

EFFICIENCY OF LAND MANAGEMENT PROVISION OF SUSTAINABLE LAND USE OF AGRICULTURAL

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Abstract

The article is devoted to the substantiation of theoretical-methodological approaches to assessing of effectiveness of land management for sustainable land use in agrarian sector. It is proved that when justifying the criteria for evaluating the effectiveness in this area, it is necessary to proceed from the basic provisions of the interaction of economic and environmental subsystems that determine the interests of society and the interests of the business entity. To assess the effectiveness of land management, a method for calculating the integral indicator that integrates the system of environmental and economic indicators in this area has been proposed. According to the integral indicator, four groups of clusters are formed in terms of the effectiveness of land management provision: first group is the most efficient management; second group is the level of efficiency above the average; third group is the level of efficiency below the average; fourth group is inefficient management. The proposed method involves the use of a matrix method for assessing the effectiveness of management for ensure sustainable use of land. The advantage of the proposed approach is that it allows you to determine how to effectively or ineffectively optimize land resources at the regional district level, which ensures relative comparability of the calculated indicators. Approbation of the proposed methodology for assessing has proved that state authorities, as well as business entities can take adequate management decisions, and the effectiveness of land use by agrarian producers can be improved.

Key words: efficiency, assessment, land management, provision, sustainable, agricultural, integral indicator.

INTRODUCTION

Land resources are the main means of agrarian production, and the process of their use in economic activities ensures the socio-economic development of the country. Stable land use plays an important role in this, which in turn is impossible without effective land management. However, in the process of reforming land relations, the use of agricultural land became one of the most acute problems of a market economy.

In all major areas of state control over the conduct of land management operations, it is necessary to ensure the availability of stocks and conduct monitoring over the protection of land. It is noted that the administrative-territorial functions for the ward regime in the country should be coordinated with the necessary documents, including for the embassy in the country.

In modern market conditions, one of the primary tasks of increasing the economic

effectiveness of land use in agrarian sector is the formation of optimization of management decisions in this area. Therefore, one of the most pressing issues is the scientific substantiation of the methodology for assessing the effectiveness of land use management to ensure the supportable use of agricultural land.

An effective land governance process for agrarian land must take into account the current social conditions and economic relations and ensure the beginning of a civilized land market, the stability of land rights, complete and accessible information support for regional development planning. This will make it possible to reduce the development of monopolies and latifundia in agriculture, which impede the provision of sustainable land use. The priority task of land governance science is to change the direction of development of land governance design of the territories of agrarian formations.

With the development of new forms of

management and methods of organizing the territory, the issues of establishing criterion indicators for determining the degree of land management for supportable use of land resources taking into account environmental requirements are put in the forefront [2; 6; 11-13]. In the theory of economic performance, there are "criteria" and "indicators". Efficiency criteria characterize its qualitative side, the correspondence of the result of activity to the goals that define this activity. A quantitative reflection of these criteria is expressed in the relevant indicators. In particular, such indicators include: yield, capital productivity, costs per unit of production, as well as indicators of profitability and indicators of improving the quality of land resources and their fertility.

In the process of functioning of land governance mechanism, is inextricably linked with the formation of stable use of land, it is necessary to be guided both by generally accepted (in particular, regulatory and legal) provisions, and a number of requirements and principles reflecting the features of this ecological-economic process. In particular, an important environmental and economic imperative of land use support is territory use planning.

The purpose of land management regulation is the establishment of obligatory qualitative and quantitative indicators (standards) aimed at ensuring the sustainable use, protection and reproduction of land, as well as ensuring environmental safety in land relations [7].

From the point of view of public interest, indicators of land use effectiveness is to meet the needs of the population in agricultural products at the expense of domestic production. From the point of view of the economic interests of producers, efficiency consists in obtaining the maximum profit per unit of invested capital, and the economic interests of consumers in improving the quality and lowering prices for agrarian products.

Considering that land resources are a natural object, as well as an object of land relations, we propose to divide the effectiveness of land management into the following types:

ecological and economic. Ecological efficiency characterizes created as a result of management provision of land resources and other elements of the natural environment and their improvement, reproduction of soil fertility, prevention and suppression of ground degradation processes, water erosion, deflation and other negative phenomena. Economic efficiency takes into account the effectiveness of land use measures to ensure their use in monetary terms. It can be expressed as the ratio of the valuation of the results in the valuation of resource expenditures over the entire duration of the activities, taking into account the time factor. At the same time, compulsory compliance with environmental and social requirements, which are also evaluated as ancillary economic effect or costs, must be ensured.

MATERIALS AND METHODS

Effective functioning of a land management system is impossible without a comprehensive presentation of the results of land organization activities, therefore, the initial element of its support system is an effectiveness analysis. The need for analytical evaluation of efficiency is indisputable, because its results are the basis for making management decisions that allow you to choose the optimal strategy, tools and methods in the framework of land management provision for land use.

Considering this, the important issues are the selection of criteria and indicators for such an assessment, which will most objectively reflect the level of land management.

The priority of one or another criterion of efficiency depends on the specific conditions of management, the level of development of the productive forces. The application of the criteria of environmental and economic effectiveness allows us to provide an assessment of land use forms of complexity. These criteria create restrictions for methods of obtaining profit or income from using land as a natural resource, and also provide an opportunity to form a system of rational and at the same time balanced land use.

Analysis of materials and literature [1; 3; 9;

16] leads to the following conclusion: the bias of many methodologies for assessing the effectiveness of land use lies in the various dimensions of absolute and relative indicators. Absolute indicators illustrating trends in land structure changes provide an opportunity to assess the degree of intensity of land use. Relative indicators, including performance indicators of 1 hectare of agricultural land, characterize the efficiency of potential use. However, in our opinion, it is necessary to evaluate both groups of indicators, because the effectiveness of management directly contributes to the ecological status of land resources, and vice versa.

From the point of view of the level of economic effectiveness of agricultural production should be considered not only as the ratio of results to costs. First of all, it is necessary to evaluate the possibility of using the available resources subject to obtaining the maximum result. This approach primarily provides an opportunity for a real comparative assessment of the achieved and expected results. In addition, it provides an opportunity to clarify the amount of lost profits, as well as to conduct a fair comparison of the performance of economic entities, regardless of their size, specialization and location [16, p. 213].

In general, justifying the criteria for the ecological and economic assessment of land management, it is necessary to proceed from the basic provisions of the interaction of economic and environmental subsystems that determine the interests of society and the interests of a business entity [4; 8; 12]. Criteria for assessing the interaction of economic and environmental subsystems should reflect the fullest set of interactions that embodies the economic and environmental objectives.

The effect of land management cannot be assessed only by the ratio of project costs and future cost reduction, because some of the effects are ultimately revealed by improving the quality of land management, and the manifestation of a number of positive factors deferred over time due to lower costs due to better land management.

Having considered various methodologies for assessment of effectiveness of land management, we have formed a set of environmental and economic indicators used to assess sustainable land use in agrarian sector (Table 1).

One of the main results of the implementation of any land management project is the increase in agricultural production, the proceeds from the implementation of which determines the incremental financial flows in evaluating its effectiveness. Therefore, special attention should be paid to the question of justifying the productivity of land-land, which is a fundamental factor in the formation of technical and economic indicators of an investment project in land management in agrosphere.

Table 1. The main indicators of efficiency of land management provision of sustainable land use of agricultural

Indicator	Criterion of optimality
Economic	
Increase productivity agrolandscapes, conventional units	Max
Land transfer coefficient, units	Max
Cost recovery, units	Min
Additional income as a result of cost reduction, conventional units	Max
Budget efficiency of land management	Min
Environmental	
Coefficient of ecological stability of territories, units	Max
Tension of relief, %	Min
Coefficient of technogenic land destruction, units	Min
Dynamics of soil bonitet score, %	Max
Motley land, units	Min
Degree of soil erosion, %	Min

Source: systematized by the author based on [3; 5; 13-15].

The set of indicators proposed by us for assessing the effectiveness of land management for the sustainable use of agricultural land demonstrates their multifactorial nature and interdependence in questions of optimization, which leads to the need to develop management decision-making measures.

When improving and systematizing the

environmental and economic indicators for evaluating the effectiveness of land management to ensure the stability use of land in agrarian sector, we proceeded from the following: the level of ecological and economic efficiency of land use and the availability of the necessary natural resource potential create prerequisites for its improvement; the process of land use must reproduce the specific result that occurs during land management; the environmental and economic efficiency of land use must necessarily take into account the peculiarities of the reproduction process in agrarian production.

The proposed method involves the use of a matrix method for assessing the effectiveness of land management security of use of agricultural land in the context of sustainable development, which is supplemented by the solution of the problem of dimensional differences and the application of selection criteria. At the first stage, the necessary information for the assessment is collected. At first, clustering is conducted on a territorial basis (regions, districts, zones, etc.). To compare different types of land in agrosphere it is necessary to transfer hayfields and pastures into conditional arable land.

For the formation of the basic indicators necessary for the implementation of the proposed methodological approach, we use information for a three-year period in order to minimize the influence of natural factors and market conditions.

At the second stage, the proposed performance indicators are calculated. The matrix on the absolute values of the indicators of the effectiveness of land management for the sustainable use of agricultural land is formed according to the results of the calculation of evaluation criteria by groups of economic and environmental parameters for each alternative considered. The solution of the obtained matrix provides for the elimination of the differences in the dimensions of the reduced parameters, that is, their translation into a dimensionless form [10]. To do this, the absolute values of the indicators are replaced by the degree of their

achievement:

$$K_i = i_1 + i_0, \quad (1)$$

i_1, i_0 – the current value of this indicator and the base value for a given species, which is the desired, in terms of optimization conditions (maximum or minimum) value.

In the modern conditions of agrarian production, in order to assess the ecological and economic effectiveness of land management in agricultural, a need has arisen for an integral indicator that would reflect the efficiency of land use from the standpoint of realizing the soil potential and its market value. In this regard, to assess the effectiveness of land management to ensure the sustainable use of agricultural land, we proposed an integral indicator:

$$I_{ef} = i \sqrt{\sum K_i}, \quad (2)$$

The integral indicator of assessment and indicators of environmental and economic efficiency, which are its constituent elements, make it possible to fully reflect the effectiveness of land management to ensure the sustainable use of agrarian land.

It is worth noting that in order to select the most significant factors influencing the resultant attribute of an integral indicator, a correlation analysis can be applied; it involves measuring the degree of connection between them.

RESULTS AND DISCUSSIONS

The environmental and economic effect of land management projects is determined by increasing yields, reducing the cost of processing crops, reducing or restoring soil fertility, protecting the soil from loss of soil due to erosion, forest reclamation measures, and preventing damage from anthropogenic factors.

In order to test the proposed methodological approach, we calculated an integral indicator of land management provision sustainable

land use of agricultural in the administrative districts of Lviv region. Averages are calculated over three years, which is associated with fluctuations in crop yields, which is due to a significant discrepancy in natural climatic conditions and market conditions.

In table 2 shows the results obtained by our proposed methodological approach in the ranked order, according to the ecological and economic efficiency of land management to ensure the sustainable use of agricultural land in the administrative districts of the Lviv region. At the same time, during the formation of clusters, the correspondence of the obtained results to normal distribution was taken into account so that the distribution of areas into groups occurred adequately and it was possible to carry out economic and statistical analysis methods.

Table 2. Efficiency of land use management for sustainable agricultural land use of Lviv region, 2015-2017

District	K_{econ}	K_{ecol}	I_{ef}
First group (from 0.76 to 1)			
Stryiskyi	0.94	0.71	0.82
Sokalskyi	0.87	0.68	0.77
Kam`ianka-Buzkyi	0.90	0.66	0.77
Drohobyskyi	0.75	0.78	0.76
Second group (from 0.51 to 0.75)			
Radekhivskyi	0.77	0.59	0.67
Zolochivskyi	0.82	0.41	0.58
Buskyi	0.78	0.35	0.52
Brodivskyi	0.76	0.35	0.52
Yavorivskyi	0.72	0.38	0.52
Third group (from 0.26 to 0.50)			
Zhydachivskyi	0.68	0.35	0.49
Turkivskyi	0.17	0.88	0.41
Mykolaiivskyi	0.51	0.31	0.40
Sambirskyi	0.52	0.28	0.38
Skolivskyi	0.16	0.79	0.36
Peremyshlianskyi	0.32	0.41	0.36
Mostyskyi	0.37	0.33	0.35
Pustomytivskyi	0.37	0.32	0.34
Horodotskyi	0.25	0.40	0.31
Zhovkivskyi	0.24	0.41	0.31
Fourth group (from 0 to 0,25)			
Starosambirskyi	0.14	0.42	0.24

Source: author's calculations.

As a result, we have identified four groups of clusters on the effectiveness of land management to ensure the sustainable use of

agricultural land: the first group is the most efficient land tenure; the second is the level of efficiency above the average oblast; the third is the level of efficiency below the average oblast; the fourth group is inefficient land management.

The advantage of the proposed approach is that it allows you to determine how to effectively or inefficiently streamline land resources at the regional district level, ensures relative comparability of calculated indicators. In some districts of the Lviv region, a situation has arisen where areas with relatively high environmental criteria (for example, bonitet score, ecological stability) have low or sometimes low profitability of production, that is, they use land resources ineffectively. At the same time, there are also opposite cases: with medium and even lower values, the bonitet score gives manufacturers quite high economic indicators.

This situation creates the threat of the formation of intense negative effects in the agrarian sphere of Lviv region, because the lack of an appropriate response to the acceleration of destructive soil processes leads to an increase in the level of danger for the food industry and the environmental sustainability of the region as a whole.

In general, the results obtained in the course of the study allow not only to reveal the mechanism for improving the efficiency of the entire industry due to its modernization, but also create the basis for its reasonable leading role in relation to other industries with spatial reference.

CONCLUSIONS

Having approbation the integral indicator of land management provision of land use of in the context of sustainable development of agricultural, we can talk about the relevance of its use in practice, because it allows state authorities, as well as business entities and investors to take adequate management decisions and improve the effectiveness of land use by agricultural producers.

It should be noted that increasing the efficiency of land use in agrosphere is

possible only by applying a systematic approach. The land governance system approach is expressed in the sustainable use of agro-ecosystems and their natural resources. Therefore, the basis of a balanced use of land resources is the choice of the most effective option for their use, in terms of solving certain environmental and economic priorities. In turn, the use of land for a specific purpose should also be the most efficient of all possible options.

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