

**METHODOLOGICAL PRINCIPLES OF THE INTEGRAL
ASSESSMENT OF LAND EFFICIENCY AND LAND ORGANIZATION
WITHIN THE TERRITORIES OF THE VILLAGE COUNCILS**

A. M. Tretiak Doctor of Economics, Professor

State Ecological Academy of Postgraduate Education and Management

E-mail: tretyak2@ukr.net

V. M. Tretiak, Doctor of Economics, Professor

N. O. Kapinos, Candidate of Economic Sciences

O. M. Kanivets, Senior Lecturer in the Department of Geodesy and Land

Management

Sumy National Agrarian University

E-mail: snauztk@ukr.net

Abstract. *In the context of reforming land relations and land system usage individual methodological approaches and systems of natural and economic indicators of land use efficiency assessment require improvement. The current research covers various views and approaches of native scientists to the evaluation of land resource usage with taking into account factorial and result indicators, which differentially influence the formation of elements of land tenure system and land management efficiency. The efficiency of land tenure system and land management is substantiated to be determined by a set of its priority types: environmental, technological, legal, social, economic, and budgetary efficiency and their varieties. A system of criteria and indicators for integrated assessment of land tenure system and land management efficiency level at the local level has been proposed. It includes assessment of environmental, social and economic efficiency, which are interrelated and interdependent. It has been confirmed that the development of sustainable and effective methodological bases for land tenure system and land*

management evaluation is gaining great importance in the context of land market introduction in Ukraine and the abolition of moratorium on agricultural land sale.

Keywords. *Land tenure system, land management, economic efficiency, environmental efficiency, social efficiency.*

Rationale. Economic literature has rapidly considered different approaches as to the assessment of land use. In particular, L. H. Solomkina has been trying to find the generic indicator (index) which would allow determining simultaneously the economic efficiency of the land use. However, these indicators were conditional in the most cases. That is why they could not give an insight into the extent of land use, material and labour resources. Other scientists propose to evaluate the economic efficiency of land use by separate indicators: gross income, net income, profit per land area unit, gross output in monetary terms and other indicators. According to L. H. Solomkina, the productive properties of the land are brought into action by living and past labour and are showed in the produced products. That is why a direct dismemberment of results by such factors of production is almost impossible, because the production process is carried out only in the presence of all the factors' combinations in specially realized proportions. Therefore, a system of indicators is often used for the overall assessment of the land use.

The system of factorial and performance indicators is the most common. This system was formed in the pre-reform period and, in the course of time, it has been supplementing and updating by new indicators [1]. Therefore, the factorial indicators include the following indicators such as structural and related to resources.

Structural indicators point at the following:

- a) the degree of land and other natural resources development of the respective territory;
- b) the level of agricultural lands' ploughness;
- c) the indicator of the completeness of the use of lands suitable for plowing, which points at the degree of their involvement into the agriculture.

At the same time, the context of reforming of land relations and land system usage acquires a particular relevance and necessity to improve individual methodological approaches and systems of natural and economic indicators of land use efficiency assessment.

Analysis of resent researches.

Economic literature has rapidly considered different approaches as to the assessment of land use, in particular in researches of A. M. Tretiak, D. S. Dobriak, V. M. Druhak, A. G. Martyn, O. S. Dorosh, L. H. Solomkina, S. N. Volkova, H. I. Hreschchuk, L. V. Horbatova, S. M. Muzyka etc. However, at present, there is no comprehensive solution as to the issue concerning the assessment of the land tenure system and land management efficiency within the territories of the village councils.

The goal of research is to justify the application of system of criteria and indicators for integrated assessment of economic, environmental and social efficiency of the land tenure system and land management at the local level.

Materials and methods of research. Some literature and on-line researches, as well as materials of own researches have been used in this study. In order to perform the assigned task the following research methods have been used: monographic method (studying of scientific publications, normative documents, statistical data); method of analysis and synthesis (justification of systematic research methodology); experimental method (justification of scientific basis for environmental and economic study of land resources); abstract-logical method (theoretic generalization and drawing of conclusions), etc.

Results of the study and their discussion. At the present stage of land relations development, there are some trends for preference of profitability and value of the land rent. It is directly related to the development of the market economy.

At the present stage of development of different forms of land ownership and land use, it is difficult to apply a single method for assessment of economic efficiency of land use for state-owned enterprises, collective or private farms. Performance

indicators, that determine the economic effect of land use, are very different. Some researches show that a large variety of indicators, oriented to the considerable land use, can be applied to state-owned enterprises and some collective farms. For private enterprises, in particular for rural farmers and smallholder agriculture, the system of assessment indicators becomes more narrow. In case of crop farming, it narrows down, first of all, for the determination of gross income from the sales of products and actual costs spent for their production.

Economic process of material benefits creation depends working conditions and, first of all, on the quality of farmland. Land quality and land use intensification factors are the main criteria that influences the improvement of agricultural land use efficiency.

Based on the experience of farming functioning in the Western countries and USA, profit is the main purpose of most commercial farms, and it is the main criterion for solving organizational and economic matters on farms. A farmer makes a choice being guided by the profit and by taking into account his knowledge about physical properties of natural resources and ratio that characterizes their values. From our point of view, it is useful to consider a methodology for assessment of economic efficiency of land use by private agriculture enterprises and farms in order to distinguish fundamental differences in this issue from other forms of land use. Farmer analyses physical data in order to determine profitability. Herewith, he should receive an answer on the following questions [1]:

- which kinds of lands and soils' types are available in this household, what is the area of each of them and which physical properties of them are the most important?
- what is the comparative yield capacity of different crops that are raised on different soils and what are the production costs of each of the several possible yield levels?

- what is the amount of gross revenue, costs and profits per unit of land area typical for different crops at several levels of yield of crops that are raised on different types of soils?

The first two questions can refer to the environmental conditions; the third one is connected to the economic assessment of information about these different conditions. Profit margin of agriculture enterprises is directly influenced by the costs for production. There is no consensus among economists on the classification of efficiency by its features [3, p. 21].

However, according to the most scientists, the complex of priority types shall determine the efficiency of land use, such as agricultural sector of economy: economic, social and environmental efficiency and their varieties that bring about their research in order to determine the efficiency of land tenure system and land management.

Different types of efficiency are more important for each planning direction (*design*) of land use development (Table 1).

Table 1

Ranking values of major efficiency types of land management*

Direction for organization of land use, land protection and other natural resources	Efficiency type			
	economic	budgetary	social	environmental
Land as the main mean of production	2	2	2	3
Land as spatial basis	1	1	1	3
Land as natural resource	3	3	2	1
Rights for land and other natural resources	2	2	2	3
Formation of land rent	2	1	3	3

* Source: refined by the author based on the source [5, p. 96].

** Grade from 1 to 3 in descending order (1 is the maximum interest, 3 is the minimum interest).

For example, the environmental, social and budgetary efficiency shall be used for organization of land use as the main mean of production and as the natural

resource; economic and budgetary efficiency shall be used for organization of land use as spatial basis and rights for land; social and budgetary efficiency shall be used for formation of land rent which is formed by enforcement of the rights for land and its use.

When effecting land management, the researches study such type of efficiency, besides the specified ones, as technological (taking into account, for example, the unique feature of agriculture caused by the actions of natural factor, *land structure of the territory (supplemented by the author) etc.*) [3, p. 21].

The classification presented schematically, illustrates the relationship between efficiency types (Figure 1).

This scheme clearly shows the influence of the state on: formation of efficiency of land tenure system and land management (through *land management measures and actions*); land matters and process of land use organization and land protection; land use results (*through land management design decisions, projected matters for land protection, environmental network designing, territories of nature reserve fund, measures to promote the use and protection of lands*).

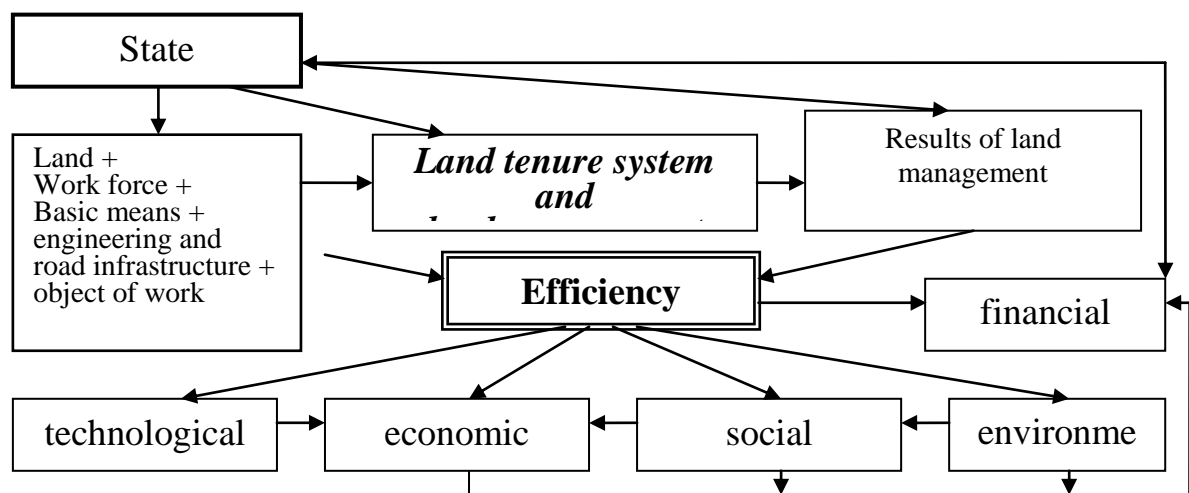


Figure 1. Formation of efficiency of land tenure system and land management and interrelation between its types (*developed by using sources [3, p. 22; 4, p. 97]*)

Herewith the technological efficiency determines the level of economic efficiency, and the latter, in its turn, of all other types of efficiency.

According to the researches of M.V. Zos-Kior [5, p. 96], financial efficiency is the intersection point of interests of manufacturer (*land user, supplemented by author*) and state, because it is related to the state investments, in particular in the form of government support, environmental investments and taxes. Researches consider that the land rent and added value per area unit is the key factor [6, p. 53]. The position concerning deduction of operating income for land use, rent income and added value, which is a socio-economic indicator for territories, should be considered as the main one.

Let's also consider the other indicators, including:

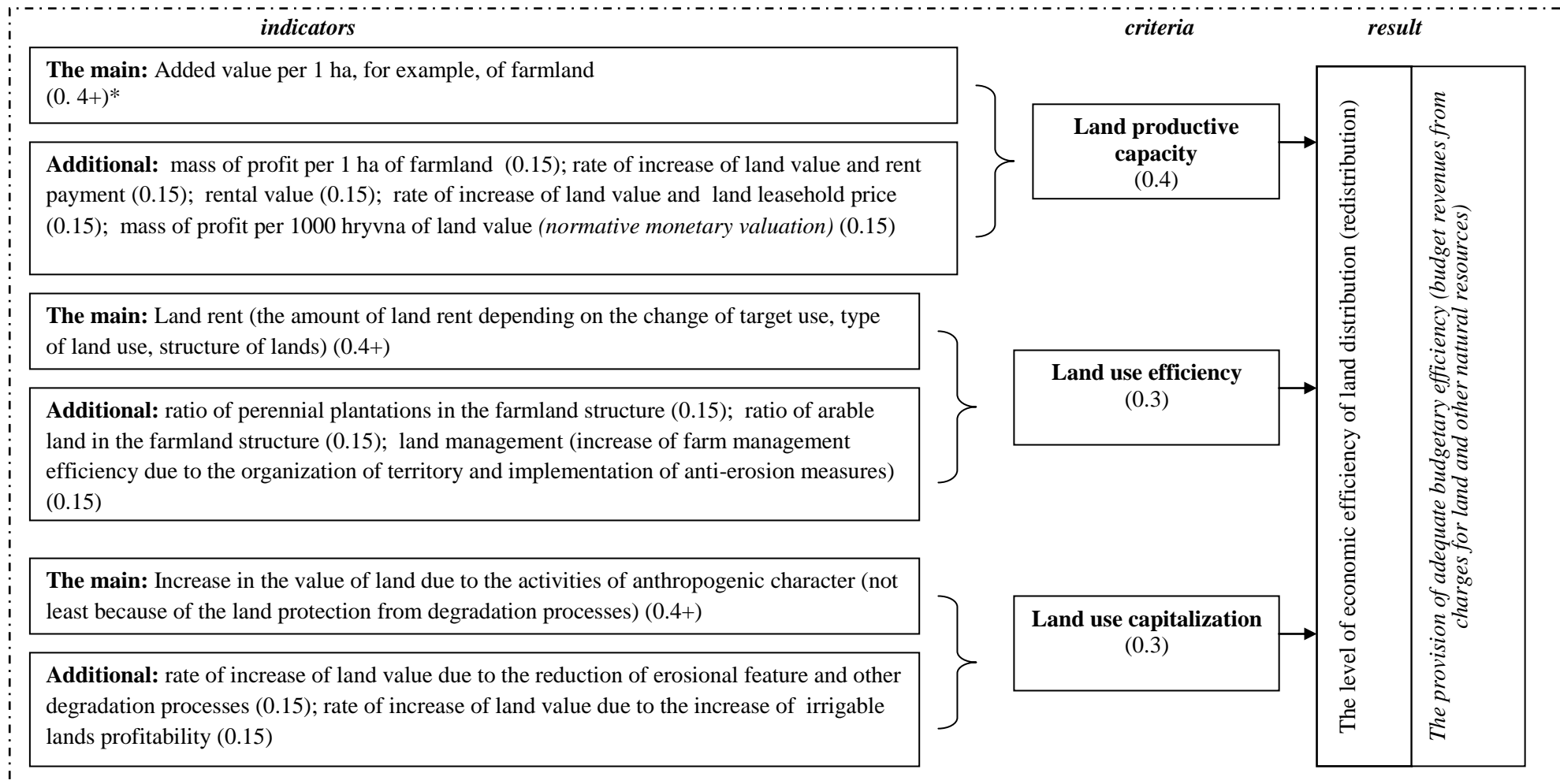
1) the rate of increase in land value due to the reduction of erosional feature by means of land management implementation, which demonstrates the process of long-term capitalization. In particular, the costs for preventing soil loss and its destruction by ravines (hryvna/ha); the costs for preventing the removal of mineral fertilizers annually deposited in soil (hryvna/ha); the costs for accumulation of soil fertility elements as a result of application of soil protective crop rotations, minimal systems of soil cultivation, etc. (hryvna/ha);

2) an increase in the value of lands due to the activity of anthropogenic character (including, because of the increase of seeding the high value crops such as sugar beets, sunflowers and vegetables), which demonstrates the effect of long-term capitalization; ratio of land productive capacity to the district average (*region average, best household of the district, country, world level*), and comparison of the profitability of the whole agricultural sector.

Taking into account the above mentioned, Figure 2 shows a system of criteria for assessing the level of economic efficiency of land tenure system and land management at the territorial level. Among the presented indicators by using expert method there have been selected 13 indicators (weightiness 0.15–0.40) according to three criteria (weightiness 0.3–0.4) – land productive capacity, land use efficiency, land use capitalization.

In this case, the economic efficiency of land tenure system and land management, in our opinion, is the ensuring of growth of added value, land rent and capitalization by means of the rational land use. Social efficiency at the level of a territorial community or district is characterized by the occupational level and reduction of unemployment etc. [3, p. 26].

The basis for social efficiency formation is the economic efficiency. The economic effect created only in the course of economic activity is a source of satisfaction of the whole spectrum of social needs of the population. Therefore, there is an objective such a dependence: the higher the economic efficiency, then, under the same other conditions, there will be higher social efficiency, and vice versa. At the same time, there is a feedback between these kinds of efficiency: the increase of social efficiency increases the labour productivity, and consequently, the economic efficiency of production, that is, there is multiplicative lever [7, p. 27]. This regularity shall be used in assessing the efficiency of land tenure system and land management.



* 0.40+ means that the indicator has a weight of 0.40, stimulant

Figure 2. The system of criteria and indicators for assessment of economic efficiency of land tenure system and land management at the territorial level (*developed by the author based on results of expert evaluation and resources [5, p. 124]*)

For this reason, according to V. S. Diiesperov, the relation between land and labour resources is especially important in the economic and social context. It is convenient to express it as an indicator of land use intensity of workplace, that is, the area of land based on the average annual employee. The increase of labour productivity causes an increase of land use, and the intensification of the production structure influences in the opposite direction [6, p. 51]. Now the reduction of profitability in gross output of its high intensity types, does not allow increasing wages for agricultural workers while increasing share of owner's income.

Among other things, according to M. V. Zos-Kior [5, p. 115] in order to increase the social efficiency of the agricultural sector of the Ukrainian economy, it is necessary to use all kinds of resources rationally. They have to be effectively used and studied as they are shared between different process owners [6, p. 48]. For example, 70 % of agricultural land in the United Kingdom is owned by 1 % of the population (feudal-monopoly land use) [8]. It leads not only to high prices for objects of land management but also to artificially high food prices. Therefore, a lot of findings of Ukrainian scholars shows, that mass latifundia can cause the social collapse of rural territories and deprive the state of the source for renewal of intellectual, ethnic and demographic potential [9].

At the same time agroholdings provide the countryside with the highest wages and rents, they have the highest capital-labour ratio, and, therefore labour productivity. According to the authors, it causes the necessity to use such an indicator as “the ratio of labour productivity growth rate to the growth rate of land use intensity of workplace”.

Using the researches of M. V. Zos-Kior [5, p. 120-121] the social indicators of land tenure system and land management may include:

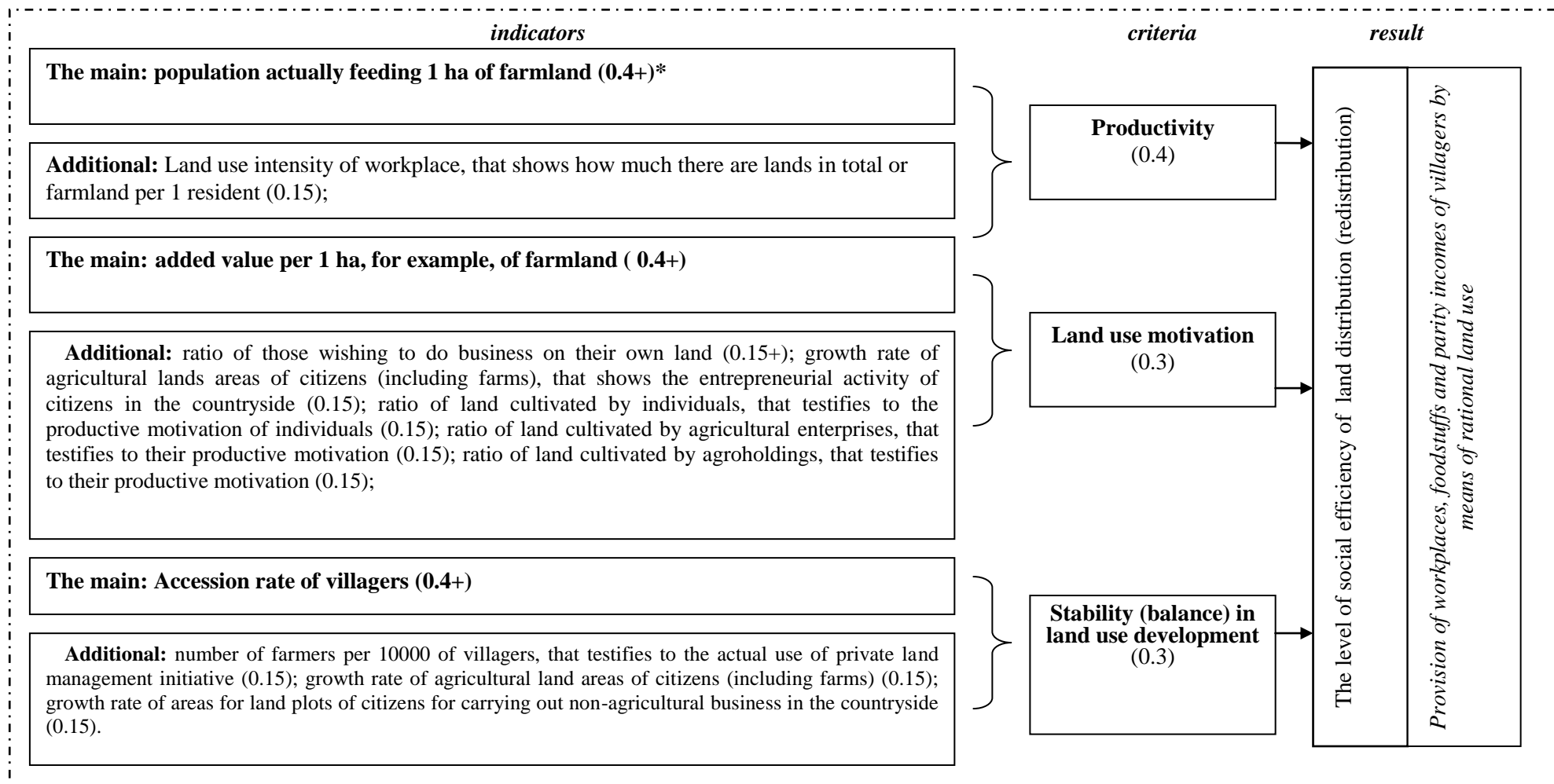
- the ratio of land cultivated by individuals, that testifies to the productive motivation of individuals;
- the ratio of land cultivated by agroholdings, that testifies to the productive motivation of agroholdings;

- the ratio of increasing of entrepreneurs engaged in commodity production or provision of recreational services on their own land, that testifies to the productive motivation of peasants (*individuals*);
- number of farmers per 1000 of villagers, that testifies to the actual use of private land management initiative;
- land use intensity of workplace, that shows how much there are farmlands per 1 farm worker;
- growth rate of land areas in use of citizens (including farms), that shows the entrepreneurial activity of citizens in the countryside.

Among the presented indicators by using expert method there have been selected 10 indicators with weightiness 0.15–0.4 according to three criteria (according to weightiness 0.3–0.4) productivity, motivation, stability. At the same time, the social efficiency of land tenure system and land management of rural territories is the provision of foodstuffs to the population and parity incomes of villagers by means of rational land use.

Taking into account the above mentioned and expert assessment, Figure 3 shows a system of criteria for assessing the level of social efficiency of land tenure system and land management at the territorial level.

The next step of a comprehensive assessment of tenure system and land management efficiency at the territorial level is to investigate the methodological foundations of environmental efficiency for land tenure system and land management at the territorial level.



* 0.40+ means that the indicator has a weight of 0.40, stimulant;

Figure 3. The system of criteria and indicators for assessment of social efficiency for land tenure system and land management at the territorial level (*developed by the author based on the resources [5, p. 124]*)

Formation of methodological bases for integrated efficiency of land tenure system and land management at the territorial level is impossible without environmental component, so in this context it is relevant to study the hierarchy of priorities depending on economic results of subjects of land relations, criteria and indicators of this efficiency type, their weight in the presence of aggregation, as well as interests of all subjects of land use.

The separation of environmental efficiency for land tenure system and land management at the territorial level into an independent form is caused, at least, by two reasons:

- the need to create an environmentally safe environment for people, wildlife and flora, which preserves biological equilibrium and water balance of the territory, improves the circulation of organic materials, provides an increased reproduction of economic fertility of soil accompanied by increased content of humus, realizes the production of ecologically harmless agricultural production and does not allow any contamination of the environment by agricultural chemicals;
- the need for an indicator to determine stable development of territory and land use.

From the set of environmental efficiency indicators in the system of land management, recommended by M. V. Zos-Kior, we propose to use those indicators for assessment of efficiency for tenure system and land management at the territorial level, that are important [5, p. 120-121]:

- improvement of structure of land and types (subtypes) of land use, which focus on the ratio of some types of lands to its total area and areas of types (subtypes) of land use to the total area;
- quality state of technology-related contaminated and degraded low-productive lands, a complex indicator that demonstrates economic and natural fertility;
- afforestation of degraded and low-productive lands;
- conservation of low-productive and degraded lands;

- placement of crop rotations on environmentally friendly lands, an indicator showing a part of crop rotation, or crop rotation at a particular area located on environmentally suitable land;
- land-improvement reflects the effects of the complex of factors characterizing the specificity of the land fund;
- stability of landscape and land use demonstrates the persistence of land use parameters for an indefinitely long time.
- environmental activity in the countryside demonstrates the degree of activities intensity, aimed at harmonization of human-environment interaction (*as an average between assessing the level of environmental stability and level of plowed land*).
- part of land of nature reserve and other intended for nature protection, health-related, historical, cultural, recreational purposes, as well as lands of forest and water funds in the total area;
- ratio of the area of eroded land in the structure of agricultural lands shows the dynamics of changes in the aggregated (geological and anthropogenic) soil erosion;
- part of perennial plantations, hayfields, grasslands, as well as lands for windbreakers in agricultural landscapes;
- coefficient of anthropogenic load factor is an aggregated indicator characterizing the load on land resources of agricultural and non-agricultural character.

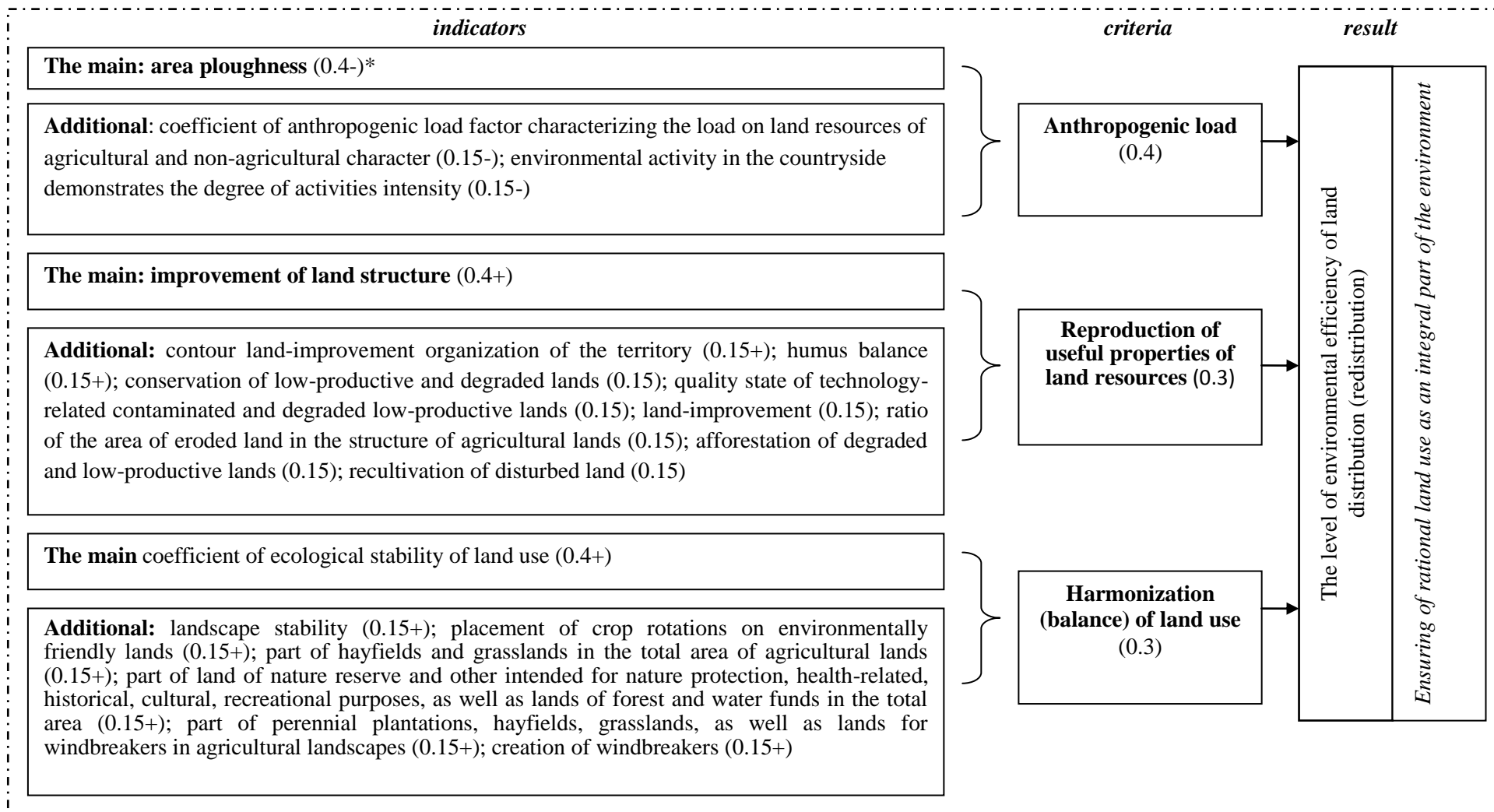
Among the presented indicators by using expert method there have been selected 13 indicators (weightiness 0.15–0.4) according to three criteria (weightiness 0.3–0.4) anthropogenic load, reproduction of useful properties of land resources, harmonization (*balance*) of land use. At the same time, the environmental efficiency of land tenure system and land management at the territorial level is the ensuring of rational land use as an integral part of the environment.

Taking into account the above-mentioned and author's considerations and expert assessment, Figure 4 shows a system of criteria for assessing the level of environmental efficiency of land tenure system and land management at the territorial level.

According to A. M. Tretiak and V. M. Druhak, in terms of public interest, the criterion for the efficiency of land resources management is the value of newly created product (*added value*), which shows for how much increases the material well-being of society and value of land. The value of newly created product is defined as the difference between the combined public product and compensation fund and characterizes the amount of national income. Due to the national income, the production expansion and social sphere development are in progress, the work of all members of society is paid, and public consumption funds are formed.

The advantages of this indicator are that it accumulates all types of management efficiency – economic, social and environmental, and characterizes all stages of social reproduction – own production, consumption, distribution and exchange [2, p. 216-217].

Moreover, added value gives the possibility to separate the budget efficiency from the efficiency itself, i. e. the efficiency of budget investments in land improvement, land protection, land management and state land use management. Therefore, it can be enlisted to the assessment of social efficiency rather than to the economic one.



* 0.40+ means that the indicator has a weight of 0.40, stimulant.

Figure 4. The system of criteria and indicators for assessment of environmental efficiency for land tenure system and land management at the territorial level (*developed by the author on the basis of resources [5, p. 149]*)

Conclusions. We can note that there is still no consensus among scientists on the classification of efficiency by its characteristics.

However, according to the most scientists, the complex of priority types shall determine the efficiency of land use, especially in agricultural sector of economy: economic, social and environmental efficiency and their varieties which bring about their research importance in order to determine the efficiency of land tenure system and land management.

The authors propose to assess environmental efficiency according to the following criteria:

- 1) anthropogenic load of land use;
- 2) reproduction of land resources quality;
- 3) harmonization (balance) of land use.

Social efficiency is proposed to be assessed according to three criteria:

- 1) land use productivity;
- 2) motivation of land use ;
- 3) stability (*balance*) of land use development.

Economic efficiency is proposed to be assessed according to such three criteria:

- 1) land productive capacity;
- 2) land use efficiency;
- 3) land use capitalization.

In this case the economic efficiency of land tenure system and land management, in our opinion, is dependent on environmental and social efficiency, and characterizes the provision of land rent growth and land use capitalization due to the rational land use.

In view of the above, the further direction of the research shall be the introduction of methodological foundations of the integrated efficiency assessment of land tenure system land management under conditions of open land market functioning.

References

1. Solomkina L.H. (1988) *Orhanyzatsyonno-ekonomycheskiye osnovy yspolzovaniya zemel v novikh uslovyakh khoziaistvovaniya (Na prymere khoziaistv Yuha Rostovskoi oblasti)* [Organizational and economic bases of land use in new economic conditions (On the example of the households of the South of the Rostov region)] Novocherkassk, 160.
2. Tretiak A.M., Druhak V.M. (2003) *Naukovi osnovy ekonomiky zemlekorystuvannia ta zemlevporiadkuvannia* [Scientific bases of economics of land use and land management: monograph] Kyiv, Ukraine: TsZRU, 337.
3. Andriichuk V.H. (2006) *Efektivnist diialnosti ahrarnykh pidpriemstv: teoriia, metodyka, analiz* [The effectiveness of agricultural enterprises: theory, methodology, analysis] Kyiv, Ukraine: KNEU, 292.
4. Haltsova O.L. (2010) *Derzhavne rehuliuвання APK na osnovi otsinky rivnia resursnoho potentsialu* [State regulation of agroindustrial complex on the basis of assessment of the level of resource potential] Zaporizhzhia, Ukraine: KPU, 306.
5. Zos-Kior M.V. (2016) *Upravlinnia zemelnymy resursamy ahrarnoho sektora ekonomiky Ukrainy v konteksti hlobalizatsii* [Management of land resources of the agrarian sector of the economy of Ukraine in the context of globalization] Zaporizhzhia, 530.
6. Diiesperov V.S. (2014) *Vykorystannia zemelnykh resursiv silskykh terytorii* [Use of land resources in rural areas]. *Ekonomy of agroindustrial complex*. 11, 48–56.
7. Kukhta K., Oroshan T. (2018) *Efektivnist yak osnovna ekonomichna kharakterystyka rezultatyvnosti vyrobnytstva* [Efficiency as the main economic characteristic of production efficiency]. *Agrarian economy*. 1-2, 15-22.
8. Shubravskoi O.V. (2014) *Ahroprodovolchyi rozvytok Ukrainy v konteksti zabezpechennia prodovolchoi bezpeky: kol. Monohr* [Agri-food development of Ukraine in the context of food security: qty. monogram] Kyiv: Institute of Economics and Forecasting of NAS of Ukraine , 456.

9. Holian V. (2016) The land question in the context of rural revival. Available at: <http://ua-ekonomist.com/120-zemelnaya-reforma-v-ukraine-institucionalnye-razryvy-okonchanie.html>.

А.М. Третьяк, В.М. Третьяк, Н.О. Капинос, Е.Н. Канивец

МЕТОДОЛОГИЧЕСКИЕ ОСНОВЫ ИНТЕГРАЛЬНОЙ ОЦЕНКИ ЭФФЕКТИВНОСТИ ЗЕМЛЕУСТРОЙСТВА В ПРЕДЕЛАХ ТЕРРИТОРИЙ СЕЛЬСКИХ СОВЕТОВ

Аннотация. В условиях реформирования земельных отношений и системы землепользования нуждаются в совершенствовании отдельные методические подходы и системы натуральных и экономических показателей оценки эффективности использования земельных ресурсов. Текущим исследованиям охвачено различные взгляды и подходы отечественных ученых к оценке использования земельных ресурсов с учетом факториальных и результативных показателей, дифференцированно влияют на формирование элементов эффективности землеустройства. Обосновано, что эффективность землеустройства определяется комплексом приоритетных ее видов: экологической, технологической, правовой, социальной, экономической и бюджетной эффективности и их разновидностями. Предложена система критериев и показателей интегральной оценки уровня эффективности землеустройства на местном уровне, включает в себя оценку экологической, социальной и экономической эффективности, которые являются взаимосвязанными и взаимозависимыми. Подтверждено, что выработка устойчивых и эффективных методологических основ оценки землеустройства приобретает немалой важности с учетом внедрения рынка земли в Украине и отмене моратория на продажу земель сельскохозяйственного назначения.

Ключевые слова. Землеустройство, экономическая эффективность, экологическая эффективность, социальная эффективность.

Третяк А. М., Третяк В. М., Капінос Н.О., Канівець О.М

МЕТОДОЛОГІЧНІ ЗАСАДИ ІНТЕГРАЛЬНОЇ ОЦІНКИ ЕФЕКТИВНОСТІ ЗЕМЛЕУСТРОЮ ТА ЗЕМЛЕВПОРЯДКУВАННЯ В МЕЖАХ ТЕРИТОРІЙ СІЛЬСЬКИХ РАД

Анотація. В умовах реформування земельних відносин та системи землекористування потребують вдосконалення окремі методичні підходи і системи натуральних й економічних показників оцінки ефективності використання земельних ресурсів. Поточним дослідженням охоплено різноманітні погляди та підходи вітчизняних науковців до оцінки використання земельних ресурсів з урахуванням факторіальних та результативних показників, що диференційовано впливають на формування елементів ефективності землеустрою та землевпорядкування. Обґрунтовано, що ефективність землеустрою та землевпорядкування визначається комплексом пріоритетних її видів: екологічною, технологічною, правовою, соціальною, економічною, та бюджетною ефективністю і їх різновидами. Запропоновано систему критеріїв та показників інтегральної оцінки рівня ефективності землеустрою та землевпорядкування на місцевому рівні, що включає в себе оцінку екологічної, соціальної та економічної ефективності, які є взаємопов'язаними та взаємозалежними. Підтверджено, що вироблення сталих та ефективних методологічних засад оцінки землеустрою та землевпорядкування набуває неабиякої важливості з огляду на запровадження ринку землі в Україні та скасування мораторію на продаж земель сільськогосподарського призначення.

Ключові слова. *Землеустрій, землевпорядкування, економічна ефективність, екологічна ефективність, соціальна ефективність.*