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MONOGRAPH

GUANGDONG OCEAN UNIVERSITY

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**GEOSPATIAL ANALYSIS:
THEORY, TECHNOLOGY AND SOFTWARE**

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The current state of land relations is determined by ambiguous trends, characterized by declining land valuation of regions, the establishment of boundaries of settlements, other spatial factors, unreasonable urban policy, which violates the directions of development. The monograph which reveal the directions and features of development and implementation of geospatial analysis, ensuring the territorial development of regions in the context of land use, describes the main aspects of modeling and assessing the level of territorial development using geospatial analysis.

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У монографії розглянуті питання визначення напрямів та особливостей реалізації геопросторового аналізу, обґрунтовані підходи до застосування геоінформаційних систем у контексті розвитку територій. Охарактеризовані технологічні й інформаційні аспекти щодо здійснення геопросторового аналізу територій. Представлені у монографії теоретичні положення та практичні рекомендації можуть бути використані студентами, аспірантами, науковцями, практиками та іншими зацікавленими особами, які працюють у сфері застосування геоінформаційних систем, забезпечення територіального розвитку, землекоритування.

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Chapters written by Liu Chang are section 3, section 4, section 5, Conclusions and Reference.

Chapters written by Mamonov Kostiantyn, Troian Vladyslava are introduction, section 1 and section 2.

LIST OF CONDITIONAL ABBREVIATIONS

LC - land cadastre

LP - land plot

UPA - urban planning activities

UC - urban cadastre

UM - urban monitoring

UMLU - urban monitoring of land use

INTRODUCTION

The contours of the functioning of the regions are to ensure the territorial development of land use, taking into account the impact of spatial, urban, investment and environmental factors. The interaction of these factors is an important catalyst for driving sustainable regional development.

The Declaration on Environment and Development, adopted in Rio de Janeiro, substantiates the areas of sustainable development, where special attention is focused on environmental aspects. The concepts of sustainable development combine economic, social and environmental components. However, spatial and urban factors influencing regional development are ignored. In recent decades, the importance of these factors has grown, as they increase the efficiency of land use as a major factor in regional development.

The current state of land relations is determined by ambiguous trends, characterized by declining land valuation of regions, the establishment of boundaries of settlements, other spatial factors, unreasonable urban policy, which violates the directions of development. Along with this, there is an increase in the information component in the field of land use, which allows you to respond in a timely manner and make informed decisions.

At the theoretical level, the conceptual apparatus for determining the territorial development of land use in the region, substantiation of its components, ensuring the use of technology development and implementation of the relevant information system needs to be clarified. A methodological approach to the integrated assessment of territorial development of land use has not been developed, which allows to form a quantitative basis for regional development. Of particular importance is geospatial analysis, technology of its development and implementation.

Scientists J. Williamson, J. Larsson, A. Martin, K. Meteshkin, Y. Palekha, I. Perovych, O. Petrakovska, V. Sidorenko were engaged in solving fundamental issues

in the field of land formation and use, development and implementation of geospatial analysis. J. Stoter, M. Stupen, A. Tretyak, V. Shipulin, S. Enemark and others.

A significant contribution to the development of theoretical and methodological provisions for territorial development was made by J.-P. Blondinier, O. Borodina, J. Joy-Matthews, S. Ishchuk, M. Kyzym, S. Mocherny, W. Powell, V. Ponomarenko, O. Tridid, L. Shevchuk and others.

Theoretical and methodological provisions for determining the directions and features of land use, ensuring territorial development are systematized in scientific developments. However, further research is needed to resolve the contradictions between low-structured and unclear processes of organization and use of land resources of the regions of Ukraine, leading to conflict situations in land relations and modern methods, techniques and technologies that ensure territorial development of land use in the region. implementation of geospatial analysis. In the context of the problem, the following issues are identified: 1) the formation of a theoretical and methodological platform for determining the territorial development of land use in the region and geospatial analysis; 2) development of a diagnostic system of indicators for assessing the territorial development of land use in the region with the use of geospatial analysis; 3) assessment of territorial development of land use in the region; 4) development of technology for the formation of information system of territorial development, taking into account the influence of spatial, urban, investment and environmental factors on the basis of geospatial analysis.

Thus, the scientific and practical task of solving a particular problem is relevant and forms the direction of research.

The aim of the study is to increase the efficiency of land use in the region by developing a theoretical and methodological platform and developing on its basis practical scientifically sound recommendations to resolve contradictions in land relations in Ukraine, taking into account the impact of spatial, urban, investment and environmental factors. development using geospatial analysis.

To achieve this goal:

- to analyze and identify the features of territorial development of land use in the region, taking into account domestic and international experience;
- substantiate the theoretical and methodological provisions for determining the territorial development of land use in the region;
- to determine the factors influencing the territorial development of land use in the region;
- to carry out geospatial analysis of factors of territorial development of land use in the region;
- to form a multilevel diagnostic system of indicators used to assess the territorial development of land use in the region on the basis of geospatial analysis;
- to develop a methodological approach to the integrated assessment of territorial development of land use in the region using geospatial analysis;
- to model the impact of spatial, urban, investment and environmental factors on the integrated indicator of territorial development of land use in the region;
- to determine the reliability of the results of modeling the factors of territorial development of land use in the region by the method of neural networks;
- to propose the technology of development of the information system of territorial development of land use of the region with the use of geospatial analysis;
- to develop a system of geoinformation support for the territorial development of land use in the region;
- to forecast systemic factors of territorial development of land use in the region.

The object of study - a set of interrelated processes that affect the territorial development of land use in the region. The subject of research is methodological and technological bases of geospatial analysis of land relations in Ukraine.

The theoretical basis and methodological basis of the work are general scientific methods: systematization, comparison and dialectical development of systems, methodology of normative-legal and information-analytical support of territorial development of land use in the region.

The scientific basis of the research is determined by the methodology of territorial development assessment, systems theory and systems analysis, theory of mathematical statistics, methodology of legal and information support, results of geospatial analysis.

The scientific novelty of the results is as follows:

- developed a methodological approach to integrated assessment of territorial development of land use in the region based on the definition of integrated indicators and the use of analytical, expert and method of analysis of hierarchies through geospatial analysis of spatial, urban, investment and environmental factors;

- built an information system of territorial development of land use through the use of geographic information technologies and the results of determining the integrated criterion and geospatial analysis, which offered a technology that includes a set of interrelated stages, methods and models to determine the state and directions of territorial development at the regional level. changes in spatial, urban, investment and environmental factors;

- developed a multilevel system of factors based on the systematization of existing theoretical and methodological approaches and regulations, which allowed to build tuples and form information support for spatial, urban, investment and environmental factors to form a quantitative basis for determining indicators of territorial development of land use in the region;

- criteria for selection of spatial, urban, investment and environmental factors in the system of geospatial analysis of land use in the region by applying the tools of expert assessments, which in contrast to the existing allowed to form an information-analytical basis for developing a methodological approach to integrated assessment and build a diagnostic system;

- methodological approach to integrated assessment of land use in the region, based on the principles of scientific validity, complexity, system, integrity, goal-orientation, structure, development, adequacy and interrelated areas of its development withThe practical significance of the obtained results is that the theoretical results and

methodological provisions are brought to the level of specific proposals and methodological developments for the development and implementation of geospatial analysis technology.

The monograph consists of 6 chapters, conclusions, which reveal the directions and features of development and implementation of geospatial analysis, ensuring the territorial development of regions in the context of land use, describes the main aspects of modeling and assessing the level of territorial development using geospatial analysis.