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TECHNOLOGICAL MODEL OF LAND RESOURCES ADMINISTRATION

I. Perovich
Lviv Polytechnic National University

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Formulation of the problem

Administration of Land Resources is intended to address issues related to the efficient use of land resources of the territory under the condition of its reproduction and protection. Thus, one should consider the influence factors on the development of land relations both within given territory and outside. For reasonable administrative and managerial decision-making regarding the intended use of certain land resources of administrative-territorial units at a certain technological model we should make an analytical analysis of natural, human, economic and other potentials in this area, using for these purposes developed techniques and approaches of analytical activity. This allows us to determine priorities of using land resources, their specificity, to establish the script of development of the territories in general.

Connection between important scientific and practical tasks

Decentralization of power in Ukraine, transference of a lot of rights to local self-governments are on the agenda the issue of development of scientifically grounded methods of effective use of the existing mineral resource base, natural resources, including the land resources too. In this aspect, in terms of land management and cadastre, this publication is closely associated with the program of socio-economic development of certain territories and administrative territorial units. The developed theoretical provisions, suggestions and recommendations will find practical application in the implementation of the above-mentioned programs.

Analysis of recent researches and publications devoted to solving this problem

In the last period the issues related to the strategic planning of development of the territories were obtained a wide elucidation. These include works of Kuibida V. and Bilokin Yu [1], Nudelman W., Sanzharovskyi I. [2], Mamonova V. [3] and many others. In these publications and in many others the questions about the impact of a variety combination of factors to determine the priority development of territories without sufficient consideration of certain important land forming factors of functional land use are considered.

It should be noted that the Land Fund of the particular territory and its structure are major and basic factors of territorial planning, distribution of productive and industrial forces, engineering and technical infrastructure, recreational and nature-protection zones and so on. Thus territorial planning of the areas must be preceded by a comprehensive study and analysis of the current state of land resources, its cadastral zoning and evaluation, and development of design solutions for planning housing and public buildings, industrial and recreational facilities, highways of engineering infrastructure.

In this aspect it should be noted the works of Sokhnych [5], Krivov V. [6], in which there are displayed the issues of planning of the intended use of the land fund. However, in most cases presented researches are related to the lands of only one category actually for agricultural purposes and, on the other hand, there are not widely used modern analytical methods of analysis, in particular, in SWOT, PESTLE there are no reasonable technological models of resolving the issues of administration of land resources.

Unsolved parts of the general problem

Displaying the possibilities of using modern analytical approaches, which are widely used in the planning of economic activity of enterprises and organizations, forming strategic development of territories for the purposes of the administration of land resources are the purpose of this study. Therefore, in this publication it is regarded a technological model of procedure for the administration of land resources (ALR) taking into account a number of internal and external factors and methodological analytical approaches.

The basic material of the research

Administration of land resource is characterized by whole complex of different geospatial, economic, social, engineering, infrastructure, historical, cultural, environmental and other factors that must be considered in implementing territorial land management.

The system of territorial land management provides for the establishment of quantitative and qualitative composition of the land fund by categories of the lands, their functional use, zones of restrictions and encumbrances, legal status, pollution and negative natural phenomena and processes, which ultimately are reflected in the materials of the land inventory.

On the basis of inventory materials of land management and urban planning documentation it is

possible to form objective and reliable data on land resources (6-ZEM form) and then, using a variety of statistical indicators to create an integrated system ALR. These include:

• Strategic long-term administration for 10-15 years;

• long-term priority administration for 10-15 years;

• administration for short-term strategic objectives for 3-5 years;

• administration for operational goals for 1-3 years.

Strategic long-term administration provides effective and efficient use of land resources, their restoration and protection for a long prospect in the future and serves as a basis for determining priorities of intended use of the territories, development of the goals and objectives. In terms of a certain limitation of land resources on the basis of strategic administration we establish no more than three priorities [4]. Thus, the priorities have to belong to the most important purposes of using of land resources in relation to sustainable economic development of the territories, taking into account the factors of most attractive vital activity and environmental safety.

Achieving of the long-term goals of the strategic ALR is possible through the short-term operational and strategic administration, which must be preceded by a comprehensive analysis of various internal and external factors. Currently, the most common methods of analysis are: socio-economic, comparative, SWOT, PESTLE, sociological, etc.

The information base of the analysis of the territory of ALR are the data on:

• geospatial location of land resources;

• ecological situation of the environment;

• natural resource potential;

• priorities of economic development of the territories;

• engineering and technical infrastructure;

• living standard of population and demographic situation;

• legal support for land management and more.

By analyzing certain analytical approaches, you should choose one or several that more fully allow to establish efficient solutions with minimal risk.

For the development of strategic decisions of ALR in terms of external environmental dynamics and other processes we can use SWOT and PESTLE analysis.

The methodology of SWOT-analysis provides identification of the qualitative characteristics of internal and external factors that affect on the validity of administrative decisions.

Through applying of this analysis the dominant factors are found and evaluation their impact on the final result have been provided. In addition, there are "absolute" factors that can not affect on the administrative decision-making. These include the geospatial position of land parcels, geometric parameters (area) of certain categories of land and more. Against the background of the analysis of the strengths and weaknesses of use of land resources it becomes possible to formulate various options of strategies of ALR. It is important to direct the strategy to eliminate the weaknesses by transforming land resources from one category to another, and their transformation within the certain categories for the functional using.

Political factors determine the compatibility of land resources administration of certain territorial communities with the goals and programs of regional and national development. Economic factors, mainly, establish the degree of utilization of labor resources and their costs, unemployment and household incomes. Long-term changes in the social sphere, the demographic situation and the development of cultural values and traditions are set by analyzing the socio-cultural factors. The special importance is attached to the analysis of tendencies of development of the territories, including land resources, based on the use of modern communication and IT technologies, new methods of conducting of works on land management and cadastre. One of the main basic factors of ALR is the presence of an attractive investment climate. In this respect the investment indicator is becoming an important stimulant of the development of the territories. Achieving the desired results in the administration of land resources must meet state standards and the requirements of ecological balanced state of the environment and of land resources that requires research and analysis of this type of factors.

Research of factors of external and internal environment it should be conducted comprehensively and systemically considering the relationship that may exist between them. All of this requires the use of economic-mathematical methods and approaches to analyze and assess the impact of various factors on decision-making in land resources administration.

Our proposed technological model of land resource administration involves four basic steps: first - the collection of information which is necessary for effective decision-making; second - the establishment of groups of main and dominant factors determining in each group of the priority factors and their quantitative and qualitative characteristics; third - economic and mathematical processing of information; establishment of effective of administrative decisions regarding use of land resources; four - the future risks and chances, evaluation of proposed solutions, recommendations, etc. (Fig. 1).

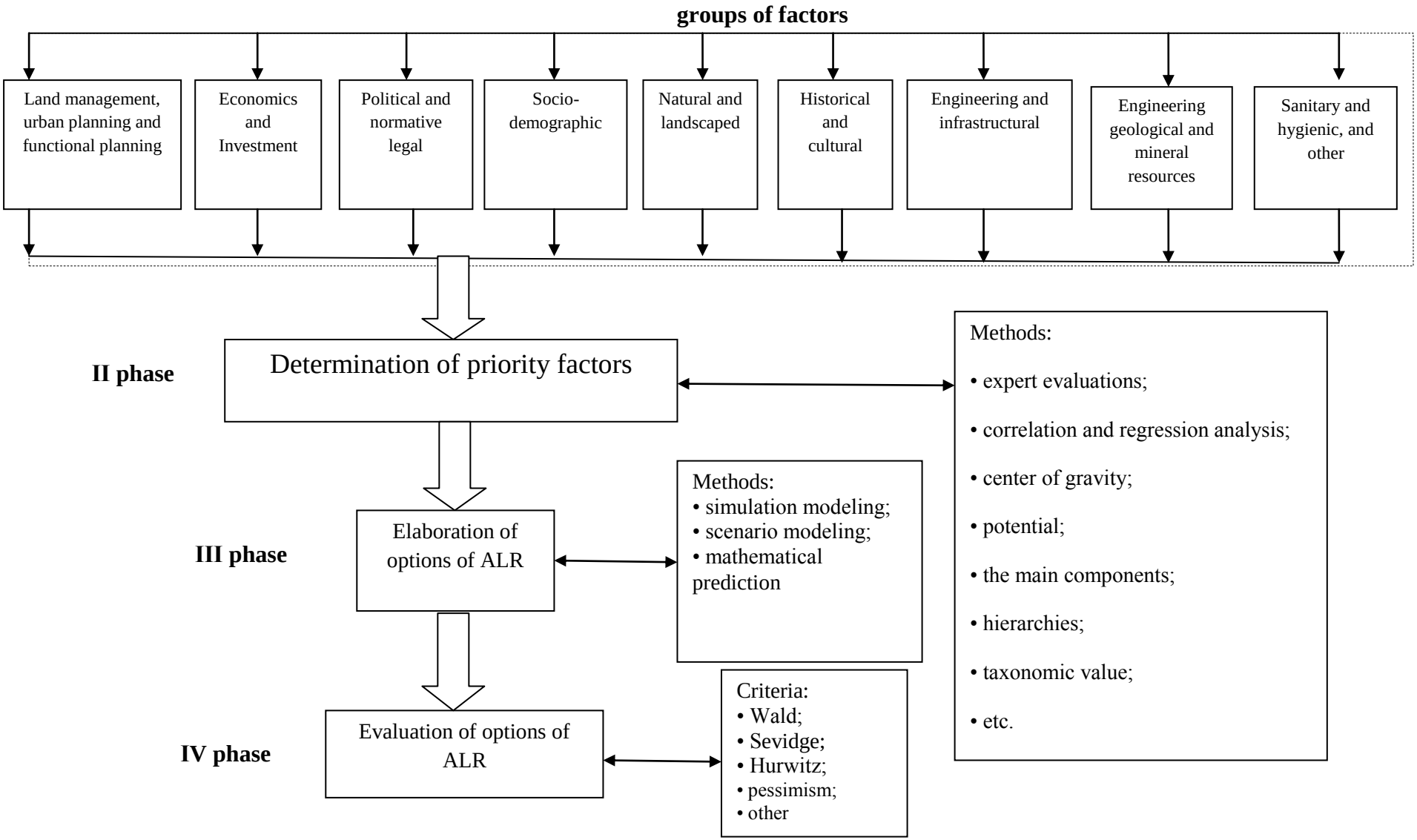

Figure 1. Technological model of development of the system of ALR

Identifying the priority factors should take place with the use of one or more mathematical methods: expert estimates, correlation and regression analysis, center of gravity or potential, major components, hierarchs and taxonomic index. The choice of the method for determining the priority factors depends on the value of degree of confidence in the information database, skills of practical knowledge of certain mathematical apparatus, professional training in the subject area of formation of ALR.

On the basis of appropriate analytical and economic-mathematical processing of systematic priority factors it is possible to form a program of ALR. The most acceptable for the solution of this part of the problem are the methods of simulation and scenario modeling, and mathematical prediction. In terms of mathematical rigor of solving of this problem, the method of mathematical prediction may be the most appropriate.

An important final stage is to evaluate the developed variants of ALR. This requires to use a system of criteria: Wald, Sevidge, Hurwitz, pessimism and other.

The application of the proposed technique will allow to set priorities in the development of land resources and to form a strategy for the development of individual territorial communities and regions. It should be noted that the overwhelming majority of the methods of priority (most important) factors is determined through the expert evaluation, which in its essence is based on the conclusions and judgments of specialists and experts in the field of knowledge or production, that allows also to consider hidden connections between certain groups of factors or factors, which does not allow to detect them by traditional economic-mathematical or simply mathematical methods.

For the detection of the risks and opportunities of the development of the process of ALR there is, on the one hand, a number of mathematically-based criteria [7], on the other hand, it can apply the system of analytical indicators, which allows to classify these threats. For land resources, in the last case, it may be the maximum permissible concentration of chemical compounds, radionuclides and heavy metals or other contamination; development of negative erosion, karst and other processes and phenomena. In this case, the formation of sets of potential opportunities and threats can be carried out taking into account the qualitative characteristics of indicators. For example, if

$$F = \{F_1, F_2, F_3, \ldots F_n\} \quad (1)$$

the set of factors,

$$X = \{X_1, X_2, \ldots X_n\} \quad (2)$$

the running values of these n factors;

$$Y = \{Y_1, Y_2, \ldots Y_n\} \quad (3)$$

the set of indicators

then

$$F_i \Rightarrow \begin{cases} X_i \le Y_i \in M, & (4) \\ X_i \langle Y_i \in 3, & (5) \end{cases}$$

where M – the set of potential opportunities;

3 - the set of potential threats.

Thus the function (4) and (5) allow us to establish potential opportunities or threats of certain factors.

Thus, taking into account the collected information and its processing you can develop an effective strategy of ALR. It is necessary systemically to approach to the problem of research on the impact of individual internal and external factors on the outcome.

Conclusions

Administration of land resources for the presented technological model on the basis of analytical and mathematical economic methods for processing a variety of physical, economic, natural, social, engineering, legal, functional planning, environmental and other factors become an effective mechanism of objective assessment of land resources and prospects for their use.

The proposed technological model requires practical testing and implementation.

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Technological model of land resources administration

I. Perovich

It is proposed the technological model of the formation of the system of land resources administration.

This model includes a number of rental forming factors: economic, natural, social, engineering, legal, environmental, and other statistical information that allows on the basis of analytical and mathematical economic methods to form objective and reliable programs of administration of land resources of certain territories or administrative and territorial units.