

## Improvement of Land Management in Ukraine

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### Abstract

Successful implementation of land reform requires the implementation of large-scale market transformations, in particular in the structure of land tenure and land use, in the field of land valuation. The article is devoted to the development of scientific and methodological bases of economic evaluation and use of land resources of agricultural enterprises, substantiation of approaches and recommendations for improvement of ecological, economic and institutional principles of land development in the conditions of new land relations. The economic mechanism of realization programs of protection and reproduction land resources is developed. Mandatory monitoring lands of agricultural significance is proposed in order to identify degradation processes, negative changes in soil condition, development of a long-term forecast of agricultural land use. Due to the fact that the state does not carry out strategic management of land resources, the rate of land degradation is growing, actions to increase soil fertility is not planned. One of the main method of monitoring land resources can be the observation of changes in their condition in the long run using five- and ten-year cycles. It is proposed to move to annual monitoring, which allows to identify the main trends in land use and apply the results to the planning and management of land potential of the country, region, company. The results of monitoring of agricultural land resources in general can be an information base for the characteristics of arable land, which can be used for the purposes of internal land management, implementation of measures to optimize land use, as well as to improve the regulatory assessment of land.

**Keywords:** Land management, land cadaster, land relationship, environmental, economic and social assessment of land resources.

### 1. Introduction

The modernization stage of the national economy requires the substantiation of a set of measures in the direction of adaptation to the principles of sustainable development of agricultural production. In its composition, a prominent place should belong to the institutional transformation of organizational and legal forms of management, the use of promising mechanisms for agricultural projects, greening of agricultural production, land development, streamlining of economic relations in the land market.

Issues of reproduction and increase of fertility of agricultural lands, as well as certification of lands of agricultural enterprises according to WTO rules are referred to the so-called "green box", so transformation of land relations and assessment of land resources at the state, regional and economic levels as an object of

Land resources have a number of properties that are not inherent in other components of the productive forces. Prokopenko S. and Selevich, 2016).

economy and means of production in agriculture is of particular relevance (Boginska L, 2012).

An adequate response to changes in the external environment, as domestic and foreign experience shows, Land is the basis of the regional economic and ecological system, the basis for the formation of ecological balance and the harmonization of human relations. It is the most

important component in the means of production because it is the basis for the development of agroindustrial complex.

The basis of land relations is the ownership of land. M. Rudenko: "can be considered the law of nature: if the peasant is not the unconditional owner of the land, as well as the products of his labor - labor of the whole society is aimed at the depletion of humus and the people, therefore, to self-destruction of the state" (Kuriltsiv R., 2017).

The organization of rational use and protection of land is a decisive factor in the recovery and development of all spheres of the country's economy and an integral part of the state's land policy. Domestic and international experience demonstrate that land management is a key element in any country's land management and land use system.

Land reform is a process of improving land relations. Today, the issues of development of land relations management in the direction of: formation and functioning of the land market (especially agricultural purpose), creation of the state land (mortgage) bank are required; development of the state land cadastre; improvement of land management; development of ecological and economic evaluation of agricultural lands; inclusion of land-capital in production assets; protection

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and restoration, conservation and reclamation of soils, etc

## 2. Methodology

The methodological basis of the study was fundamental scientific provisions and principles of economic theory, the economics of land and nature management, applied research on improving ecological and economic principles of development and implementation of land management. The use of retrospective analysis made it possible to examine the effectiveness of the land management and land management system through a system of performance evaluation criteria and indicators.

The results of the calculation by groups made it possible to make assumptions about promising directions of the applied analysis of the application of economic instruments of ecological and economic processes in agricultural production.

## 3. Results and Discussion

$$V = \frac{\sum_{n=1}^n Va[(B \cdot A \cdot P)_1 + \dots + (B \cdot A \cdot P)_n] + Vi(Sc \cdot A) + Cl(Cll + Cm) + Ce}{Ims} \quad (1)$$

where:

V - value of land of agricultural enterprise, thousand UAH;

Va - the value of arable land, thousand UAH;

B - land bonus, score;

A - area of land, ha;

P- the price of 1 hectare of land of specific ballpost, thousand UAH / ha;

Vi- value of other agricultural land, thousand UAH;

Sc - the specific cost of production from 1 ha of other agricultural land, thousand UAH / ha;

C<sub>1</sub>- cost of live and accomplished labor, thousand UAH;

C<sub>II</sub> - cost of living labor, thousand UAH;

C<sub>m</sub> - materialized labor cost, thousand UAH;

C<sub>e</sub> - cost of ecologization of land, thousand UAH;

Ims - macro-stability index (inflation, the national currency rate).

When implementing integrated land valuation, it should be borne in mind that arable land, orchards, vineyards, hayfields, pastures, fallow lands and clean vapors that are part of agricultural land have different levels of use in modern conditions and therefore the approaches to their assessment must be differentiated.

For a practical example of the application of the calculation of the integrated land valuation, the data of the annual and statistical reports for 2019 year of LLC "Agrobusiness TSK" of Nedrigaylovsky district of Sumy region were used.

Natural and economic indicators of the economy:

- Agro-ecological group - with predominant plain terrain, chernozems and sod-podzolic soils. Agricultural land occupies the largest share in the structure of agricultural land (98.6%), 88.7% of it is arable land, 3.7% - hayfields, 7.6% - pastures.

- production type - crop production with advanced grain production and animal husbandry.

(Rudenko V., 1993).

### 3.1. Preparation of a comprehensive land assessment

The most common and official in content is the Methodology of monetary valuation of agricultural lands and settlements, approved by the Resolution of the Cabinet of Ministers of Ukraine of March 23, 1995, № 213.- (normative directive legal documents) (Methods of monetary valuation of agricultural lands and settlements, 1995).

However, it does not fully take into account all aspects of anthropogenic and other impacts on land use processes.

We propose the author's approach to the calculation of integrated land valuation, the content of which is to determine the impact of individual structural elements of agricultural land, the cost of living and land labor, environmental factors on the integrated assessment of land resources of agricultural enterprises, taking into account macroeconomic factors.

The total area of land (in hectares) is 2394, including 2360 farmland, of which: arable land - 2093, hayfields - 87, pastures - 180.

Monetary valuation of agricultural land in Nedryhaylovsky administrative district for 01.01.2020:

Total - 11035,46 UAH / ha

including:

- arable land - 12430,49 UAH / ha;

- hayfields - 3906,73 UAH / ha;

- pastures - UAH 2857.24 / ha;

- perennial crops - 17101,92 UAH / ha.

The price of 1 hectare of arable land in agriculture when growing crops is –monetary estimate (c).

Field score - actual 48, regulatory 46 (S).,

Conditional hay harvest in the farm - 12 c / ha;

Conditional yield of green mass on pastures - 5 c / ha

The price of hay - 120 UAH / centner

The price of green mass is 80 UAH per centner

The total value of arable land in Agrobusiness TSK LLC will be (48: 46 \* 2093 \* 12430) = UAH 27147 thousand. (V).

We propose to evaluate the other components of agricultural land (Vi) at the notional value of the crop. For hayfields and pastures, this is a contingent crop of hay and green mass, the amount of which is determined expertly, and the value is based on the real market conditions.

Vi = 197,28 thousand UAH.

The cost of live and accomplished labor is actually the costs that shape the level of land capitalization caused by human activity.

During the reporting period (2019 year), capital expenditures for improving land resources amounted to UAH 1.37 thousand. (land reclamation) and arrangement of the field road, based on its book value - UAH 3,720 thousand.

Cost of ecologization of land ( $C_e$ ) includes the costs of returning degraded lands, increasing their fertility; including green rent, which is generated by the valuation of organic produce, through the introduction of organic farming.

$C_e = 7,32$  thousand UAH (increase of economic fertility of soils: introduction of mineral and organic fertilizers).

Thus, the value of land of the agricultural enterprise of Agrobusiness TSK LLC in 2019 will be  $27147 + 197,28 + 1,37 + 3,720 + 7,32 = 27356,7$  thousand UAH.

The aforementioned approaches determined by the value of land of agrarian enterprise require adjustment to the macroeconomic stability index ( $I_{MS}$ ). The latter refers to the need to adjust the value of land to the level of inflation, the fluctuation of the national currency to hard currencies, as well as the impact of factors of insurmountable power (natural disasters, man-made disasters, etc.).

This index is calculated using the formula:

$$I_{mc} = I_{inf} \times I_{cc} \times I_{if} \quad (2)$$

where:

$I_{inf}$  - equals 1-fact inflation

$I_{cc}$  - 1-level fluctuation of the exchange rate to the previous year

$I_{if}$  - 1-level deviation due to the influence of factors of insurmountable force.

$I_{inf}$  for 2019 inflation in Ukraine

$$I_{cc} - 8.18 (2019) / 8.18 (2012) = 1.008$$

$I_{if} = 1$  (there are no force majeure factors for 2019)

$$\text{And } I_{ms} = 0.998 * 1.008 * 1 = 1.006$$

Integrated land valuation of Agrobusiness TSK LLC in 2019 will be:

$$27356,7 : 1,006 = 27193,5 \text{ thousand UAH.}$$

It is proved that complex land valuation is always inextricably linked to the land cadastre and its size is determined by economic, socio-environmental factors.

The choice of the evaluation criterion must be scientifically substantiated, and the economic nature of the indicator, which is accepted as a criterion, must be the same for all land resources being evaluated. The essence of the criterion is interpreted differently in the literature. Some authors say that the criterion is a measure of the assessment of land resources as a means of production; others emphasize that the evaluation criteria should express the technical suitability (favorableness) of the object for a particular type of use, the economic efficiency of such use, its social value. They justify this by the fact that the assessment should reflect the result of comparing the properties of a natural object with the needs of society (Baranovska O,1997, Golub A., Strukova E.,1998) .

On this basis, a comprehensive assessment of agricultural land is based on the use of methodological approaches to assess soil cover as a natural-historical formation, which, due to its ability to self-development and self-renewal, maintain favorable environmental conditions, as well as

comprehensive study of the socio-economic value of land as a major means of production operational basis for the development of productive forces (Fig. 1).

In modern conditions, the formation of a mechanism for managing land resources of agricultural enterprises requires an optimal combination of national, regional and entrepreneurial interests at all levels (Shevchuk V., Satakin. Yu., Bilyavsky O. etc.,2004).

As a mechanism for managing land resources and as one of the main methods of monitoring can be the observation of changes in their condition in the long run using five- and ten-year cycles. The transition to annual monitoring is relevant, which allows to identify the main trends in land use (Stupen M., 2011).

A key problem of the emerging land market is land prices. Since non-agricultural lands are much more expensive than agricultural land, there is an administrative control that prevents urbanization of the agricultural land fund.

In the context of reforming Ukraine's economic system, land, as a sustainable basis of the credit and financial system, is and remains the main resource for the revival of the national economy. During the formation and development of the secondary land market, the number of landowners who have purchased land will increase, that is, land ownership will be part of the investment process that ensures the most efficient use and the highest capitalization of land resources (Kovalyshin O., 2002).

### *3.2. The role of land management in the structure of land relations management*

When determining ways to improve the standard of living of the population, depending on the economic efficiency of land use, in the implementation of land management and land management can not ignore that in real life land use and other natural resources is not isolated. Therefore, existing land and other natural resource use schemes are so complex and interconnected that the use of each land as a natural resource will inevitably affect the use of many other resources (Tretyak R., 2005).

With the independence of Ukraine, the task of land management, focused on the implementation of land policy of the state and a radical change in land relations. Proper assessment and rational use of available natural resources in each region or territory of a territorial community will be crucial in making management decisions and implementing development programs. All this brings to the fore the task of accounting and socio-economic assessment of natural resources of each administrative district and territorial community. This problem can be most successfully solved by the formation and maintenance of long-standing sectoral resource inventories and comprehensive territorial inventories of natural resources (KTCPR). A comprehensive account of natural, economic, environmental conditions and features allows for sustainable environmental management and effective land use in systems of natural resource potentials of integral territorial sources of resources of various kinds (Tretyak N., 2013).

The territorial combination of natural resources in the respective area is not the sum of disparate resources, individual natural factors, but a single natural complex in which all the elements

are interconnected. In this case, land management and land cadastre are an instrument of economic land valuation and accounting of land value in the composition of natural resources.

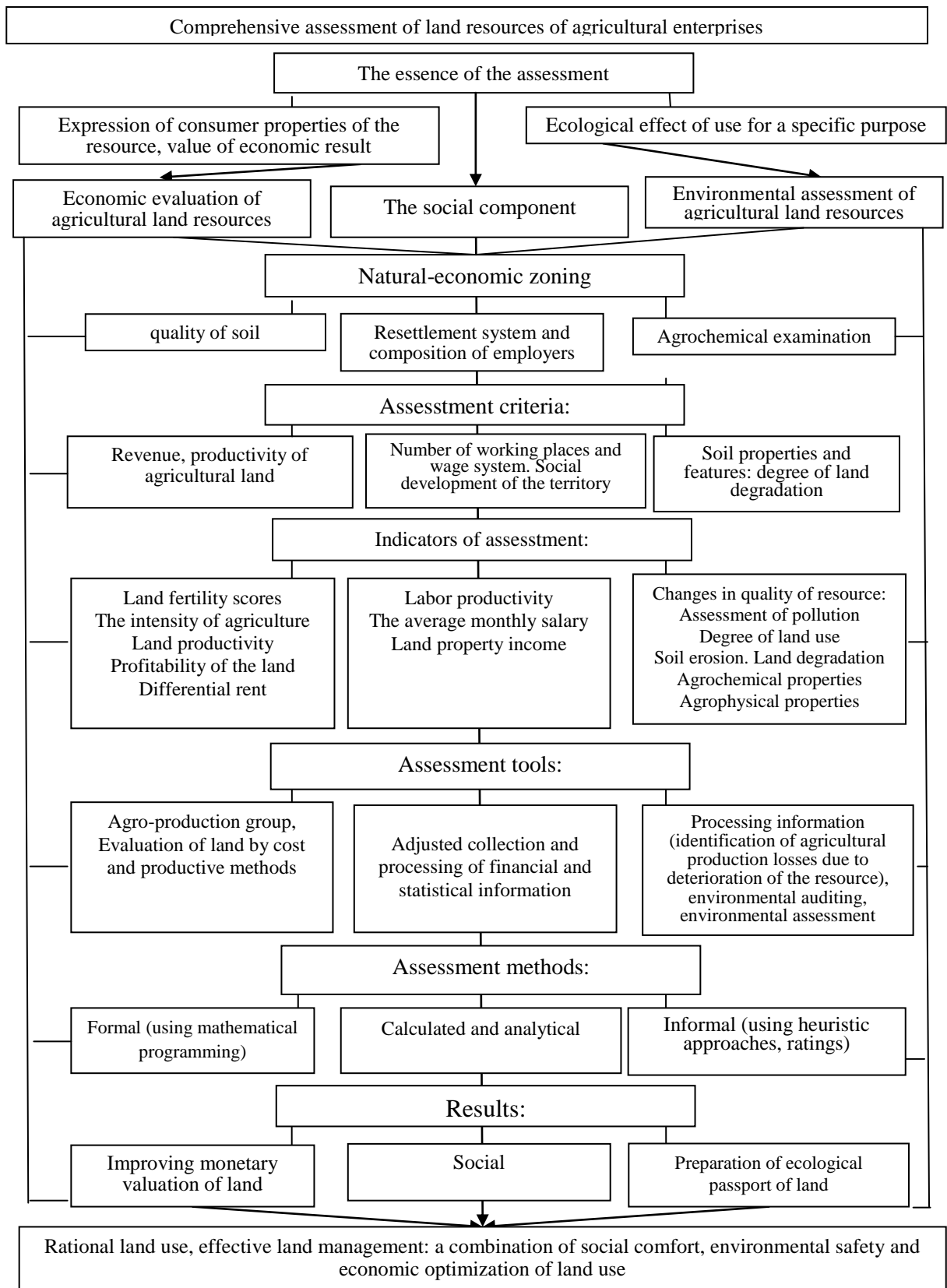


Fig. 1. Block scheme of comprehensive assessment of the management of land resources for agricultural enterprises

Specific natural conditions call for a closer study of land management and land management. Reforms conducted in the country's economy and administrative and land systems will not produce positive results if consistent state-supported programmatic measures are not implemented in land use. For example, the organization of agricultural production requires the availability of accurate data on the status of land owners and the fertility of the land, and then the mode of land use. For this purpose it is obligatory to have at the country and territories level a single system of accounting and assessment of land management measures (Stepanenko T., 2013). Previously, information on land was limited to land registration and quantitative accounting of land, which provided the need for society to legally register the right to own and use land indefinitely and to account for their composition of land, in the context of land users. However, the quality of the land was not taken into account.

The economic efficiency of a particular economic form in a socially oriented market economy is considered in conjunction with overall efficiency, which is a consideration and assessment of the impact of many factors (Gutorov O. (2016) Problems of sustainable land use in agriculture: theory, methodology, practice: Monograph, 405.

Gutsulak G. (2010) Sustainable development of land use: methodological aspects of management: monograph. Chernivtsi: Prut, 365

Kapinos N., (2017).

In relation to land use or land tenure, rationality implies the expediency of industrial and non-productive use of land through the use of both intensive and extensive factors that ensure a constant increase in soil fertility. But the use of intensive factors should not lead to a decrease in the fertility of the land and their removal from agricultural production.

It is advisable to distinguish between socio-economic (social), economic (economic), environmental, social and other efficiency of land resources of any form of ownership. The concept of socio-economic (social) land use efficiency is broader in comparison with economic efficiency, as it includes not only economic but also social results achieved on the basis of the most rational use of land and other natural resources (Collection of materials of the Eleventh Annual Meeting of the All-Ukrainian Congress of Agrarian Economists, 2009).

We propose a comprehensive vision of the effectiveness (effect) of the land management system and land management through a system of criteria and indicators of performance evaluation (Fig. 2).

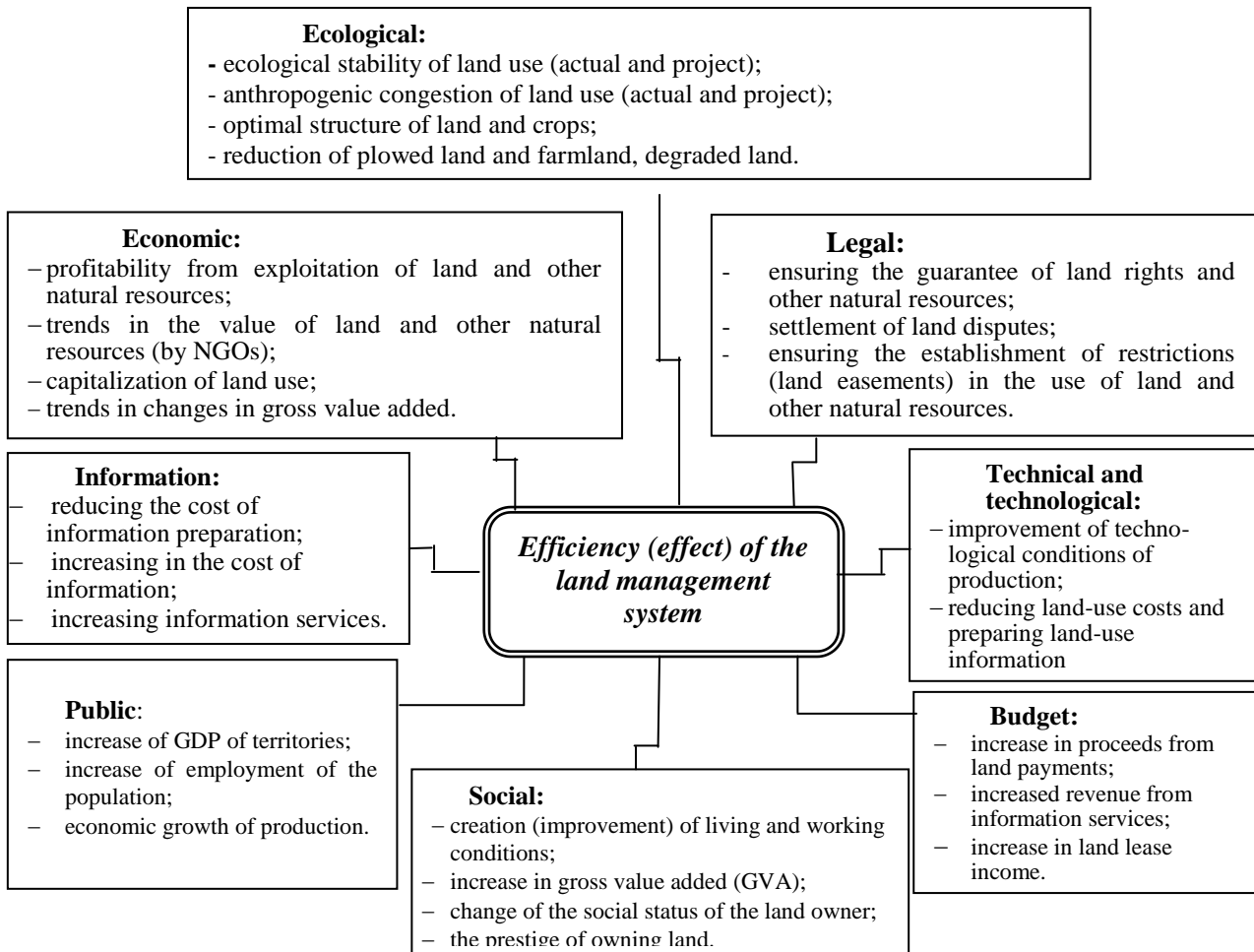


Fig. 2. Logical and semantic scheme of the system of criteria and indicators of evaluation of land management and land management efficiency

Separation of the ecological component of land management and land management at the territorial level into independent form is due to at least two reasons:

- the need to create an environmentally safe environment for humans and wildlife, which preserves biological balance and water balance of the territory, improves the
- the need for an indicator to determine sustainable land development and land use (Gutorov O., 2016).

Ecological and landscape organization of land use means taking into account the properties of land and other natural resources and specific landscape in the development of types and types (subtypes) of land use (zoning), the assessment of their resistance to this type of loads, the assessment of the degree of transformation, the assessment of environment-forming networks territories, definition of landscape functions, analysis of the degree of adaptability of geosystems, the use of adaptive methods of land use in all species (Dobryak D., 2012).

circulation of organic matter, provides enhanced reproduction of soil economic fertility, accompanied by increased content of humus, produces environmentally friendly production and environmentally friendly production pollution of the environment by agricultural chemicals;

Among the components of land management, a special place belongs to the state land cadastre. The modern automated land cadastre system is needed not only by the country as an information base for regulating land relations, but also as a means of protecting landowners' rights.

Since land resources are a determining factor in shaping the results of economic activity, and the potential of agricultural enterprises is assessed as insufficiently realized, taking into account the ecological and economic condition of the soil is a necessary factor in objectively assessing the efficiency of management (Boginska L., 2011).

### 3.3. Land cadastre is an integral part of land management

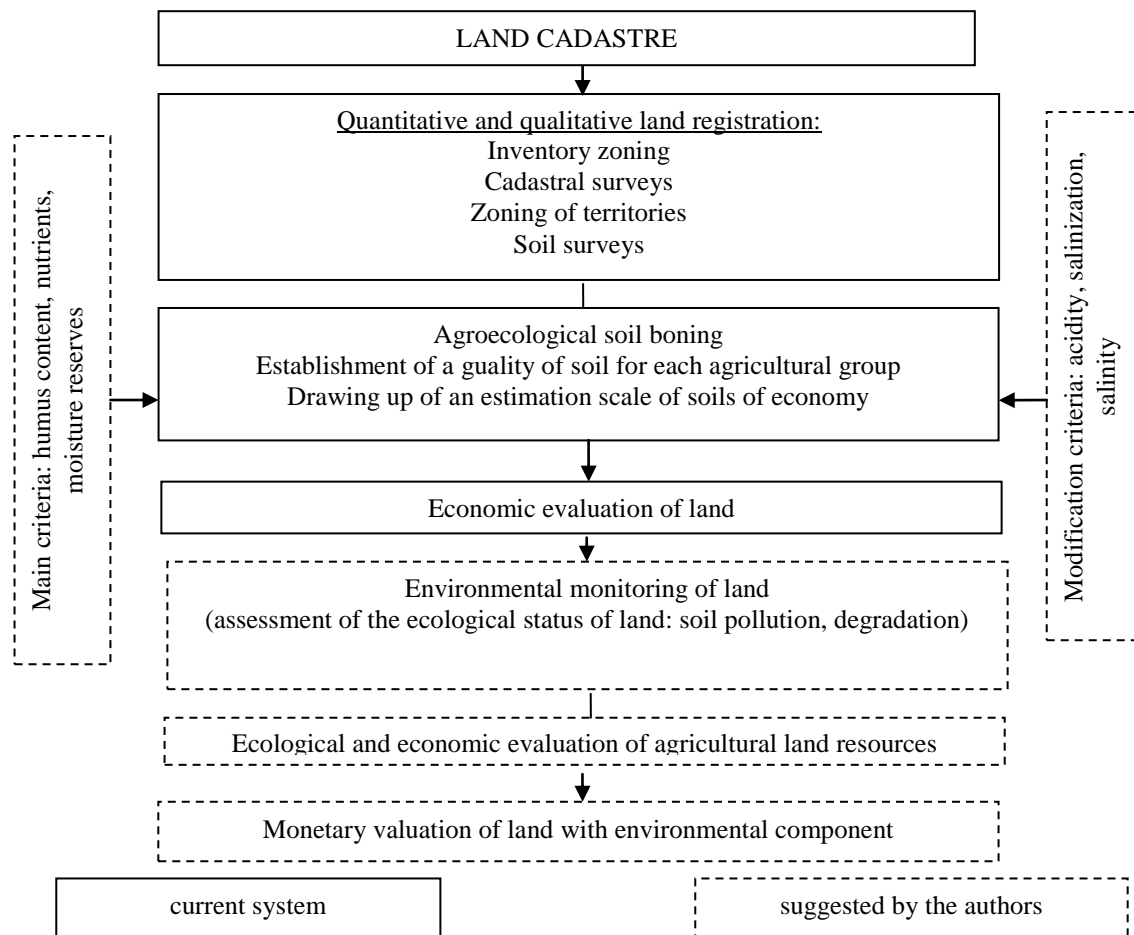


Fig. 3. Block diagram of the formation of ecological and economic assessment of agricultural land resources through the Land Cadastre

The State Land Cadastre is a systematic report of documented information about objects of state accounting and contains such basic information about land plots as: cadastral numbers; location; square; land category and land use permitted; description of land boundaries;

economic characteristics; qualitative characteristics; property rights and restrictions (Gutsulak G., 2010) and is the starting point for the formation of ecological and economic assessment of agricultural lands (Fig. 3).

We believe that on the basis of land cadastre the ecological certification of lands of agricultural enterprises should be conducted. Land certification is necessary to take account of contaminated sites and limit environmental pollution. It

should be noted that the ecological passport of land as a form of environmental control should be used as an innovative basis for the certification of regions, climatic zones, Ukraine as a whole (Boginska L, 2012).

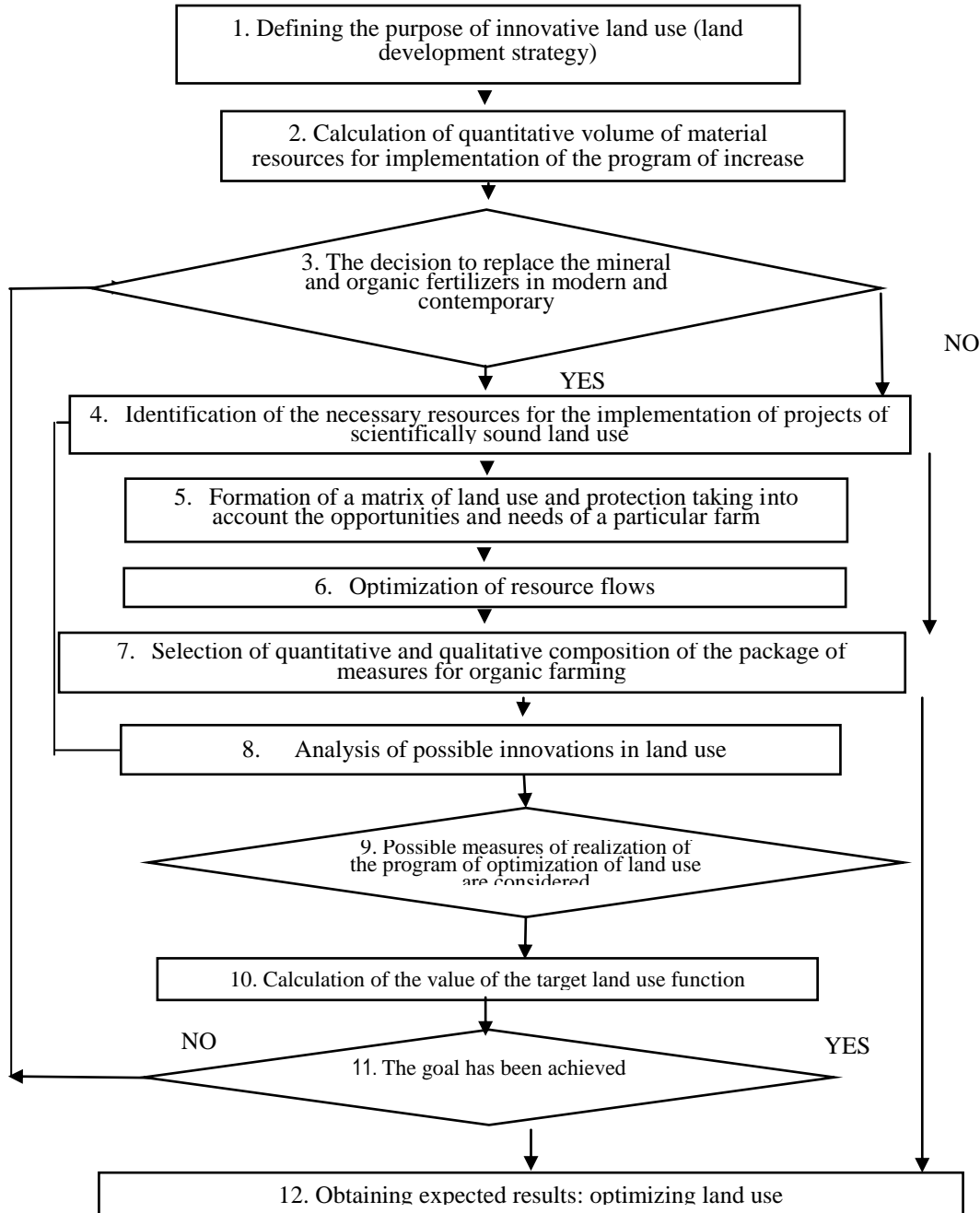


Fig. 4. Land use optimization algorithm

### 3.4. Simulation of land relations optimization

In modern conditions of land management development, the main emphasis is shifting from solving economic planning and forecasting problems (economic prospects and demographic projections) to analyzing the rational

use of resources available in agro-formation, problems of the existing spatial situation and finding ways to eliminate them (Budzyak O. 2017).

In order to determine ways to increase the economic efficiency of agriculture and to achieve optimization of land use, a step-by-step plan of activities was developed,

which can be represented by the following algorithm (Fig.4).

The proposed model will allow to create a stable base for the development of agricultural production by type "science-development-implementation-competitiveness-profit".

It is impossible and inexpedient to directly compare existing systems of landscape planning and land valuation in different European countries and in Ukraine. This is due to a variety of reasons: history, features of political systems, cultural traditions, level of economic development, the nature of legal systems and property relations.

It is important for Ukraine to find its own approaches to optimizing land planning and land use, which embodies socio-economic and environmental measures: the formation of goals for territorial development of land relations is achieved through certain actions, for which differentiate land and other natural resources of the territory by types (subtypes) land use.

These goals are subordinated to the methodology of ecological-landscape design, complex evaluation of land resources. Land-use optimization depends on the level of planning, sectoral tasks in organizing the use and protection of land and other natural resources of the territory and the approach to nature management at the level of the territorial community, including the united or administrative area.

The developed model can become the basis of the economic mechanism of realization of programs of protection and reproduction of land resources, drawing up of the passport of quality of lands of agricultural purpose, methodological approaches to the organization of ecological monitoring.

#### **4. Conclusion**

Land relations - a component of industrial relations, which is subject to objective economic laws. In case of inconsistency, there is a need to review land law and the appropriate economic mechanism.

It is confirmed that the effective use of land requires consideration and assessment of the specific natural, legal and other conditions for organizing the use of separately cultivated land, since even within one farm, and even more within the area, there are lands that differ significantly in natural and economic fertility, which affects on production results.

Land reform is an improvement in land relations. It is substantiated that solving the problems of organizing innovative activities in the agro-industrial complex requires the participation of the state as an objectively needed coordinator and regulator of innovation processes. In this context, it should be emphasized that an important object of state protection is agricultural land. In Ukraine, there is an urgent need for the formation of a new market-oriented model of territorial planning for the development of land use territories of territorial communities, scientifically-based assessment of land resources.

The logical and semantic scheme of the system of criteria and indicators of the estimation of the efficiency of land management and land management has been developed, which includes components of ecological, economic, legal, information, technical and technological, social, social and budgetary.

An algorithm for optimization of land use has been developed, which will allow to create a stable base for the development of agricultural production.

Regarding the prospects for further research and the formation of proposals, we consider it an important direction to develop a system of calculations of the efficiency of radical transformations and to carry out an applied analysis of the use of economic tools of ecological and economic processes in agricultural production.

#### **References**

- Baranovska O (1997) Improvement of methods of economic evaluation of land in terms of market relations (on the example of forest-steppe farms of Ukraine): Abstract. dis. Cand. econ. Science. 25.
- Boginska L. (2012) The essence of ecological and economic assessment of agricultural land resources. Uzhgorod University Scientific Bulletin, series "Economics", 103-109.
- Boginska L. (2011) Ways to improve the management system of the agrosphere in the light of the concept of sustainable development. Scientific Bulletin of Uzhgorod. 33, 31-34
- Budzyak O., Budzyak V. (2017) Problems of land use in terms of property relations reform: Mater. All-Ukrainian. Research Practice Conf., April 19, 135.
- Dobryak D. (2012) Problems of modern land management in Ukraine. Land surveying bulletin. 1, 30-35.
- Golub A., Strukova E. (1998) Economics of natural resources. Aspect Press, 432.
- Gutorov O. (2016) Problems of sustainable land use in agriculture: theory, methodology, practice: Monograph, 405.
- Gutsulak G. (2010) Sustainable development of land use: methodological aspects of management: monograph. Chernivtsi: Prut, 365
- Kapinos N. (2017) The value and role of land management at local level and development of land use of territorial communities. Land management, cadastre and land monitoring. 1, 98-105.
- Kovalyshin O. (2002) Improvement of regional land relations in the process of land reform: (On the example of Lviv region): abstract diss. PhD in Economics: Ukr. state. lumbering. Univ. Lviv, 20.
- Kuriltsev R. (2017) Integrated Land Use Management in the Context of Sustainable Development: Theory, Methodology, Practice: Diss. Doctor of Economics: Kyiv, 518.
- Methods of monetary valuation of agricultural lands and settlements. Resolution of the Cabinet of Ministers of Ukraine of March 23, 1995.



- Perevozova, I., Babenko, V., Krykhoveretska, Z., and Popadynets, I. (2020). "Holistic approach based assessment of social efficiency of research conducted by higher educational establishments". E3S Web Conf., 166, 2020, 13022. doi: <https://doi.org/10.1051/e3sconf/202016613022>
- Rudenko V. (1993) Handbook of geography of natural resource potential of Ukraine. Kiev: High school, 180.
- Stepanenko T. (2013) Economic and ecological efficiency of land use in agricultural enterprises: Ph.D. econ. Science. 302.
- Stupen M. (2011) Features of agricultural land use in market conditions. Economist. Ukrainian magazine. 4, 49-52
- Shevchuk V., Satalkin. Yu., Bilyavsky O. etc. (2004) Environmental Management. Lybid, 432.
- Transformation of land relations to market conditions: Collection of materials of the Eleventh Annual Meeting of the All-Ukrainian Congress of Agrarian Economists, Kyiv, 2009, 518.
- Tretyak N. (2013) Development of land management system as an economic function of land ownership: monograph. Kherson: Grin D.S., 254.
- Tretyak R. (2005) Economic principles of formation of agricultural land holdings and land use in terms of land reform: dis. Cand. econ. Science. Kiev. 219.

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