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AGRICULTURAL ENTERPRISES LAND USE AND ITS EFFECTIVENESS

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In the article the current trends of agricultural enterprises land use are described, its effectiveness is determined and the main ways of its efficient development are grounded

Statement of the problem. Agricultural market transformation in Ukraine requires necessary conditions forming for production intensification, new forms of management development, economic relationships improvement in the agricultural sector. It is very important to ensure effective use of all resources. In agriculture, the land plays very important role as a main production mean of and the subject of labor, physical basis for the allocation of production facilities and infrastructure. It is very important to use it in efficient way and preserve its good quality.

The current level of agricultural development is characterized by a high degree of arable land resources. It is higher compared to developed countries and even exceeds 90% in some regions of Ukraine. Obsolete production technologies result the humus loss, soil degradation, the wind and water erosion. It leads to a decrease in natural soil fertility and adversely affects the possibility of the efficiency of land use entities improvement. Therefore, the effective land use is topical issue under current conditions of the agrarian economy.

The analysis of scientific publications. The problems of effective land use by business entities are the subject of research of many domestic and foreign scientists. Its theoretical, methodological and practical

issues are discovered in the works of domestic scientists: D. Babmindra, A. Danylenko, D. Dobryak, O. Kanash, V. Mesel-Veselyak, A. Tretyak, M. Fedorov and others.

However, taking into account the prolonged crisis state of agriculture and the need of integration of into the global market, there is an urgent need for the scientific substantiation of economic regulation effective instruments of land use in order to ensure food security.

The main purpose of the article is to research the current trends of agricultural enterprises land use in Ukraine and identifying key factors for its development.

The main material. Efficient land resources use is extremely important for the development of agriculture. The land plays a special role in the national economy. Some enterprises use it to place different objects, industries and infrastructure, others – to provide production process. Specific peculiarities of land as a resource can provide the necessary conditions for extended reproduction in agriculture. Land use by agricultural units is in view of the economic laws which should provide economic, social and environmental performance.

Effective land use development bases on a system of organizational and economic conditions: the forms of ownership and

management, the size of enterprises, their production structure, legal, financial and tax systems, state support system (Fig. 1).

To address the important issues of effective land farms established the State Land Bank is established to improve land use of agricultural companies. Its main goal is management of state-owned agricultural land, but its operation will benefit some producers too. Some funds from the lease of public lands will cover interest rates for the farmers up to 3-4% below market ones [2]. Some other scientists state that the cost of borrowing will be approx 10-16,5% per year [4].

The amount of credit for turnover capital is within 75-700 thousands Euro and for investment loans – from 200 thousands Euro to 1 million Euro with rate – 8.12% per annum. Larger loans are expected to issue only under state guarantees [3].

The survey results indicate that the current level of agricultural enterprises land use is characterized by a decrease of land area under cultivation. In the overall structure of agricultural land arable land share is growing steadily, hayfields and pastures – is reducing. In 2012 agricultural enterprises in Ukraine used about 20,665.5 thousand hectares of agricultural land, of which 19395.4 thousand hectares were under arable land,

392.1 thousand hectares – grasslands, 673.1 thousand hectares – pastures and 204, 9 thousand hectares – other lands.

The tillage increase is a negative phenomenon, as more and more land is under intensive use. This trend highlights some changes in the structure of agricultural production due to declining interest of producers to keep a livestock. It makes more difficult the environmental situation. The largest share of arable land in the structure of agricultural land is in the southern and central regions of Ukraine, where this figure exceeds 85% and in some areas – 90%.

The increase of arable land leads to many negative consequences such as soil depletion, water and wind erosion, etc. In Ukraine the average level of tillage is 84.6%, and in some areas more than 90%. For example, in the US the figure is 25%, Hungary – 37%, France – 48% [1, p.216].

One of the most important conditions for effective land use is rational fertilizer system, which is currently characterized by a decrease of organic fertilizers and increase mineral ones (Fig. 3).

A special role for effective land use plays melioration system. Liming of acidic and alkaline soils gypsum properly enhances crop yields (Table. 1).

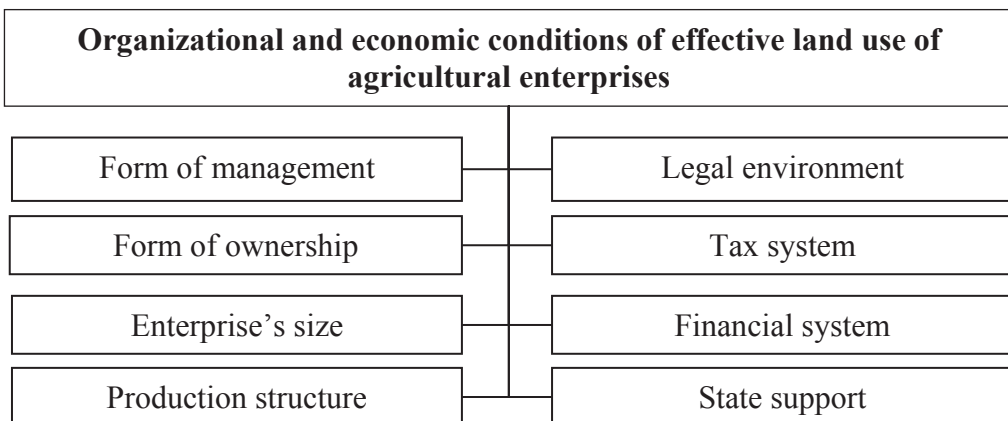


Fig. 1. Organizational and economic conditions of effective land use of agricultural enterprises

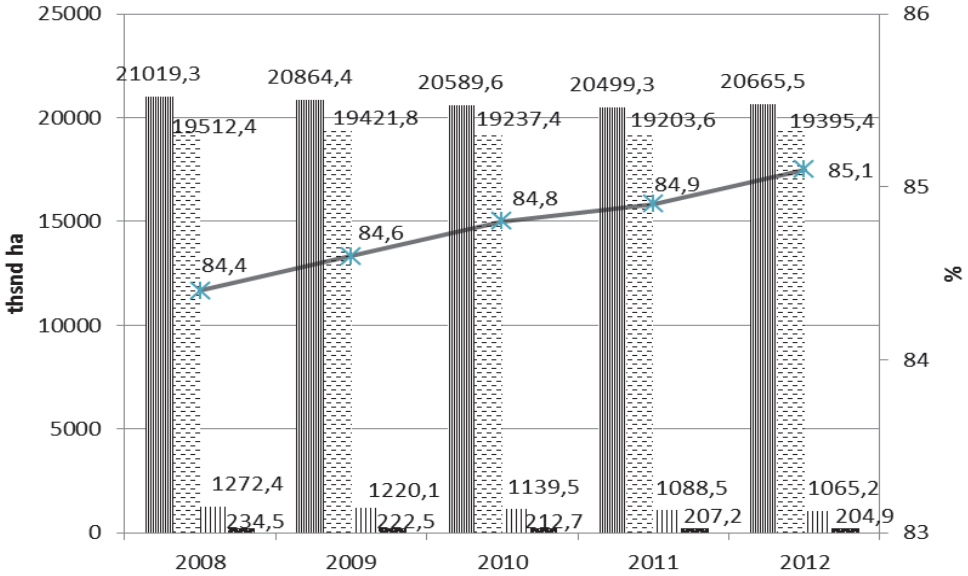


Fig. 2. Dynamics of agricultural enterprises land use in Ukraine

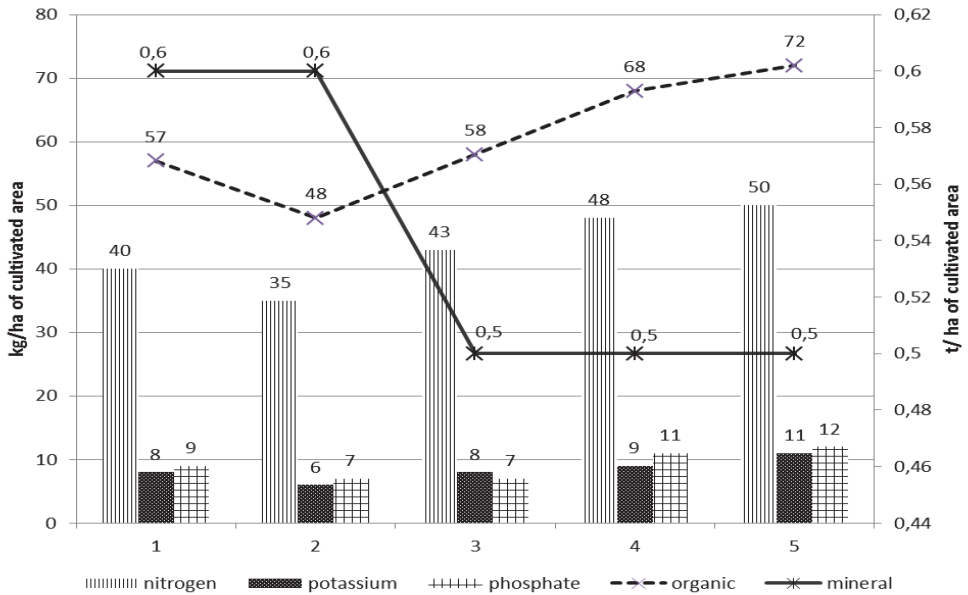


Fig. 3. Fertilization in agricultural enterprises in Ukraine

Economic efficiency of land use by agricultural enterprises is characterized by a number of indicators. One of them is the profit for 100 hectares of agricultural land, which increased at 56834.5 UAH or 4.3 times during 2008–2012.

The results of research indicate that researched agricultural enterprises uses the land more efficient than in another farms in their zone (Table. 2).

Table 1. Yields of major crops in the reclamation area of agricultural enterprises in Ukraine in 2012, kg / ha

Crops	The area under cultivation		In average in Ukraine
	irrigated	drained	
Cereals	41,3	43,0	31,2
including wheat	25,6	36,4	28,0
rye	29,7	18,1	22,7
barley	25,5	31,9	21,1
Sugar beet	433,2	411,5	410,8
Sunflower	17,3	17,6	16,5

Table 2. Efficiency of agricultural enterprises land use, 2011–2013.

Показник	Kyiv region, total/average	including	
		researched agricultural enterprises of Polissya zone	researched agricultural enterprises of Forest-Steppe zone
Level of Production per 100 hectares of agricultural land, total (in comparable prices in 2010), thousand UAH	644,1	758,4	944,8
including plant growing	242,1	138,7	146,7
animal breeding	402,0	619,7	798,1
Profit per 100 hectares of agricultural land, thousand UAH	0,19	81,08	92,8
Number of employees per 100 hectares of agricultural land	3,9	3,2	2,8
Agricultural production per 1 employee, thousand UAH	165,2	237,0	337,4
Fertilization per 1 ha, kg mineral	81,0	162	195
organic	1,4	4,3	6,7

Main organizational and economic ways to improve the efficiency of land use include production technologies modernization, industrial structure of the company and acreage optimizing, rational mix of industries, management improvement, production diversification, integration and cooperative relationships deepening, funding of production at scientific reasonable level. Very important role plays ecological production

that results decrease of the chemical load on the soil, the use of synthetic substances, emissions into the environment (Fig. 4). Therefore, the progressive development of effective land farms can be achieved by the combination and balance of the necessary organizational and economic conditions.

As a result of research a model of production structure of the enterprise in the forest-steppe zone is developed with consid-

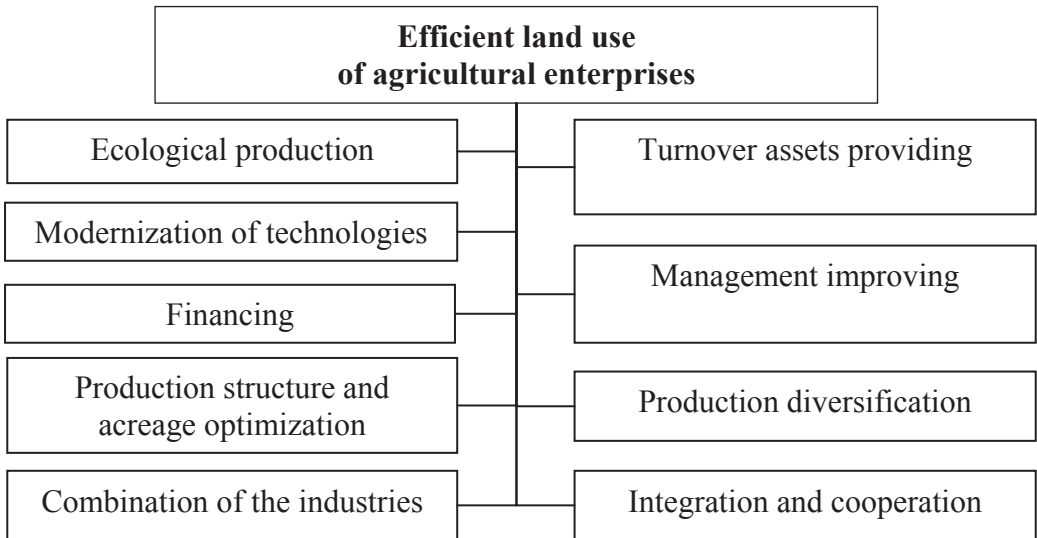


Fig. 4. Main ways of efficient land use of agricultural enterprises

ering providing working capital and optimal rotation. Developing the model and determining its optimal size provide harmonization of economic, environmental and social performance.

For the economic and mathematical calculations the conventional techniques were used based on specific features of the functioning of agricultural enterprises surveyed. This solution makes the task of finding the optimal value need areas of agricultural production (crops and livestock) under certain specified conditions, which would provide a set of optimal values $(x_j, x'_j, x''_j) \geq 0$, for which the maximum level is reached return (F) of the economy as a whole:

$$F_{\max} = \sum_{j \in I_1 \cup I_2} c_j x_j \rightarrow \max,$$

c_j – profit of j-th product, UAH/t;

x_j – size desired value j-th activity.

In order to address the issues raised in the model parameters the limits specified, including he following:

1. Structure of cultivated farmland and direction of their use. Limiting criteria

that considered in this group may be a qualitative indicator of arable land, pastures and hayfields. This restriction is written as follows:

$$\sum_{j \in J_1} a_{ij} x_j \leq b_i,$$

a_{ij} – need of i-th kind of resource per j-th type of product, ha / kg;

b_i – volume of i-type land, ha

2. The amount of engagement and use of labor resources. For the above mentioned criteria are the following restrictions:

$$\sum_{j \in I_1 \cup I_2} a_{ij} x_j \leq D_i,$$

D_i – availability of manpower, people. h.;

3. Limited criteria of financial collateral production process:

$$\sum_{j \in I_4} x_j \leq P_i (i \in I_8); \quad P x_i \leq P_i$$

$P x_i \leq P_i$

P_i – possible financial resources;

4. . Limited criteria of mineral and organic fertilizers:

$$\sum_{j \in J_1} a_{ij} x_j \leq \sum_{j \in J_2} v_{ij} x_j + \mathcal{E}_j ;$$

\hat{x}_j – amounts received additional fertilizer.

The level of production and feed intake when combined crop and livestock sectors. The formation of the model takes into account the balance of forage diet feeding while optimizing a ration available for groups of animals. In this case, the balance sheet restrictive criteria were the main types of nutrients:

$$\sum_{j \in J_1} v_{ij} x_j + Q_i \geq \sum_{j \in J_2} a_{ij} x_j ;$$

The main results of the research to determine the production structure of the basic enterprise for the future forest-steppe zone are shown in table. 3.

From the calculations, a reduction in the availability of working capital from 100 to 50% decreases the profit per 1 hectare by almost 20%. The difference in the rate of reduction is provided by optimizing the production structure of the company and the combination of crop and livestock sectors. With the reduction in the availability of working capital base enterprise zone of forest-steppe forced to change the production program, which involves reducing the area under costly and less profitable crops and prefer crops that do not require large amounts of funding. In 50% of running costs ensuring there is an urgent need for reducing the area of crops or to attract additional external funding for their use.

Full providing of the need of working capital in the researched company will increase the sown area under corn and soybeans about 1.5–2 times that will increase the effectiveness of management compared to other crops yield. Reducing need provid-

ing up to 50% will result in rejection of winter wheat, corn and sugar beet yield which is lower or higher compared to they need to cost of cultivation.

Therefore, optimization of production structure on the basis of the recommendations and with the full implementation of the planned manufacturing operations will provide the company a profit of 1904 USD per 1 ha of agricultural land.

We support the authors who state that further development of plant growing in agricultural formations possible through the introduction of innovative approaches to conservation and improvement of soil fertility. Domestic scientists have proved and introduced a soil protection system whereby the primary tillage is without plowing, ie without rotation layer of soil. It has been proven its effectiveness for the conservation of soil structure and improve its physical and physic and mechanical properties [6].

In Ukraine, there are some companies that already use this technology. It is very useful the experience of a private company "Agro-Soyuz". During the whole period of regular use of soil protection technology in agriculture sector average yield crops significantly increased, recovering fertile soil began. The yield of winter wheat increased from 11.2 kg / ha in 2003 to 59 kg / ha in 2011, the humus content in the soil increased from 4.3% to 4.4%. The cost of fuels and lubricants decreased from about 100 l / ha to 24 l / ha for the whole year, number of tractors decreased from 40 to 4 pieces [7].

Organization of production of agricultural enterprises regarding scientifically based recommendations and providing of valuable resource for all necessary technological operations will increase the economic efficiency of land use. Improving economic component will create the necessary conditions for the development of environmental and social components.



Table 3. Optimal model of production structure of basic forest-steppe zone enterprise for perspective, 2016

Index	2013	The level of working capital and taking into account the optimization of crop rotation, &			
		100	90	70	50
<i>Plant growing</i>					
Winter wheat, ha	700	600	550	650	-
Barley, ha	300	200	450	700	1700
Corn, ha	392	600	560	550	-
Soybean, ha	330	600	560	550	650
Sugar beet, ha	500	520	400	100	-
Corn for, ha:					
silage	450	349	349	349	349
green fodder	90	49	49	49	49
Winter crops for green fodder, ha	95	82	82	82	82
Annual grass for, ha:					
hay	80	71	71	71	71
haylage	150	102	102	102	102
green fodder	40	15	15	15	15
Perrenial herbs for, ha					
hay	300	256	256	256	256
haylage	300	291	291	291	291
green fodder	40	32	32	32	32
Area, ha	3767	3767	3767	3767	3597
Profit, UAH/ha	884,80	1164,38	1052,32	970,57	910,62
<i>Animal breeding</i>					
Number of cattle	1050	1170	1170	1170	1170
including cows	715	800	800	800	800
Annual milk yield per cow, kg	4300	5400	5400	5400	5400
Number of pigs	608	640	640	640	640
including pigs	38	40	40	40	40
Profit, UAH/ha	550	740	740	740	740
<i>Total in enterprise</i>					
Profit, UAH/ha	1434,8	1904,38	1792,32	1710,57	1650,62

Conclusions and suggestions. The development of efficient agricultural land use in agrarian formations can be provided through a combination of economic, environmental and social efficiency. Balancing the interests of all stakeholders will enable producers to increase profitability and ensure competitiveness of sales, customers – to get high-quality and healthy products that meet their buying ability, and society as

a whole – to keep a proper state of the environment, provide jobs and contributions to the budget.

Under this condition the interests of producers, the state and society could be combined. Development of bioeconomic land use as specific commodity relations concerning land use, provide a balanced and efficient use of production resources and reduce an environmental load.

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АНОТАЦІЯ

Ільчук М. М., Сичова О. Д., Радько В. І.
Землекористування сільськогосподарських підприємств та його ефективність // Биоресурсы и природопользование. – 2014. – 6, №5–6. – С. 151–158.

У статті розкрито сучасні тенденції землекористування сільськогосподарських підприємств, визначено його ефективність та обґрунтовано основні напрями ефективного розвитку на перспективу.

АННОТАЦИЯ

Ильчук Н.М., Сычева О.Д., Радько В.И.
Землепользование сельскохозяйственных предприятий и его эффективность // Biological Resources and Nature Management. – 2014. – 6, №5–6. – P. 151–158.

В статье раскрыты современные тенденции землепользования сельскохозяйственных предприятий, определена его эффективность и обоснованы основные направления эффективного развития на перспективу.