892.4	81742548.7	31021212.5
	2018	1027836624.2	736724615.0	203857027.3	87254981.9	39388116.4

Continuation of table H.7

1	2	3	4	5	6	7
Base index (2018/2013)		***2,746 th most common***	***3,120 th most common***	***2,141 th most common***	***2,032 th most common***	***2,644 th most common***
Temporary accommodation and catering	2013	37009381.3	-	-	13899120.5	7575547.6
	2014	27359653.9	-	-	11575023.4	5736817.6
	2015	29689543.6	-	-	12302468.8	6495838.4
	2016	34236294.4	-	-	14930082,0	7474273.3
	2017	39357839.4	-	-	18987122.6	11700861.3
	2018	46083909,5	-	-	21126559.4	12207469.5
Base index (2018/2013)		***1,245 th most common***	***-***	***-***	***1.52***	***1,611 th most common***
Information and telecommunications	2013	90121088.9	40231415,0	26562915.4	23326758.5	12311553.5
	2014	94420146.8	41742619,0	28975092.3	23702435,5	11709224.6
	2015	186852450,2	52896135.0	36627990.3	97328324.9	36376391.7
	2016	146238363.3	59461832.0	34239111,8	52537419.5	36257635.1
	2017	149639976.6	68204582,0	38043188.3	43392206.3	24504971.2
	2018	171769573.3	81364571.0	43864551.0	46540451.3	25876830.8
Base index (2018/2013)		***1,906 th most common***	***2,022 th most common***	***1,651 th most common***	***1,995 th most common***	***2,102 th most common***
Financial and insurance activities	2013	366595186.0	4901817.0	139559066.7	222134302,3	162307256.0
	2014	335333861.7	-	-	151488173.7	87798679.0
	2015	324714070.4	-	-	165743189.8	95963601.0
	2016	303759091,2	-	-	174132051.8	110510818.6
	2017	353430409,2	-	136770304.7	216660104,5	125737613,8
	2018	415714225.2	-	-	232921049.1	152796990.2
Base index (2018/2013)		***1,134 th most common***	***-***	***-***	***1,049 th most common***	***0.941***
Fund management	2013	13005086.3	-	6509984.1	6495102.2	3285125.2
	2014	15108411,8	-	9666458.4	5441953.4	4291863.9
	2015	5400853.5	-	-	-	2923664.7
	2016	5258434.7	-	-	-	2972110.2
	2017	5597046.5	-	-	-	2553052.9
	2018	6300778.4	-	-	-	2516880.7
Base index (2018/2013)		***0.484***	***-***	***-***	***-***	***0.766***
Professional, scientific and technical activities	2013	464020351.2	164411387,0	133932987,2	165675977.0	118031655.7
	2014	615355801.5	215946363.0	123508182.5	275901256.0	234761976.4
	2015	881364087.3	474258310,0	118551019.7	288554757.6	234189144.3
	2016	903829204.3	-	-	184084424,1	136200274.8
	2017	975232435.7	-	-	209726803.7	153348264.1
	2018	871965425.4	-	-	204725731.4	151460132.4
Base index (2018/2013)		***1,879 th most common***	***-***	***-***	***1,236 th most common***	***1,283 th most common***
Education	2013	2357028.8	-	1561259.3	795769.5	331792.8
	2014	2308134.6	-	1513722.9	794411.7	358288.5
	2015	2679711.5	-	1699999.2	979712.3	443275.4
	2016	2926588.7	-	1953192.0	973396.7	432250.8

Continuation of table H.7

1	2	3	4	5	6	7
	2017	3213978.3	-	1885596.1	1328382.2	609216.8
	2018	4345908.7	-	2276120.2	2069788.5	835789.4
Base index (2018/2013)		***1,844 th most common***	***-***	***1,458 th most common***	***2,601 th most common***	***2,519 th most common***
Health care and social assistance	2013	12589851.0	-	8684875.7	3904975.3	1776268.9
	2014	9618588.2	-	6262455.2	3356133.0	1830622.1
	2015	11692657.5	-	7262061.9	4430595.6	2024566.7
	2016	12914698.1	-	7915660.0	4999038.1	2247447.3
	2017	15873120,5	-	10301954.1	5571166.4	2758444.4
	2018	26936695.3	-	20487019.1	6449676.2	3039621.7
Base index (2018/2013)		***2.14***	***-***	***2,359 th most common***	***1,652 th most common***	***1,711 th most common***
Arts, sports, entertainment and recreation	2013	32876150.9	6223935.0	18990595.0	7661620.9	3468962.0
	2014	31697448.5	9961956.0	14260336.7	7475155.8	3473946.2
	2015	34726817.8	8862509.0	18483073.5	7381235.3	4268701.0
	2016	33577596.1	-	-	8723984.4	3805308.8
	2017	37363775.7	-	-	10905256.4	4320528.5
	2018	40533735.5	-	-	10390732.5	4732790.9
Base index (2018/2013)		***1,233 th most common***	***-***	***-***	***1,356 th most common***	***1,364 th most common***
Provision of other types of services	2013	4419627.5	-	1078380.1	3341247.4	892354.2
	2014	5108681.2	-	1371771.9	3736909.3	1371319.0
	2015	6732024.7	-	1782469.4	4949555.3	2031614.8
	2016	7269655.2	-	2732581.9	4537073.3	2175804.2
	2017	7766825.6	-	2348661.2	5418164.4	2232319.2
	2018	9794152.9	-	4164407.6	5629745.3	2699216.1
Base index (2018/2013)		***2,216 th most common***	***-***	***3,862 th most common***	***1,685 th most common***	***3,025 th most common***

Annex I

Indicators of China's economic development

Table I.1.

Principal Aggregate Indicators on National Economic and Social Development and Growth Rates за 1978–2018

Item	Years						Indices and Growth Rates (%)								
							Index (2018 as percentage of the following years)					Average Annual Growth Rate			
	1978	1990	2000	2010	2017	2018	1978	1990	2000	2010	2017	1979-2018	1991-2018	2001-2018	2011-2018
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Population and Employment									-						
Population (10000 persons)															
Population with Residence Registration at the Year-end	50 64 ,1 5	624 6,3 2	74 98, 54	85 21, 55	931 6,9 1	95 02, 12	187, 6	152, 1	126,7	111,5	102,0	1,6	1,5	1,3	1,4
Permanent Population at the Year-end	50 64 ,1 5	634 7,1 9	86 50, 03	10 44 0,9 4	111 69, 00	11 34 6,0 0	224, 0	178, 8	131,2	108,7	101,6	2,0	2,1	1,5	1,0
Male	25 86 ,6 8	324 9,7 6	44 02, 87	54 44, 95	586 2,6 1	59 20, 34	228, 9	182, 2	134,5	108,7	101,0	2,1	2,2	1,7	1,1
Female	24 77 ,4 7	309 7,4 3	42 47, 16	49 95, 99	530 6,3 9	54 25, 66	219, 0	175, 2	127,7	108,6	102,2	2,0	2,0	1,4	1,0
Urban Population		233 5,7 7	47 57, 52	69 08, 77	780 1,5 5	80 21, 62		343, 4	168,6	116,1	102,8		4,5	2,9	1,9
Rural Population		401 1,4 2	38 92, 51	35 32, 17	336 7,4 5	33 24, 38		82,9	85,4	94,1	98,7		-0,7	-0,9	-0,8

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Employment (10000 persons)															
Employed Persons at the Year-end	2275,95	3118,10	3989,32	5870,48	6340,79	6508,95	286,0	208,7	163,2	110,9	102,7	2,7	2,7	2,8	1,3
Number of Registered Unemployed Persons in Urban Areas				39,23	37,13	36,55				93,2	98,4				-0,9
Macro Economy															
National Accounting (100 million yuan)															
Gross Domestic Product	185,85	1559,03	10810,21	46544,63	89705,23	97277,77	10938,3	2594,5	626,7	186,0	106,8	12,5	12,3	10,7	8,1
Primary Industry	55,31	384,59	986,32	2254,49	3611,44	3831,44	718,0	290,2	193,2	132,1	104,2	5,1	3,9	3,7	3,5
Secondary Industry	86,62	615,86	5055,71	23296,73	38008,06	40695,15	21343,0	4190,7	699,2	176,3	105,9	14,3	14,3	11,4	7,3
Tertiary Industry	43,92	558,58	4768,18	20993,41	48085,73	52751,18	14548,5	2465,4	635,9	201,8	107,8	13,3	12,1	10,8	9,2
Per Capita Gross Domestic Product (yuan)	370	2484	12817	45252	80932	86412	4883,9	1446,2	469,5	169,9	105,1	10,2	10,0	9,0	6,9
Gross Domestic Product by Expenditure Approach (100 million yuan)	194,14	1541,99	10810,21	46544,63	89705,23										

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Final Consumption Expenditures	130,02	938,48	5717,11	225017,78	45128,95										
Household Consumption Expenditures	1111,46	807,84	4474,11	177022,35	34097,05										
Government Consumption Expenditures	18,56	130,64	1243,00	4799,43	11031,90										
Gross Capital Formation	54,79	502,90	3917,11	182266,60	39657,52										
Gross Fixed Capital Formation	37,93	336,61	3160,12	170035,10	38390,85										
Changes in Inventories	16,86	166,29	756,99	1191,50	1266,67										
Net Exports of Goods and Services	9,33	100,61	1175,99	5816,25	4918,76										
Investment in Fixed Assets (100 million yuan)															
Investment in Fixed Assets	27,23	381,47	3233,70	161113,19	37477,96						110,7	20,1	18,2	15,2	12,8
Real Estate Development		32,70	858,61	3659,69	12075,69	1441 2,19		44074,0	1678,5	393,8	119,3		24,3	17,0	18,7
Floor Space of Buildings under Construction (10 000 sq.m)			2352 0,91	5722 1,79	92203,09	9810 6,51			417,1	171,4	106,4			8,3	7,0

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Floor Space of Buildings Completed (10 000 sq.m)			13492,94	20420,60	14680,63	10729,28			79,5	52,5	73,1			-1,3	-7,7
Domestic Trade (100 million yuan)															
Total Retail Sales of Consumer Goods	79,86	667,36	4379,81	17458,44	38200,07	39501,12	49463,0	5919,0	901,9	226,3	108,8	16,8	15,7	13,0	10,7
Foreign Trade (USD 100 million)															
Total Exports and Imports		418,98	1701,06	7848,96	10066,80	10851,03		2589,9	637,9	138,2	107,8		12,3	10,8	4,1
Exports		222,21	919,19	4531,91	6228,73	6470,46		2911,9	703,9	142,8	103,9		12,8	11,5	4,6
Imports		196,77	781,87	3317,05	3838,06	4380,57		2226,2	560,3	132,1	114,1		11,7	10,0	3,5
Foreign Capital Utilized															
Foreign Direct Investment Actually Utilized (USD 100 million)		14,60	122,37	202,61	229,07										
Foreign Direct Investment Actually Utilized (RMB 100 million)						1450,88					104,9				
Government Finance (100 million yuan)															

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Local Public Budgetary Revenue	41,82	131,02	910,56	4517,04	11320,35	1210 5,26	28946,1	9239,2	1329,4	268,0	107,9	15,2	17,5	15,5	13,1
Local Public Budgetary Expenditure	28,70	150,69	1069,86	5421,54	15037,48	1572 9,26	54805,8	10438,2	1470,2	290,1	104,6	17,1	18,1	16,1	14,2
Price Indices (preceding year= 100)															
Retail Price Index	100,4	95,6	99,9	103,3	101,6	102,1									
Consumer Price Index		97,5	101,4	103,1	101,5	102,2									
Producer Price Index for Manufactured Goods			103,4	103,2	103,3	101,8									
Investment in Fixed Assets Price Indices				103,0	105,3	102,5									
Production and Consumption of Energy (10000 tons of SCE)															
Total Energy Production		1006,24	3711,69	4858,07	7037,37	7079,05		703,6	190,7	145,7	100,6		7,2	3,7	4,8
Total Energy Consumption		4044,28	9447,70	25445,22	32341,66	33330,30		824,1	352,8	131,0	103,1		7,8	7,3	3,4
Industry															
Agriculture															

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Gross Output Value of Farming, Forestry, Animal Husbandry and	85,94	600,71	1701,18	3697,18	5969,87	6318,12	761,2	332,5	195,5	129,7	104,2	5,2	4,4	3,8	3,3
Fishery (100 million yuan)															
Output of Major Farm Products (10000 tons)															
Grain	1509,51	1896,29	1822,33	1249,15	1208,56	1193,49	79,1	62,9	65,5	95,5	98,8	-0,6	-1,6	-2,3	-0,6
Oil-bearing Crops	36,04	58,93	78,78	83,34	101,28	106,25	294,8	180,3	134,9	127,5	104,9	2,7	2,1	1,7	3,1
Sugarcane	835,42	2093,46	1137,59	1064,09	1144,14	1207,97	144,6	57,7	106,2	113,5	105,6	0,9	-1,9	0,3	1,6
Tea	0,92	2,59	4,21	5,38	9,29	9,99	1085,6	385,6	237,2	185,5	107,5	6,1	4,9	4,9	8,0
Fruits	29,40	328,58	643,52	1049,21	1421,23	1547,81	5264,7	471,1	240,5	147,5	108,9	10,4	5,7	5,0	5,0
Meat	48,45	202,45	324,48	454,86	444,08	449,90	928,6	222,2	138,7	98,9	101,3	5,7	2,9	1,8	-0,1
Aquatic Products	65,50	207,66	593,19	729,03	833,54	842,44	1286,2	405,7	142,0	115,6	101,1	6,6	5,1	2,0	1,8
Industry															
Output of Major Industrial Products															
Cloth (100 million m)	2,27	4,59	16,99	28,27	27,01	25,55	1125,6	556,6	150,4	90,4	100,6	6,2	6,3	2,3	-1,3
Machinemade Paper and Paperboard (10000 tons)	27,47	104,13	260,30	1434,68	2177,74	2028,88	7385,8	1948,4	779,4	141,4	96,5	11,4	11,2	12,1	4,4

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sugar (10000 tons)	96,15	184,50	91,30	91,66	82,27	263,29	273,8	142,7	288,4	287,2	133,2	2,6	1,3	6,1	14,1
Household Refrigerators (10000 sets)		105,75	320,70	1457,76	1556,37	1628,45		1539,9	507,8	111,7	104,8		10,3	9,4	1,4
Household Washing Machines (10000 sets)		143,01	244,18	467,83	749,62	677,42		473,7	277,4	144,8	92,3		5,7	5,8	4,7
Color Television Sets (10000 sets)		262,37	1531,53	4494,78	8399,88	10758,27		4100,4	702,5	239,4	112,3		14,2	11,4	11,5
Cameras (10000 sets)		99,30	3545,88	3798,93	656,59	653,79		658,4	18,4	17,2	70,1		7,0	-9,0	-19,7
Crude Oil (10000 tons)	10,22	49,05	1393,17	1287,15	1435,20	1393,50	13635,0	2841,0	100,0	108,3	97,1	13,1	12,7	…	1,0
Electricity (100 million kwh)	92,32	343,98	1292,69	3101,28	4407,30	4369,60	4733,1	1270,3	338,0	140,9	99,1	10,1	9,5	7,0	4,4
Raw Steel (10000 tons)	35,84	116,96	286,99	1239,34	2890,71	2763,24	7709,9	2362,6	962,8	223,0	102,9	11,5	12,0	13,4	10,5
Steel Products (10000 tons)	43,67	133,74	406,28	2918,89	4213,69	4503,26	10312,0	3367,2	1108,4	154,3	105,0	12,3	13,4	14,3	5,6
Cement (10000 tons)	369,08	2070,91	5872,00	11536,67	15752,98	16319,85	4421,8	788,1	277,9	141,5	105,6	9,9	7,7	5,8	4,4
Motor Vehicles (10000 units)			3,94	156,29	321,06	323,27			8204,8	206,8	100,0			27,7	9,5
Main Indicators of Industrial Enterprises above Designated Size															

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Value-added of Industry (101 million yuan)			3422,60	203338,34	31349,47	32305,16			1110,4	187,4	106,3			14,3	8,2
Total Assets (100 million yuan)			143770,57	626626,90	115201,19	1242 84,19			857,5	206,2	108,6			12,7	9,5
Main Business Revenue (100 million yuan)		1287,91	123 80,65	84114,85	133924,37	135616,08			1227,6	197,0	107,9			14,9	8,8
Pretax Profits (100 million yuan)	32,91	121,50	1042,77	9418,42	13769,27	12850,30			1556,8	199,6	100,9			16,5	9,0
Construction															
Number of Employed Persons in Construction Enterprises at the	14,78	67,22	141,46	196,32	289,97	280,87	1900,4	417,8	198,6	143,1	96,9	7,6	5,2	3,9	4,6
Year-end (10000 persons)															
Gross Output Value (at current prices) (100 million yuan)	5,47	113,40	944,61	4742,09	11571,33	13714,37	250719,7	12093,8	1451,9	289,2	118,5	21,6	18,7	16,0	14,2
Transportation															
Passenger Traffic (10000 persons)	15906	78046	164791	467049	148549	154682	967,4	720,1	348,9	186,0	103,9	5,8	7,3	7,2	8,1
Railways	2410	4467	12165	14956	28476	33745	1500,9	831,8	439,8	257,2	118,5	7,0	7,9	8,6	12,5
Highways	10897	70681	148945	442224	105919	105249	1126,8	688,3	326,6	172,1	99,4	6,2	7,1	6,8	7,0
Waterways	2546	2428	2363	2241	2733	2775	32,8	149,0	153,1	133,6	101,5	-2,7	1,4	2,4	3,7

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Civil Aviation	53	470	1318	7628	11420	12913	23817,1	2677,1	954,7	165,0	110,2	14,7	12,5	13,4	6,5
Freight Traffic (10000 tons)	15204	85809	1192116	2050334	400601	424996	1526,4	652,6	497,0	206,0	106,1	7,1	6,9	9,3	9,5
Rail-ways	3206	4803	15172	12170	7254	7617	318,2	186,6	103,8	88,6	105,0	2,9	2,3	0,2	-1,5
High-ways	3967	63709	75365	1423389	288904	3047743	1364,9	735,4	621,7	212,8	105,5	6,8	7,4	10,7	9,9
Water-ways	7887	16198	25696	430932	94871	1023352	953,1	651,8	410,9	225,3	107,9	5,8	6,9	8,2	10,7
Civil Aviation	1	8	31	116	166	226	18195,5	2208,2	569,9	152,7	106,5	13,9	11,7	10,2	5,4
Pipe-lines	143	1091	2952	7267	9407	10058	6751,2	884,9	327,0	138,4	106,9	11,1	8,1	6,8	4,1
Volume of Freight Handled at Ports (10000 tons)	7133	11904	31649	1222258	198015	211037	2958,6	1772,8	666,8	172,6	106,6	8,8	10,8	11,1	7,1
Postal and Tele-com-munica-tion Services															
Total Busi-ness Volume (100 million yuan)	0,90	26,30	757,22	4832,94	6107,19	11010,28	4816085,6	245117,1	8513,5	1059,7	180,3	30,9	32,1	28,0	34,3
Number of Letters Delive-red (100 million pieces)	2,32	5,50	10,66	7,62	6,66	5,29	227,6	96,2	49,6	69,4	79,4	2,1	-0,1	-3,8	-4,5
Accu-mulated Number of Newspa pers and Magazi-nes Distri-buted		11,63	10,78	8,79	7,91	7,52		64,7	69,8	85,6	95,1		-1,5	-2,0	-1,9
(100 million copies)															

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Number of Subscribers of Local Telephones (10000 accounts)		113,00	1414,94	3169,14	2406,09	2211,42		1957,0	156,3	69,8	91,9		11,2	2,5	-4,4
Number of Subscribers of Mobile Telephones (10000 accounts)		1,11	1357,26	97 10,09	14798,85	16823,26		1515608,8	1239,5	173,3	113,7		41,0	15,0	7,1
Broadband Subscribers of Internet (10000 accounts)			216,41	1523,22	3288,15	3667,65			1694,8	240,8	111,5			17,0	11,6
International Tourism															
Foreign Exchange Earnings from International Tourism (USD 100 million)		7,17	41,12	124,32	196,63	205,12		2860,8	498,8	165,0	104,3				
Banking and Insurance															
Deposits of Financial Institutions (100 million yuan)			190833,64	8201 9,40	194535,75	208051,16			1090,2	253,7	106,9			14,2	12,3
Loans in in Financial Institutions (100 million yuan)			132227,62	5179 9,30	126031,95	145169,39			1097,5	280,3	115,2			14,2	13,7

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Premium Income (100 million yuan)		18,05	191,88	1421,68	4304,60	4663,89		25838,7	2430,6	328,1	108,3		21,9	19,4	16,0
Education, Science and Technology and Culture															
Education															
Full-time Teachers (10000 persons)															
Institutions of Higher Education	0,90	1,57	2,04	7,86	10,44	10,82	1202,2	689,2	530,4	137,7	103,6	6,4	7,1	9,7	4,1
Secondary Schools	15,93	16,33	27,24	45,48	49,91	50,33	315,9	308,2	184,8	110,7	100,8	2,9	4,1	3,5	1,3
Primary Schools	26,09	27,73	36,41	43,07	50,78	53,03	203,3	191,2	145,6	123,1	104,4	1,8	2,3	2,1	2,6
Students Enrollment (10000 persons)															
Institutions of Higher Education	3,07	9,59	29,95	142,66	192,58	196,32	6394,8	2047,1	655,5	137,6	101,9	11,0	11,4	11,0	4,1
Secondary Schools	316,96	284,52	541,72	939,39	700,14	697,18	220,0	245,0	128,7	74,2	99,6	2,0	3,3	1,4	-3,7
Primary Schools	743,02	747,29	929,93	848,55	941,96	988,37	133,0	132,3	106,3	116,5	104,9	0,7	1,0	0,3	1,9
Government Expenditures on Education (100 million yuan)		21,34	144,39	921,48	2575,52	2792,90		13087,6	1934,3	303,1	108,4		19,0	17,9	14,9
Science and Technology															

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Number of R&D Personnel (10000 persons)				44,66	87,99	102,31				229,1	116,3				10,9
Internal Expenditure on R&D (100 million yuan)				808,75	2343,63										
Number of R&D Programs/Pro-jects (item)				72747	170214	184118				253,1	108,2				12,3
Culture															
Number of Publications															
Number of Books published (100 million copies)	1,72	2,81	2,70	2,31	3,02	3,53	205,0	125,5	130,6	152,6	116,7	1,8	0,8	1,5	5,4
Number of Magazines Issued (10000 copies)	1519	11325	26299	21201	11428	10753	707,9	94,9	40,9	50,7	94,1	5,0	-0,2	-4,8	-8,1
Number of Newspapers Issued (100 million copies)	3,19	13,81	34,63	45,59	27,47	22,12	693,4	160,2	63,9	48,5	80,5	5,0	1,7	-2,5	-8,6
Family, People's Livelihood and Environment															
Family															
Average Permanent Household Size in Urban Areas (person)	4,8	3,9	3,6	3,2	2,9	3,2	65,6	82,5	89,0	98,9	110,7	-1,0	-0,7	-0,6	-0,1

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Average Permanent Household Size in Rural Areas (person)	6,0	5,7	5,2	5,0	3,7	3,5	57,7	61,1	67,1	69,8	94,6	-1,4	-1,7	-2,2	-4,4
Marriages and Divorces															
Registered Number of Marriages (10000 couples)		50,66	56,21	85,71	75,81	71,38		140,9	127,0	83,3	94,2		1,2	1,3	-2,3
Number of Divorces (10000 couples)		2,58	4,75	12,70	22,03	22,88		886,9	481,7	180,1	103,8		8,1	9,1	7,6
Residence															
Per Capital Floor Space of Urban Permanent Residents (sq.m)	5,5	15,8	24,6	34,1	33,1	34,5	630,5	218,7	140,2	101,1	104,2	4,7	2,8	1,9	0,1
Per Capita Floor Space of Rural Permanent Residents (sq.m)	8,7	17,4	22,4	29,2	45,3	47,1	539,8	271,0	210,2	161,2	104,1	4,3	3,6	4,2	6,2
People's Livelihood															
Per Capita Disposable Income of Permanent Residents (yuan)					33003,3	35809,9									

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Per Capital Disposable Income of Urban Permanent Residents (yuan)	412,1	2303,2	9761,6	23897,8	40975,1	44341,0	10759,0	1925,2	454,2	185,5	108,2	12,4	11,1	8,8	8,0
Per Capita Disposable Income of Rural Permanent Residents (yuan)	193,3	1043,0	3654,5	7890,3	15779,7	17167,7	8883,7	1645,9	469,8	217,6	108,8	11,9	10,5	9,0	10,2
Savings Deposits by Households in Renminbi (100 million yuan)	17,56	752,16	8667,29	36318,66	61890,08	69231,95	394259,4	9204,4	798,8	190,6	111,9	23,0	17,5	12,2	8,4
Wages															
Earnings of Employed Persons in Urban Areas (100 million yuan)	30,59	223,29	1057,57	4484,29	15511,55	17717,16	57918,1	7934,6	1675,3	395,1	114,2	17,2	16,9	17,0	18,7
Average Earnings of Employed Persons in Urban Areas (yuan)	615	2929	13859	40432	79183	88636	14412,4	3026,2	639,6	219,2	111,9	13,2	13,0	10,9	10,3
Health Care															
Number of Hospitals (unit)	1968	1885	2426	2444	2666	2745	139,5	145,6	113,1	112,3	103,0	0,8	1,4	0,7	1,5

Continuation of table I.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Number of Doctors (10000 persons)	4,79	8,11	11,12	16,85	25,89	27,74	579,1	342,0	249,5	164,6	107,2	4,5	4,5	5,2	6,4
Number of Hospital Beds (10000 units)	8,41	11,41	15,72	27,71	49,21	47,75	567,8	418,5	303,8	172,3	97,0	4,4	5,2	6,4	7,0
Environment and Disaster															
Volume of COD Discharged from Waste Water (10000 tuns)			95,10	85,84	100,09										
Total Volume of Industrial Sulfur Dioxide Emission (1000 tuns)			90,5	105,5	27,7										
Number of Fire Disasters (time)		1725	8622	6065	16501	13064		757,3	151,5	215,4	79,2		7,5	2,3	10,1
Fire Loss (10000 yuan)		9102	10065	17500	28017	27172		298,5	270,0	155,3	97,0		4,0	5,7	5,7
Number of Traffic Accidents (time)		25909	66072	30480	24138	24293		93,8	36,8	79,7	100,6		-0,2	-5,4	-2,8
Loss of Traffic Accidents (10000 yuan)		5044	27526	8051	10553	7977		158,1	29,0	99,1	75,6		1,7	-6,6	-0,1

Table I.2.

Number of Corporate Units by Sector and by Status of Registration in 2017

Item	Total	Domestic-funded	State-Owned	Collective-owned	Share-holding Cooperative Enterprises
1	2	3	4	5	6
Total	**1955088**	**1889179**	**65911**	**30983**	**8569**
Farming, Forestry, Anima Husbandry and Fishery	47531	46974	822	715	97
Mining	4116	4066	41	83	39
Manufacture	490284	453081	990	2642	1737
Production and Supply of Electric Power, Gas and Water	11150	10842	546	1235	125
Construction	63398	62990	472	716	176
Wholesale and Retail Trades	607193	595105	3025	4688	2695
Transport, Storage and Postal Services	49663	48051	1160	541	208
Hotels and Catering Services	32729	31458	429	354	338
Information Transmission, Computer Services and Software	63782	61799	415	76	145
Finance	12751	12105	311	76	173
Real Estate	70369	67680	1228	2406	786
Leasing and Business Services	221659	217461	3137	11424	1096
Scientific Research, Technical Services	75646	73741	3507	632	236
Management of Water Conservancy, Environment and Public Facilities	8942	8812	2252	282	27
Services to Households,Repair and Other Services	32250	31901	511	410	328
Education	45293	45186	16045	1517	139
Health and Social Service	12472	12424	3897	1083	45
Culture, Sports and Entertainment	25782	25478	1919	266	153
Public Administration,Social Security and Social Organizations	80078	80025	25204	1837	26
Total	**46465**	**5321**	**2007**	**36750**	**1067**
Farming,Forestry,Anima Husbandry and Fishery	476	60	19	332	43
Mining	35	8	4	23	
Manufacture	27649	2962	930	22849	515
Production and Supply of Electric Power,Gas and Water	190	94	13	76	4

Continuation of table I.2

1	2	3	4	5	6
Construction	340	59	28	205	9
Wholesale and Retail Trades	7841	624	116	6533	238
Transport, Storage and Postal Services	1112	170	304	571	27
Hotels and Catering Services	733	150	66	476	27
Information Transmission, Computer Services and Software	1295	123	40	1040	43
Finance	329	95	3	211	8
Real Estate	2034	398	309	1241	40
Leasing and Business Services	2608	315	67	1948	65
Scientific Research, Technical Services	1224	126	40	908	30
Management of Water Conservancy, Environment and Public Facilities	87	20	10	48	6
Services to Households,Repair and Other Services	204	28	15	140	5
Education	58	9	7	35	1
Health and Social Service	32	12	1	16	
Culture, Sports and Entertainment	197	65	33	84	5
Public Administration,Social Security and Social Organizations	21	3	2	14	1
Total	**19444**	**3519**	**718**	**12677**	**1363**
Farming,Forestry, Anima Husbandry and Fishery	81	18	6	36	10
Mining	15	5	3	4	1
Manufacture	9554	1783	299	6825	347
Production and Supply of Electric Power, Gas and Water	118	53	14	32	7
Construction	68	16	5	31	6
Wholesale and Retail Trades	4247	538	49	2844	479
Transport, Storage and Postal Services	500	140	122	173	40
Hotels and Catering Services	538	92	34	252	132
Information Transmission, Computer Services and Software	688	126	6	466	46
Finance	317	117	4	116	64
Real Estate	655	158	83	313	60
Leasing and Business Services	1590	221	29	986	114
Scientific Research, Technical Services	681	168	19	428	27
Management of Water Conservancy, Environment and Public Facilities	43	6	15	19	
Services to Households,Repair and Other Services	145	27	10	82	7

Continuation of table I.2

1	2	3	4	5	6
Education	49	7	6	14	5
Health and Social Service	16	9		3	
Culture, Sports and Entertainment	107	29	14	36	17
Public Administration,Social Security and Social Organizations	32	6		17	1

Table I.3

Number of Corporate Units by Sector by City in 2017

City	Total	Farming, Forestry, Animal Husbandry and Fishery	Mining	Manufacture	Production and Supply of Electric Power, Gas and Water
1	2	3	4	5	6
Provincial Total	**1955088**	**47531**	**4116**	**490284**	**11150**
Guangzhou	338264	1786	39	51115	372
Shenzhen	442146	252	34	90814	221
Zhuhai	75007	594	17	8307	89
Shantou	49345	999	54	14755	132
Foshan	181642	1015	34	62170	267
Shaoguan	26505	2348	308	2470	1227
Heyuan	25657	3563	467	2788	870
Meizhou	38552	5995	538	4370	1601
Huizhou	95068	2756	211	20162	476
Shanwei	11159	1001	23	1737	246
Dongguan	243583	417	20	111270	325
Zhongshan	104610	867	8	48114	129
Jiangmen	70530	1915	141	23692	333
Yangjiang	25333	1647	203	5240	544
Zhanjiang	58120	12184	243	6366	259
Maoming	41342	1105	509	5446	799
Zhaoqing	32846	1633	392	6235	777
Qingyuan	30935	4653	663	3671	1526
Chaozhou	21894	1269	30	9651	269
Jieyang	25115	785	46	8027	277
Yunfu	17435	747	136	3884	411

Continuation of table I.3

1	2	3	4	5	6
By Region					
Pearl River Delta	1583696	11235	896	421879	2989
Eastern Region	107513	4054	153	34170	924
Western Region	124795	14936	955	17052	1602
Mountainous Region	139084	17306	2112	17183	5635
City	Construction	Wholesale and Retail Trades	Transport, Storage and Postal Services	Hotels and Catering Services	Information Transmission, Computer Services and Software
Provincial Total	**63398**	**607193**	**49663**	**32729**	**63782**
Guangzhou	11870	113081	10849	7498	18102
Shenzhen	7980	186756	15504	5681	23485
Zhuhai	5171	25185	1920	1686	3913
Shantou	1083	13649	1424	915	1131
Foshan	4147	60535	3734	3363	3238
Shaoguan	643	5311	482	512	336
Heyuan	1118	4995	409	469	432
Meizhou	2044	8315	620	586	848
Huizhou	7137	22287	1649	1629	2071
Shanwei	317	1938	218	326	171
Dongguan	8618	67093	4583	3037	3253
Zhongshan	4276	23635	1779	2118	1747
Jiangmen	2327	15954	1335	1162	1138
Yangjiang	942	6376	492	552	519
Zhanjiang	1661	14480	1398	977	1042
Maoming	1013	12470	735	580	599
Zhaoqing	1011	6192	670	457	523
Qingyuan	904	5909	756	355	516
Chaozhou	314	3125	385	311	234
Jieyang	409	5615	375	294	254
Yunfu	413	4292	346	221	230
By Region					
Pearl River Delta	52537	520718	42023	26631	57470

Continuation of table I.3

1	2	3	4	5	6
Eastern Region	2123	24327	2402	1846	1790
Western Region	3616	33326	2625	2109	2160
Mountainous Region	5122	28822	2613	2143	2362
City	Finance	Real Estate	Leasing and Business Services	Scientific Research, Technical Services and Geological Prospecting	Management of Water Conservancy, Environment and Public Facilities
Provincial Total	**12751**	**70369**	**221659**	**75646**	**8942**
Guangzhou	2008	15882	51888	23620	1320
Shenzhen	5131	10333	53535	19371	833
Zhuhai	805	3876	11344	4467	385
Shantou	380	1399	3641	1063	247
Foshan	616	5600	16560	7375	779
Shaoguan	160	984	2096	681	306
Heyuan	229	1202	1785	729	259
Meizhou	197	1166	3177	801	449
Huizhou	430	8315	16388	1911	631
Shanwei	81	444	646	195	122
Dongguan	605	5575	20443	5366	652
Zhongshan	277	3322	9050	1549	300
Jiangmen	444	2875	8106	1858	581
Yangjiang	114	1247	2114	815	217
Zhanjiang	306	1978	5095	1648	337
Maoming	214	1261	5319	1064	311
Zhaoqing	191	1664	3604	936	371
Qingyuan	149	1888	2959	911	361
Chaozhou	118	303	896	422	171
Jieyang	183	395	1800	333	143
Yunfu	113	660	1213	531	167
By Region					
Pearl River Delta	10507	57442	190918	66453	5852
Eastern Region	762	2541	6983	2013	683

Continuation of table I.3

1	2	3	4	5	6
Western Region	634	4486	12528	3527	865
Mountainous Region	848	5900	11230	3653	1542
City	Services to Households and Other Services	Education	Health Care, Social Security and Social Welfare	Culture, Sports and Recreation	Public Administration and Social Organizations
Provincial Total	**32250**	**45293**	**12472**	**25782**	**80078**
Guangzhou	6368	5457	2031	6001	8977
Shenzhen	7317	5321	1237	3812	4529
Zhuhai	1648	1323	569	1736	1972
Shantou	992	2301	486	791	3903
Foshan	3082	2649	902	2034	3542
Shaoguan	334	1029	426	440	6412
Heyuan	388	1754	334	388	3478
Meizhou	467	1177	696	585	4920
Huizhou	1480	2176	495	1196	3668
Shanwei	140	1101	161	240	2052
Dongguan	3452	2624	1070	2583	2597
Zhongshan	2442	1902	459	1317	1319
Jiangmen	897	1629	547	859	4737
Yangjiang	424	1157	230	360	2140
Zhanjiang	815	3523	643	954	4211
Maoming	490	3239	752	549	4887
Zhaoqing	408	1533	380	489	5380
Qingyuan	394	1251	333	511	3225
Chaozhou	234	1210	215	400	2337
Jieyang	236	2074	261	275	3333
Yunfu	242	863	245	262	2459
By Region					
Pearl River Delta	27094	24614	7690	20027	36721
Eastern Region	1602	6686	1123	1706	11625
Western Region	1729	7919	1625	1863	11238

Continuation of table I.3

1	2	3	4	5	6
Mountainous Region	1825	6074	2034	2186	20494

Table I.4.

Number of Corporate Units by Status of Registration by City in 2017

City	Total	Domestic-funded	State-owned	Collective-owned	Share-holding Cooperative Enterprises
1	2	3	4	5	6
Provincial Total	**1955088**	**1889179**	**65911**	**30983**	**8569**
Guangzhou	338264	326899	8553	8307	2806
Shenzhen	442146	425495	2890	434	1622
Zhuhai	75007	71101	1875	888	223
Shantou	49345	48488	3767	1910	687
Foshan	181642	177612	2052	2066	761
Shaoguan	26505	26036	3199	1442	146
Heyuan	25657	25010	3125	462	99
Meizhou	38552	37548	3366	656	233
Huizhou	95068	90795	3476	1497	154
Shanwei	11159	10883	2203	429	64
Dongguan	243583	230794	1799	2440	660
Zhongshan	104610	101517	899	2207	101
Jiangmen	70530	67763	2712	1849	173
Yangjiang	25333	24984	2094	308	15
Zhanjiang	58120	57744	5574	1355	101
Maoming	41342	40946	5122	1562	244
Zhaoqing	32846	31972	3342	985	101
Qingyuan	30935	30257	2460	486	142
Chaozhou	21894	21407	2231	574	152
Jieyang	25115	24740	3074	628	44
Yunfu	17435	17188	2098	498	41
By Region					
Pearl River Delta	1583696	1523948	27598	20673	6601
Eastern Region	107513	105518	11275	3541	947

Continuation of table I.4

1	2	3	4	5	6
Western Region	124795	123674	12790	3225	360
Mountainous Region	139084	136039	14248	3544	661
City	Joint-operation Enterprises	Limited Liability Corpora-tions	Share-holding Corpora-tions Ltd.	Private Enterprises	Other
Provincial Total	**5097**	**441258**	**19450**	**1122317**	**195594**
Guangzhou	629	53289	3088	231432	18795
Shenzhen	1707	48608	3988	346375	19871
Zhuhai	181	45566	645	16693	5030
Shantou	153	15416	853	18639	7063
Foshan	377	60240	1742	96865	13509
Shaoguan	90	6421	392	6975	7371
Heyuan	89	5810	674	7419	7332
Meizhou	131	5967	602	16901	9692
Huizhou	161	13897	657	57399	13554
Shanwei	47	1227	181	4267	2465
Dongguan	289	95907	2530	113054	14115
Zhongshan	174	26691	300	66863	4282
Jiangmen	225	15641	757	34260	12146
Yangjiang	29	2910	144	15446	4038
Zhanjiang	211	3578	413	29537	16975
Maoming	173	11269	692	10867	11017
Zhaoqing	157	8104	439	10565	8279
Qingyuan	105	7368	560	12074	7062
Chaozhou	50	2964	273	11233	3930
Jieyang	74	5842	331	9044	5703
Yunfu	45	4543	189	6409	3365
By Region					
Pearl River Delta	3900	367943	14146	973506	109581
Eastern Region	324	25449	1638	43183	19161
Western Region	413	17757	1249	55850	32030

Continuation of table I.4

1	2	3	4	5	6
Mountainous Region	460	30109	2417	49778	34822
City	Enterprises with Investment from Hong Kong, Macao and Taiwan	Joint Ventures	Coopera-tive Enterprises	Sole Investment Enterp-rises	Share-holding Corpora-tions Ltd.
Provincial Total	**46465**	**5321**	**2007**	**36750**	**1067**
Guangzhou	7018	924	470	4862	178
Shenzhen	12262	1177	198	10525	179
Zhuhai	2925	395	231	2144	98
Shantou	599	109	65	396	17
Foshan	2457	729	82	1571	46
Shaoguan	378	53	29	252	28
Heyuan	537	50	11	356	78
Meizhou	891	93	48	721	22
Huizhou	3440	312	137	2898	63
Shanwei	235	26	14	183	11
Dongguan	8860	437	221	7778	201
Zhongshan	2084	233	31	1768	32
Jiangmen	2062	348	83	1528	50
Yangjiang	258	52	51	145	8
Zhanjiang	195	54	43	89	2
Maoming	320	57	19	218	10
Zhaoqing	624	107	35	450	21
Qingyuan	522	52	46	411	8
Chaozhou	350	53	137	137	8
Jieyang	253	31	41	176	3
Yunfu	195	29	15	142	4
By Region					
Pearl River Delta	41732	4662	1488	33524	868
Eastern Region	1437	219	257	892	39
Western Region	773	163	113	452	20
Mountainous Region	2523	277	149	1882	140

Continuation of table I.4

1	2	3	4	5	6
City	Enterprises with Foreign Investment	Sino-foreign Joint Ventures	Sino-foreign Cooperative Enterprises	Foreign-funded Enterprises	Share-holding Corpora-tions Ltd.
Provincial Total	**19444**	**3519**	**718**	**12677**	**1363**
Guangzhou	4347	949	161	2791	240
Shenzhen	4389	791	76	2934	115
Zhuhai	981	204	38	639	61
Shantou	258	66	34	117	32
Foshan	1573	405	59	835	215
Shaoguan	91	25	11	35	14
Heyuan	110	13	12	48	24
Meizhou	113	34	19	38	15
Huizhou	833	129	34	583	63
Shanwei	41	8	4	20	4
Dongguan	3929	339	62	2983	376
Zhongshan	1009	164	14	710	73
Jiangmen	705	147	30	436	55
Yangjiang	91	15	9	58	4
Zhanjiang	181	45	6	119	3
Maoming	76	28	4	24	9
Zhaoqing	250	63	17	142	8
Qingyuan	156	30	36	67	14
Chaozhou	137	20	57	38	16
Jieyang	122	27	28	37	18
Yunfu	52	17	7	23	4
By Region					
Pearl River Delta	18016	3191	491	12053	1206
Eastern Region	558	121	123	212	70
Western Region	348	88	19	201	16
Mountainous Region	522	119	85	211	71