

Innovative approaches towards the analysis of the dependence of production efficiency on the parameters of agricultural enterprises land use

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Abstract. The efficiency of production of agricultural enterprise in the Carpathian region of Ukraine is provided in the article. The main indicators of agricultural enterprises efficiency in the Carpathian region of Ukraine and in Ukraine are done. The evaluation of the efficiency of land use by the enterprises is separately analyzed on the basis of the analysis of gross output per unit of agricultural land. With the help of software the efficiency dependence from the parameters of land use by agricultural enterprises of Carpathian region is analyzed. Proved that the cause of the low efficiency of agricultural enterprises activity is their lack of land.

Key words: agricultural enterprises, agrarian sector of economy, the efficiency, the land use, statistic analysis.

INTRODUCTION

Land reforming in Ukraine and in the Carpathian region at this stage of development of land relations foresees their implementation on the basis of new approaches towards ensuring effective economic use of land resources of agricultural enterprises. The analysis of key indices of land use of business entities shows that reforms in the agricultural sector practically have no positive production results and the basic problem for today has not been solved – the provision of effective and rational use of land resources and the improvement of the efficiency of production of agricultural enterprises both at the national level and at the level of a particular region.

THE ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

It should be mentioned that the problems of rational land use are increasingly becoming the subject of scientific research, the results of which are being implemented in the practice of agricultural production. A signifi-

cant contribution to the theory and methodology of the research of problems connected with more efficient use of land resources of agricultural enterprises was made by A.S. Danilenko [3], I.G. Kirilenko [5], M.I. Malik [6], V.J. Mesel-Veselyak [7], I.P. Mikhasyuk [8], L.Y. Nowakowski [11], V.I. Pasternak [13], P.T. Sabluk [14] and others.

However, it should be noted that the new economic conditions determine the need for research in order to improve the efficiency of land use by agricultural enterprises in the direction of improving the efficiency of agricultural production at the level of certain regions. Therefore, the assessment of land use of agricultural enterprises aimed at increasing the efficiency of land use and improving the results of entrepreneurs' production is extremely important at the regional level.

UNSOLVED PARTS OF THE PROBLEM

The efficiency of production of agricultural enterprises is the resulting and generalizing indicator of its farming and land use, since the regulation of the efficiency of agricultural production is difficult, but necessary process. Due to the goal to hold comprehensive and objective assessment of land use by agricultural enterprises of the Carpathian region it is necessary to consider main economic performances of the enterprises concerning the farming and analyze the impact of land use parameters on the production efficiency of agricultural enterprises.

The goal of the research is to evaluate the dependence of the production efficiency on the parameters of land use of agricultural enterprises at the level of the Carpathian region of Ukraine aimed at finding ways to increase the efficiency of enterprises functioning of agrarian sector.

Object of study is economic land relations in agriculture enterprises in the Carpathian region of Ukraine.

Research methodology. Study was conducted during 2010-2012 years. Number of respondents was the four areas of the Carpathian region. The sample size is 12 observations. The statistic method is the main used in the article. Stages of statistic research presented as a correlation and regression analysis are implemented on a personal computer by means of an integrated system of statistical analysis and data processing STATISTICA v.6.0. Results of the research are presented in the form of formalized dependencies resulting from input variables (explanatory).

THE MAIN RESULTS OF THE RESEARCH

The land issue has always been the focus of researchers. "Land issues, land management – proves Academy L.Y. Nowakowski – in terms of state regulation of the market economy have always been the most important" [11].

First of all it is necessary to define what the land relations – is multifaceted problem that covers a wide range of issues: ownership and management, land, land market, rents, land tax, rent, land management, public lands, play it performance and so on [10].

They are characterized by social relations between people related to the ownership and use of land, and is a component of the entire system of relations of each historical era [2].

By their nature land relations are categorized as economic, because the land has a certain economic value as a result of its relationship with the means of production, commodities and other products of human labor [15]. We can say that they are at the heart of agriculture policy, including land ownership, tenure, by nature, its use [16].

I must say that land relations directed to land management, and at different levels - national, commercial and internal business, but also as an object of management and the means of production in agriculture [4].

In order to evaluate how currently operating land relations, we must consider them as an example of the area. In the article the Carpathian region as a striking example of the implementation of specific land relations and land use in the production process.

The Carpathian region is malozemelnym and it determines the nature of land area farmers. The implementation of land reform in the region had a number of regional differences. The need for agricultural producers

to keep production in the highlands;

- The destruction of a relatively large agricultural sector;
- Limitation of land holdings of farmers.
- Simultaneity and complexity of reform.
- In the Carpathian reform was characterized by higher than in other regions, the pace [17].

It is known that better company operates large, particularly with large plots of land. Thus, according to researchers, the effect of large agricultural production is manifested in the possibility of better use of fixed assets, labor force, they have the option of processing products, but most importantly - these businesses more efficient in terms of rational the use of land [9].

It should be noted that the world has emerged a trend toward larger farms due to the liquidation and bankruptcy of small farms. This contributes to the expansion of productive capacity of farm families due to technological progress. For example, in the United States for 100 years, the number of farms decreased from 6 to 2 million, and the average farm size increased from 56 to 175 hectares [12].

But the effectiveness of management on land depends not only on the size of land holdings, but the results of management of agricultural enterprises.

The effectiveness of the implementation of business processes is a complex concept that includes an analysis of the effectiveness of management conducted by the producers, and comparing the results of this activity with indicators of the global production system [6]. Therefore, in order to assess the economic efficiency of agricultural producers in the Carpathian region, in our opinion it is necessary to compare the main economic performance of it functioning effectiveness as compared to the state performance (Table 1).

According to the data provided in Table 1, it could be concluded that the place of researched region is not very important in the production of gross agricultural output for state performance. Concerning the production of gross crop output, three out of four areas of the region occupy the last places in Ukraine. Slightly better situation with the production of gross output of livestock – the Lviv region occupies the 6th place and Ivano-Frankivsk region occupies the 10th place. In general, the relative share of gross agricultural output in the region concerning Ukraine is about 10 %, which is the average result of the functioning of its producers.

Table 1. Basic performance of economic management efficiency of agricultural enterprises of Carpathian region and Ukraine in 2012*

*The source [20, 214, 217, 219, 232]

Region	Gross output of agriculture, mln. UAH	Place of the region in the gross agricultural output for Ukraine	Profits, losses from the sales of agricultural products, mln. UAH
Transcarpathian region	4044.8	25	-0.6
Ivano-Frankivsk region	5176.2	23	311.9
Lviv region	8400.9	14	343.7
Chernivtsi region	4318.6	24	124.2
Total for Carpathian region	21940.5	x	779.2
Total for Ukraine	233696.3	x	19926.0
The region in % for Ukraine	9.4	x	3.9

Table 2. The dynamics of gross agricultural output * * Calculated according to [20, 214, 236]

Region	Per 100 hectares of agricultural land, thsd. UAH						
	1990	2000	2005	2009	2010	2011	2012
Ukraine	683	393	485	551	541	534	641
Transcarpathian region	1009	755	904	934	972	947	999
Ivano-Frankivsk region	1103	769	852	851	925	932	1057
Lviv region	820	616	676	727	745	714	814
Chernivtsi region	1016	664	750	814	843	868	962
Carpathian region	938	680	765	804	839	828	924

Regarding the profitability of business processes of agricultural enterprises in the Carpathians region, their relative share in the state performance is only 3.9 %, which is too little. In particular, the producers of Transcarpathian region ended with a loss in 2012. This performance should be improved.

The general tendency of existing agricultural enterprises in the researched region is to reduce the production of gross agricultural output of during 1990 and 2012 and increase the production in households of the population. This is a striking reflection of the economic impact of land reform in the region and the economic performance of agricultural producers.

Speaking about the effective functioning of commodity producers of agrarian sector in the Carpathian region, it is necessary to analyze the impact of land use. One of the indicators that characterizes the efficiency of land use of agricultural enterprises is the production of gross output per unit of agricultural land (Table 2). As it is seen from the table 2, the agriculture of the Carpathi-

an region is characterized by a much more intensive use of agricultural land compared to Ukraine. In particular, in 2012 the production of agricultural products was in 1.44 times more than in Ukraine in the region of 100 hectares of agricultural land.

However, the gross output per unit of land area does not show a complete picture of the effectiveness of land use in the Carpathian region. Therefore, while analyzing the efficiency of agrarian land use in agriculture it is necessary to use advanced mathematical methods of statistical data processing. In this case, the appropriate software for personal computers should be used, especially the software STATISTICA v.6.0, which will allow identifying and describing the existing relationships between results on the basis of partial results of statistical observation of events or indicators that are analyzed. Thus, by means of the software it is possible to analyze the dependence level of production efficiency on the parameters of land use by the agricultural enterprises in the Carpathian region.

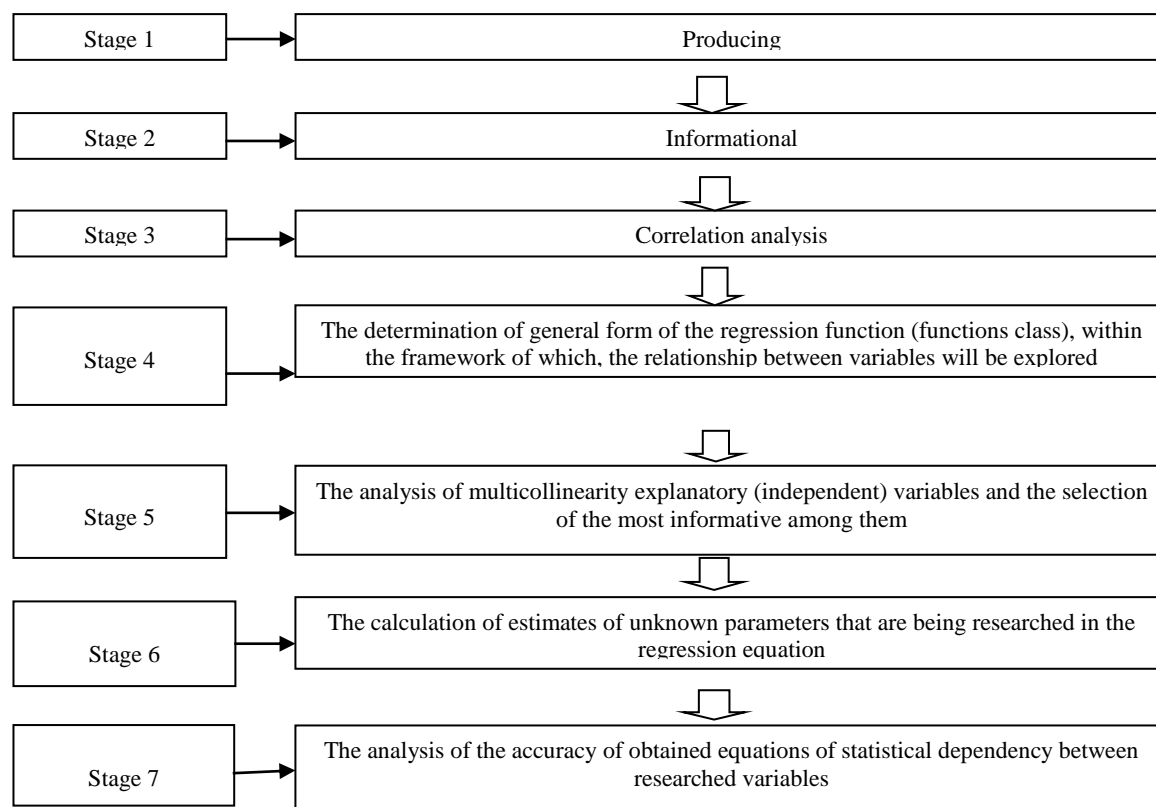


Fig. Stages of statistical analysis of dependency between efficiency performance indices of agricultural production and land use *. *the source [1]

Table 3. The list of "input" (explanatory) and "output" (resulting) variables*

* Suggested by the author.

Variable	Type of variable	Symbol
The area of agricultural land per enterprise in the Carpathian region, ha	$X^{(1)}$	$X1_PSU$
Crops capacity of agricultural enterprises in the Carpathian region, c / ha	$X^{(2)}$	$X2_UZK$
The cattle stock in the enterprises of agricultural areas of the Carpathian region per 1 ha of agricultural land, head	$X^{(3)}$	$X3_PVH$
The usage of mineral fertilizers of areas of agricultural enterprises in the Carpathian regions per 1 ha of agricultural lands, kg	$X^{(4)}$	$X4_MIN$
The usage of organic fertilizers of areas of agricultural enterprises in the Carpathian region per 1 ha of agricultural land, tons	$X^{(5)}$	$X5_ORG$
Net income (receipts) from sales of agricultural products in the areas of agricultural enterprise in the Carpathian region per 1 ha of agricultural land, thsd. UAH	$Y^{(1)}$	$Y1_CHD$
Income (loss) from sales of agricultural products in the areas of agricultural enterprise in the Carpathian region per 1 ha of agricultural land, thsd UAH	$Y^{(2)}$	$Y2_PSG$
The level of profitability of agricultural activities of agricultural enterprises of the areas in the Carpathian region, %	$Y^{(3)}$	$Y3_REN$

The analysis of literature shows that the use of statistical software and the process of statistical analysis of dependency between indicators of efficiency of agricultural production and land use can be divided into the following interrelated stages (Figure).

Let us start the process of statistical analysis of the dependency of efficiency performance indices of agricultural production and land use from the step 1 - producing. In this case, it is necessary to define the objects of study O_i ($i=1,2,3,4$). These will be the areas of the Carpathian region. For each object of the research O_i let us put into conformity the list for "input" (explanatory) and "output" (resulting) variables (Table 3). As it is seen, in the first equation on the indicator of net income from the sales of agricultural products the cattle population negatively affects ($H3_PVH$), and in the third - of the level of crops productivity negatively affects the profitability ($H2_UZK$). It affirms the need for measures to increase the crops capacity and cattle population in the researched region.

CONCLUSIONS

Therefore, based on the conducted analysis, it can be concluded that due to distortion of economic relations in agriculture in the Carpathian region the increase of the concentration level of agricultural production, which is expressed by means of crops capacity and cattle population per unit of land area. It appears to be a negative factor that affects the performance of net income from the sale of agricultural products per 1 ha of land and profitability of agricultural enterprises. It is obvious that the current structure of land use in agriculture in the Carpathian region is unable to provide effective agricultural production. In our opinion, the basis of this is a number of reasons and one of them is a shortage of arable land in the region, which causes the small size of land of commodity producers, which does not allow to introduce modern technologies of land cultivation. As a result, smallholders carry out the process of manufac-

turing processes mainly by means of primitive, natural methods.

Therefore, in order to improve land use for agricultural commodity producers in the Carpathian region it is necessary to consolidate effectively and develop positive achievements of land reform. That is to ensure the efficient use of land with the usage of restrictions concerning the deecolization. It is important to create the conditions for medium-sized landowners, ensuring a relatively high social security of rather small and very small owners. In this case the land lease should play an important role, especially by raising lease payment and payments for land revocation.

Toward further research regarding this problem, it is necessary to prove mechanism by means of which the increase the efficiency of agricultural production and the profitability of land use will be ensured. The levers of state regulation of land relations, aimed at the establishment and development of market relations in agricultural land use, improvement of tax and price policies on land markets and taking measures in order to improve the rational use of land and its protection should play an important role.

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