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ECONOMIC ANALYSIS OF THE INFLUENCE OF THE STRUCTURE OF COMMODITY PRODUCERS ON THE EFFICIENCY OF AGRICULTURE IN TURKESTAN REGION

Abstract

The purpose of research is to determine the impact of various forms of farming on the efficiency of agriculture in Turkestan region using econometric models, which will make it possible to formulate proposals for improving agricultural policy in the region. Research hypothesis. It is assumed that the structure of commodity producers has a significant impact on the efficiency of agriculture in Turkestan region. In particular, larger agrarian enterprises show high productivity and economic efficiency due to the scale of production and access to better technologies. At the same time, farmers and smallholders can make important contributions to the diversity of production and sustainability of the agrarian economy, but their efficiency may be limited by insufficient access to financial and technical resources. In the course of the study, the authors used methods of literature review of domestic and foreign researchers, statistical method, economic and mathematical method, modelling, etc. The result of the study is the development of proposals to optimise the structure of agriculture in the region, including measures to support small and medium-sized farms to improve their competitiveness, as well as the development of cooperation between producers to improve their access to resources and technology.

Key words: econometric analysis, structure of commodity producers, cooperation, agro-enterprises, farms, livestock farming, agriculture.

Introduction

As part of food security and changing economic conditions, attention is paid to improving the efficiency of agricultural production, where one of the important factors is the structure of commodity producers. It should be noted that together with large agrarian enterprises, farms and individual entrepreneurs are actively functioning, which creates a multi-layered agrarian economy in the region. Econometric analysis allows to identify patterns and determine the quantitative impact of the structure

of commodity producers on key indicators of agricultural production efficiency, such as yield, cost of production, level of profitability and use of resources. The study of these indicators using modern econometric methods helps to better understand the mechanisms that affect the productivity of various categories of farms, as well as to develop recommendations for optimizing the agricultural structure.

Studying the impact of the structure of producers on the efficiency of agriculture, it is advisable to refer to the work of researchers J. Allen, P. Lawrence [1], where in their research "Economies of scale in agricultural production: a comparative study of large-scale and small-scale farming systems" noted that large agricultural enterprises with access to large investments and financial resources, and as a result, to the latest technologies, have a great advantage over small enterprises, farms and personal subsidiary plots. Thus, agricultural enterprises show high productivity and at the same time a low level of costs in production through economies of scale.

Fuglie K., Williams R. [2] in a study on: "Technological change and agricultural productivity in developing countries: A Meta-Analysis. World Development" highlighted that large agricultural enterprises are more resistant to changes in market conditions and can quickly adapt to changes in agricultural policy and the external environment. Thus, the authors Ostrom E., Hess C. [3] indicate that despite the lack of economic and financial resources of farms, they are more mobile and flexible to external factors, and in case of force majeure situations, farms can quickly reorient themselves to new markets compared to large enterprises.

Researchers such as Mueller C., Wade M. [4] actively discuss the impact of the structure of commodity producers on agricultural efficiency in their work "Agrarian structures in developing economies: The role of small-scale farms in agricultural development. Agricultural systems", where it is noted that it is necessary to study in detail the structure of multifaceted in agriculture through economic and mathematical tools. Their econometric analysis showed that a more diverse structure of producers contributes to improving the overall productivity of the agricultural sector, since small farms operating in highly specialized markets or producing organic products can fill niches inaccessible to large enterprises.

The approach of Foster A., Rosenblum T. [5] is important, where the researchers emphasize that in the region where large agricultural enterprises are located, there is modernization in all areas of the region, from education to large-scale production, and as a result, infrastructure development. Under these conditions, farms may face difficulties in competition, which requires special support measures from the state.

Interest in the influence of the structure of commodity producers on agricultural efficiency was shown by Hannington G., Brown T. [6] in their research "Cooperatives and smallholder farmers: enhancing access to markets and resources". In this work, the researchers noted that through cooperative models, small farms can access good conditions for obtaining resources and selling their products. Also in their study, the authors cited cases where the development of cooperation in various countries led to the full development of agriculture.

Jones D., Miller S. [7] note that cooperatives have more positive aspects than negative ones. In their opinion, the level of transaction costs is reduced through cooperative associations. For the development of cooperative structures, support from the state is needed. For example, Dorothe M., Clement R. [8] in their research "The impact of government support programs on agricultural productivity and sustainability: Cross-country analysis" shows that subsidies and government rural development programs can significantly affect productivity gains for both large and small producers [9]. Thus, having studied the materials of the literary review, we can conclude that the structure of producers plays a key role in determining the effectiveness of agriculture. Econometric analysis allows a deeper understanding of the patterns associated with the influence of the structure on the productivity, profitability and sustainability of the sector [10, 11]. Key findings from the studies show that large enterprises have benefits through scale and access to resources, while smallholders retain an important role in sustainable development and food security.

The relevance of increasing the efficiency of agriculture in Turkestan region is becoming especially important against the background of growing requirements for sustainable development and food security in Kazakhstan. This region has significant agro-industrial potential, but the structure of producers in agriculture, characterized by a high proportion of personal subsidiary farms, small farm and medium-sized agricultural enterprises, has a different impact on economic productivity, innovative development and sector sustainability in a modern market economy.

The structure of commodity producers in agriculture plays a decisive role in shaping the efficiency and competitiveness of the agricultural sector. Small and medium-sized agricultural producers often face difficulties in accessing innovative technologies, financial resources and markets, which hinders their growth and reduces opportunities for increasing productivity. Large farms, on the contrary, have great access to investment and can introduce advanced technologies, but their number remains limited in Turkestan region. To understand how different types of economic actors affect the overall level of productivity, an in-depth study of the econometric relationships between the structure of commodity producers and performance indicators in the region's agriculture is needed. In this regard, special attention is paid to policies aimed at supporting a diversified agricultural economy and stimulating cooperation between producers.

The purpose of research is to conduct an econometric analysis of the impact of the structure of commodity producers on the efficiency of agriculture in Turkestan region. Based on this methodology, it is planned to determine what changes in the structure of producers can contribute to improving economic efficiency indicators, as well as identify factors that create barriers to sustainable growth.

Materials and methods

The methodology for forecasting agricultural development is based on the practice of its wide application in the field of public and economic management based on economic and mathematical methods, including trend, correlation-regression, balance and simulation modeling, using modern approaches to constructing scenarios. The main approaches used in forecasting livestock development parameters are target, resource, dynamic and factor, the synthesis of which allows taking into account, on the one hand, the internal resource capabilities of industries to achieve the targets defined in state program documents, and on the other, external limiting conditions and factors. Two approaches are currently being applied to assess performance in the livestock industry. One of them: based on methods of comparative analysis of a comprehensive system of indicators of animal husbandry efficiency, presented in dynamics, which makes it possible to assess the pace of sectoral development. The second is based on the formation of indices that determine the position of an individual business entity relative to others, with the construction of a rating system based on the results of their assessment using a group of indicators reflecting the conditions for the development of animal husbandry industries and performance. It makes it possible to quantify the level of efficiency of animal husbandry in each specific economic entity. Comparison with the reference value allows us to assess the actual state of affairs in animal husbandry, the failure to achieve which signals the presence of certain problems (threats) that require adoption appropriate management decisions to increase a system's efficiency.

The methodological and information base of the study was made up of scientific research by foreign and domestic authors, data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of Kazakhstan.

During the study, the authors used the methods of literary review of domestic and foreign researchers, the statistical method, and the economic and mathematical method.

Results and discussion

Agriculture in Turkestan region is one of the main sectors of economy, contributing to both food security and employment. Rich natural resources, favorable climatic conditions and the availability of irrigated land create the basis for the cultivation of various crops and the development of livestock. Cereals, melons, vegetables, fruits, as well as meat and dairy products are actively produced in the region.

Agriculture of Turkestan region is at the stage of active development and modernization aimed at increasing the productivity and sustainability of the agricultural sector. State support and the introduction of innovative solutions to overcome existing challenges are important. State programs to support agriculture in the Republic of Kazakhstan have a significant positive impact on agri-industrial complex, contributing to its modernization, sustainable growth and increased competitiveness in international markets. Region has a high potential for increasing efficiency through the introduction of innovative agricultural technologies and modernization of farms, which can contribute to sustainable growth and increase the competitiveness of the agricultural sector in the region.

The main agricultural indicators of Turkestan region from 2019 to 2023 are shown in table 1.

Table 1 – The main agricultural indicators of Turkestan region for the period 2019–2023

Title	2019	2020	2021	2022	2023	2023 to 2019 growth rate, %
Gross output of products (services) of agriculture, forestry and fisheries, billion tenge	616,8	729,7	936,7	932,3	971,9	157,6
Agricultural products	614,1	726,9	931	926	963,5	156,9
including:						
Gross crop production	342,2	422,8	567,6	648,4	637,6	186,3
Gross livestock production	270,9	303,3	362,2	276,2	325,2	120,0
Agricultural services	1,0	0,8	1,2	1,4	0,7	70,0
Index of physical volume of gross agricultural output (services), %	104,9	105,1	101,6	100,7	101,2	-
Note: Compiled by the authors based on reference [14].						

From the data of the table 1, it follows that the gross agricultural output of Turkestan region increased by 355,1 billion tenge, or an increase – 57,6% for the period 2019–2023. Including, gross crop production increased – 295,4 billion tenge, livestock – 54,3 billion tenge for the same period. However, the index of physical volume of gross agricultural output decreased by 3,7% over the period under review. The reason is the increase in prices for fuel, fertilizers, seeds and other resources, which influenced the decrease in the overall profitability of agricultural production in Turkestan region.

The structure of producers in agriculture is uneven. Table 2 shows the number of agricultural formations and their share as a percentage in the development of the agro-industrial complex.

Table 2 – Share of agricultural producers of Kazakhstan, 2023

Name	Headcount/%	Agriculture output		
		Total output	Production (livestock)	Production (crop)
Total	17 917 / 100%	-	-	-
Agricultural Enterprises	55/ 0,3%	29%	36%	18%
Farms	281 / 1,6%	35%	43%	19%
Households	17 581 / 98,1 %	39%	23%	66%
Note: Compiled by the authors based on reference [14, 15].				

Indicators of table 2 show that the largest share in the production is occupied by the households. The share of households in the total structure – 98,1% or 17 581 units and produces agricultural products – 39%, including in the crop industry – 66% and in the livestock industry – 23%. The second place in agricultural production among agricultural groups is occupied by farms. The share of farms – 1,6% in 2023, agricultural products were produced – 35%, including: crop production – 43%, animal husbandry – 19,0%. The third place is occupied by agricultural enterprises, their share was less than 1%, their total production – 29%. It should be noted that large agricultural enterprises, despite the fact that they have the opportunity to purchase equipment and machinery, and increase the productivity of their products compared to farms and households, face debt problems. The level of debt obligations is influenced by price volatility and instability of agricultural yields due to weather conditions in the country.

In table 2, the products produced by agricultural groups in the Republic of Kazakhstan for 2023 were studied. For a more detailed analysis, we will study the indicators of gross production produced by agricultural formations of the Turkestan region over the past five years (table 3).

Table 3 – The share of products in GDP produced by agricultural formations of the Turkestan region in 2019–2023, %

Title	2019	2020	2021	2022	2023
Agricultural enterprises					
Republic of Kazakhstan	24,6	26,4	25,2	29,3	28,7
Turkestan region	9,9	10,7	9,8	10,3	10,1
Peasant farms and individual entrepreneurs					
Republic of Kazakhstan	31,2	32,1	32,2	32,7	33,5
Turkestan region	37,6	39,2	41,7	42,6	43,4
Households					
Republic of Kazakhstan	44,2	41,5	42,6	38,0	37,8
Turkestan region	52,5	50,1	48,4	47,1	46,5
Note: Compiled by the authors based on reference [13].					

The indicators of the table 3 show that the share of agricultural production by agricultural enterprises of Turkestan region in the GDP structure amounted to 10,1% in 2023. The share of farms – 43,4% and households – 46,5%. It should be noted that there is a slight increase in agricultural production by less than 1%, and farms showed a significant increase of 5,8% from 2019 to 2023. Also, the largest share of agricultural production in the GDP structure of Turkestan region is occupied by households, their share – 46,5%. However, the share of households decreased by 6,0% over the same period.

As emphasized above, households account for the bulk of agricultural output. They usually work informally as self-employed. This situation results in households being largely outside the scope of government programs. Because their activities are informal, they are limited in accessing government support measures that are received mainly by large agricultural producers, and the lack of appropriate public services means that they have little external incentive to improve their production model or practices.

Table 4 shows the level of profitability or unprofitability of agricultural production in agricultural enterprises in the Republic of Kazakhstan and Turkestan region.

Table 4 – Level of profitability (loss-making) of agricultural production in agricultural enterprises for the period 2019–2023, %

Title	2019	2020	2021	2022	2023
Republic of Kazakhstan	34,2	30,0	37,8	44,9	24,9
Turkestan region	15,1	15,4	19,2	18,4	19,3
Note: Compiled by the authors based on reference [14].					

It follows from the table 4 that the level of profitability of agricultural production in agricultural enterprises in Kazakhstan has decreased and has a decline trend or an decrease – 9,3% from 2019 to 2023. The reason for the decline in profitability – instability of prices for agricultural products in world markets, competition with imported products, as well as between local producers, lack of capital for modernization and expansion of production and unpredictability of weather conditions, natural disasters. However, the level of profitability of agricultural production in agricultural enterprises of Turkestan region increased by 4,2% over the same period. Despite the positive dynamics of profitability, the Turkestan region has a number of problems for the development of agriculture as a whole.

The development of agriculture in Turkestan region is faced with a number of problems that require an integrated approach to solve them. The main problems are:

◆ Turkestan region, like many other regions of Central Asia, is faced with the problem of lack of water resources for irrigation;

◆ Improper use of land and lack of compliance with agricultural standards leads to soil degradation, which reduces their fertility;

 ◆ low level of technological equipment. For example, many farmers use outdated methods and equipment, which reduces production efficiency;
 ◆ lack of qualified personnel. Agriculture often has a shortage of specialists and skilled labor;
 ◆ Lack of investment and difficulty in accessing credit hinders agricultural development;
Climate change has a negative impact on crop yields and the sustainability of agricultural systems.

Having studied the main problems of agricultural development, we recommend applying the following solutions: 1. The introduction of modern irrigation technologies, such as drip irrigation and water management systems, can significantly reduce water consumption and increase yields. 2. The application of conservation farming techniques such as crop rotation, cover planting and minimal tillage can improve soil health. 3. The introduction of new technologies and the modernization of agricultural machinery can significantly increase the efficiency and productivity of agricultural work. 4. Organizing training programs and courses for farmers and professionals can help increase knowledge and skills in agriculture. 5. Government support, the creation of favorable conditions for investors and improved access to financial resources can stimulate the development of agriculture. 6. Developing and implementing climate-resilient plant varieties and agricultural practices will help reduce the negative impacts of climate change.

The experience of developed countries in the field of agriculture is shown by examples of successful practices: 1) creation of cooperatives, linking farmers into cooperatives can improve access to resources and technology, as well as improve competitiveness in the market; 2) development of agritourism, agritourism can become an additional source of income for rural residents and contribute to the development of infrastructure.

For the effective development of agriculture in Turkestan region, an integrated approach is needed, including both state support and active participation of the private sector and local communities. Innovation, education and sustainable resource management can be key factors in the successful development of the region.

The need for this study is due to the importance of identifying factors affecting the efficiency of agricultural production in Turkestan region, where the agricultural sector is the main source of employment and income for a significant part of the population. The current structure of commodity producers in the region, including large agricultural holdings, farms and personal subsidiary plots, significantly affects productivity, innovative activity and agricultural sustainability. However, the influence of various types of economic entities on the effectiveness of the agricultural sector remains poorly understood and requires systematic analysis.

Econometric analysis that quantifies the relationship between the structure of commodity producers and agricultural performance indicators can help identify optimal ways to increase productivity and sustainable sector growth. This study is also important for identifying factors that limit the ability of small and medium-sized producers to access resources and innovation, which can be useful in shaping government policies to support and develop the agricultural sector in the region. The results of the analysis will provide scientifically based recommendations for the transformation of the structure of producers aimed at increasing the economic efficiency and competitiveness of agriculture in the Turkestan region.

Effective livestock production in the context of ensuring national food security in the context of imbalances in available resources and needs, as well as increased influence of external factors, involves the use of forecasting tools for industry development parameters. The considered methodological aspects of forecasting livestock industries in modern conditions indicate the presence of a variety of scientific approaches to the formation of forecast parameters for the development of the industry. Modern forecasting methods make it possible to take into account the influence of determining factors of the internal environment (in terms of the types of available resources) and external restrictions (for example, internal and external demand for products), to determine a number of tasks and directions for increasing the efficiency of animal husbandry and the competitiveness of industry products. In this connection, research is relevant aimed at building models that reflect the most important structural characteristics of enterprises and industries [12]. Within the framework of this study, a methodology for analyzing the impact of the structure of commodity producers on the efficiency of agriculture in the region was built, which is a set of sequence of econometric models logically built to achieve the task.

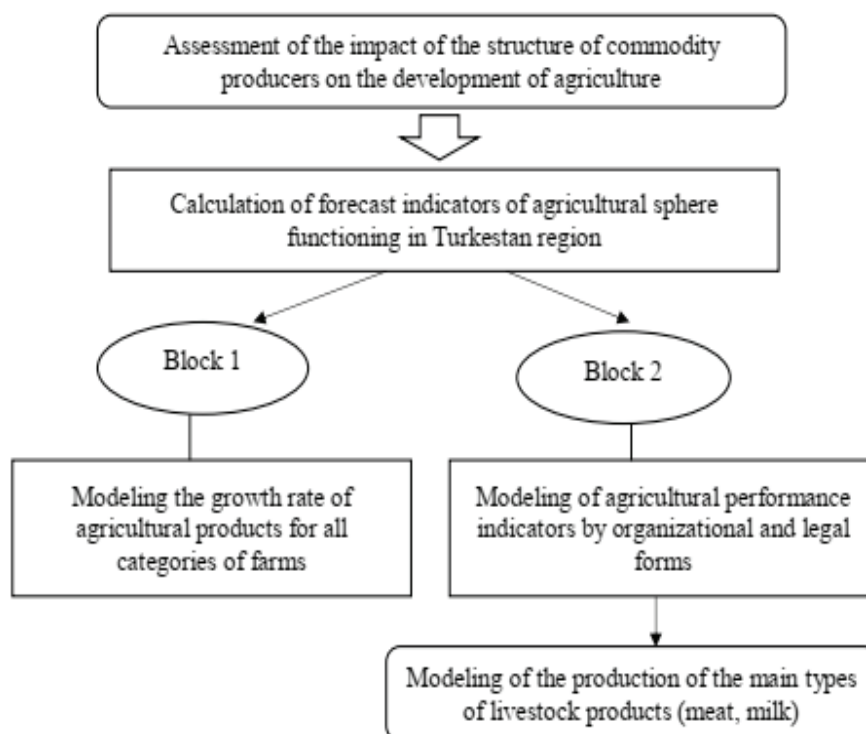The results of the application of the principal scheme of the methodology for analyzing the impact of the structure of commodity producers on the efficiency of agriculture in the Turkestan region will provide a deep understanding of the relationship between the type of economic entities and the economic productivity of the agricultural sector of the region. Figure 1 shows a diagram of the methodology for analyzing the impact of the structure of producers on the efficiency of agriculture in Turkestan region.

Figure 1 – Schematic diagram of the methodology for analyzing the impact of the structure
of commodity producers on the efficiency of agriculture in Turkestan region

Note: Compiled by the authors based on reference [14, 16].

It follows from Figure 1 that structurally the method consists of 2 blocks. The first block is modeling of indicators reflecting the efficiency of agriculture in all categories of farms in the region: a) model of agricultural production growth rate depending on growth rates of crop and livestock production; b) model of the growth rate of crop production depending on the growth rate of grain, potato and vegetable yields; c) model of the growth rate of livestock production depending on the growth rate of the average annual milk yield in agricultural enterprises (per cow) and the volume of livestock and poultry meat production. The second block is modeling of indicators characterizing the efficiency of the agricultural sphere in the context of agricultural enterprises: models of milk and meat production, etc.

It should be noted that the study of a set of indicators for assessing structural shifts (based on economic and mathematical models) makes it possible to determine the degree of change in advantages or threats in agricultural structures of the economy. The results of such an assessment can be used to optimize the agrarian structure in order to create new competitive advantages for agricultural products, agricultural producers, and rural areas.

Implementation of the first block of the methodology (using the example of agricultural enterprises of Turkestan region of the Republic of Kazakhstan in the period 2013–2023) [13], made it possible to build 3 models of dependence of the growth rate of agricultural products, including livestock, on the indicators of technological efficiency of industries (the average annual milk yield per cow in agricultural organizations and the volume of livestock and poultry meat produced per slaughter weight – for the livestock industry). Table 5 shows the growth rate model of livestock production in the study region.

Table 5 – Model of growth rate of livestock production in Turkestan region

Model	Correlation coefficient	Coefficient of determination	Average approximation error,%
Model 1: $Y = -43,895 + 0,0592x_1 + 0,41x_2 - 6,7x_3 - 0,226x_4 - 0,743x_5 - 0,18x_6$ where Y - livestock production growth rate (% y-o-y); x_1 - average annual milk yield per dairy cow in agricultural enterprises (per cow), kg; x_2 - average annual yield of eggs per laying hen, pieces; x_3 - average annual wool cut per sheep, kg; x_4 - average weight of one cattle head, kg; x_5 - average live weight of one head of sheep and goats, kg; x_6 - volume of livestock and poultry meat production, thousand tons.	0,879	0,775	23,68
Note: Compiled by the authors based on reference [15, 16].			

It follows from table 5 that the correlation coefficient of the growth rate of livestock production – 0,879, the coefficient of determination – 0,775, and as a result, the average approximation error – 23,68% [14].

The implementation of the second block of the methodology for analyzing the impact of the structure of commodity producers on the efficiency of agriculture in Turkestan region is aimed at solving the problem of taking into account both the sectoral features inherent in agricultural production and the type of organizational and legal form of management [15]. As part of the testing of the proposed methodology, we have built econometric models in which the most correlating factors in animal husbandry are connected – the volume of production of a certain type of animal products and the number of livestock. Table 6 shows the production model of the main types of livestock products.

Table 6 – Production models of the main types of livestock products

Model	Correlation coefficient	Coefficient of determination	Average approximation error,%
Model 2: $Y = 438,29 + 0,46x$ where Y - amount of milk produced per year, thousand tons; x - average annual number of dairy herd cows, thousand heads;	0,98	0,91	1,43
Model 3: $Y = 361,005 + 2,098x$ где Y - number of cattle, thousand heads; x - number of calves, thousand heads;	0,87	0,78	5,76
Model 4: $Y = 255,98 - 0,009x$ где Y - eggs, million pieces; x - laying hens, thousand heads;	0,71	0,51	14,87

Continuation of table 6

Model 5: $Y = 15,95 + 2,7x$ где Y - number of horses, thousand heads; x - number of foals, thousand heads;	0,97	0,94	2,76
Model 6: $Y = 403,07 + 3,575x$ где Y - number of sheep and goats, thousand heads; x - number of lambs and kids, thousand heads	0,96	0,93	2,02
Note: Compiled by the authors based on reference [14, 16].			

It follows from table 6 that the obtained models reflect the dependence of the volume of production on the volume of resources put into production for agricultural enterprises of Turkestan region characteristic of the time interval under consideration. The array of initial information is built on the basis of data from annual reports of selected sets of agricultural enterprises of Turkestan region. Correlation coefficients R of the obtained models are contained in the interval correlation coefficients – [0,6 and 0,9], which indicates a strong relationship between the selected features.

Thus, the found correlation relationships quite accurately reflect real data, i.e. their further use in the method of analyzing the influence of the structure of commodity producers on the efficiency of agriculture will allow to obtain an adequate reflection of the process of production and economic activity of most farms belonging to the agricultural sector of Turkestan region. This will allow not only to give an objective assessment of the state of the economy at the time of the study, but also to analyze the ways of its possible development, assuming the adoption of some new structural strategy or adjustment of the old one.

The model of profitability of agricultural production for enterprises in the region should be built in the form of a multiplicative model of the form [16]:

$$B = a_0 \cdot K^{a_1} \cdot L^{a_2} \cdot S^{a_3} \qquad (1)$$

where B - level of profitability of livestock production, %;

K - investments in fixed assets of agriculture, mln tenge;

L - average annual number of employees, person;

S - arable land area, ha.

Using the MS Excel analysis package, we obtain estimates of unknown parameters for the model of the form. The calculation results are summarized in table 7.

Table 7 – Summary of the multiplier model of the level of profitability of livestock production in agricultural enterprises of Turkestan region

Model	Correlation coefficient	Coefficient of determination	Average approximation error,%
Model 7: $B = 0,000017 \cdot K^{0,009} \cdot L^{0,398} \cdot S^{2,49}$	0,9	0,87	8,48
Note: Compiled by the authors based on reference [15, 16].			

It follows from the table 7 that the developed multiplier model of the profitability level of livestock production in the region has a correlation coefficient – 0,9, a determination coefficient – 0,87 and an average approximation error – 8,48%.

Thus, firstly, we have formed a set of models that adequately reflect the significant resulting indicators of agricultural enterprises of Turkestan region, and, therefore, suitable for forecasting and

assessing the development of the agrarian structure depending on the variation of the input parameters of the constructed models. Secondly, the proposed methodology for analyzing the impact of the structure of commodity producers on the efficiency of agriculture in the region makes it possible to assess their potential and real opportunities in the context of solving the problem of increasing the efficiency of the regional agricultural sector, and, therefore, can be used as one of the tools for forming goals, objectives and priority areas of agricultural structural policy at the meso level [17, 18].

During the study, commodity producers were divided into large agricultural holdings, farms and personal subsidiary plots, which revealed the unique characteristics and influence of each group on key performance indicators. The application of econometric models yielded the following results: 1) large agricultural holdings showed high productivity and profitability indicators, due to access to modern technologies, investments and opportunities for diversification. Their presence contributes to the modernization of the sector, but their influence is limited due to a small share in the overall structure of producers; 2) medium-scale farms have growth potential but face challenges in accessing credit resources and innovative technologies, which constrains their contribution to the overall economic outcome. Econometric analysis revealed a positive relationship between increased access to subsidies and productivity growth in this group; 3) personal subsidiary farms remain a significant source of production and employment, but their low productivity and limited resources reduce the overall level of agricultural efficiency. Supporting cooperation and optimizing resource availability can increase their contribution to the economy [19].

In addition, the analysis showed that support structures and forms of government support, such as subsidies and loans, have a significant impact on improving productivity in small and medium-sized farms [20]. Based on the data obtained, recommendations have been developed to change the structure of support for producers, which will increase the sustainability and competitiveness of agriculture in Turkestan region.

Conclusion

An econometric analysis of the impact of the structure of commodity producers on the efficiency of agriculture in Turkestan region showed that the nature and scale of economic entities have a significant impact on productivity, innovative development and sustainability of the agricultural sector. The study revealed that each group of producers - large agricultural holdings, medium-sized farms and personal subsidiary plots – has its own characteristics and limiting factors that affect the economic indicators of the region in different ways. Agricultural holdings, thanks to access to investment and modern technologies, demonstrate high productivity and sustainable growth. However, their share in the structure of producers remains relatively low, which limits their overall contribution to the development of the sector. Medium-scale farms, despite their potential for growth, face challenges in accessing finance and technology, limiting their competitiveness and hindering development. Personal subsidiary plots, which make up a significant part of the region's agricultural producers, are characterized by low productivity and limited opportunities for modernization, which requires active assistance and support from the state.

The main conclusions of the study indicate the need for an integrated approach to the transformation of the structure of producers in order to increase the efficiency of agriculture in Turkestan region. One key recommendation is to expand support measures for farms and personal subsidiary farms, including improved access to subsidies, credit and training in innovative practices. These measures can strengthen the position of small and medium-sized producers and increase their contribution to the sustainable development of agriculture in the region. The introduction of cooperation programs and the promotion of the integration of small farms can also significantly increase their economic effect and reduce the burden on the financial system of the region.

Thus, the results of this study emphasize the importance of a diversified approach to agricultural development, which takes into account the characteristics and needs of each type of commodity producer. Econometric analysis confirmed that a change in the structure of producers towards a more balanced distribution between large, medium and small producers will contribute to an increase in the overall productivity and stability of the agricultural sector of Turkestan region.

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ТҮРКІСТАН ОБЛЫСЫНЫҢ АУЫЛ ШАРУАШЫЛЫҒЫ ТИІМДІЛІГІНЕ ТАУАР ӨНДІРУШІЛЕР ҚҰРЫЛЫМЫНЫҢ ӘСЕРІН ЭКОНОМЕТРИКАЛЫҚ ТАЛДАУ

Аңдатпа
Бұл зерттеудің мақсаты – өңірдегі аграрлық саясатты жақсарту бойынша ұсыныстарды тұжырымдауға мүмкіндік беретін эконометрикалық модельдерді пайдалана отырып, Түркістан облысының ауыл шаруашылығының тиімділігіне шаруашылықтың әртүрлі нысандарының әсерін анықтау. Зерттеу гипотезасы. Тауар өндірушілердің құрылымы Түркістан облысының ауыл шаруашылығының тиімділігіне айтарлықтай әсер етеді деп болжануда. Атап айтқанда, ірі аграрлық кәсіпорындар өндіріс ауқымы мен жетілдірілген технологияларға қол жетімділіктің арқасында жоғары өнімділік пен экономикалық тиімділікті көрсетеді. Сонымен қатар, фермерлер мен шағын шаруашылықтар өндірістің әртүрлілігіне және аграрлық экономиканың тұрақтылығына маңызды үлес қоса алады, бірақ олардың тиімділігі қаржылық және техникалық ресурстарға жеткіліксіз қол жетімділікпен шектелуі мүмкін. Зерттеу барысында авторлар отандық және шетелдік зерт-теушілердің әдеби шолу әдістерін, статистикалық әдісті, экономикалық-математикалық әдісті, модельдеуді және т.б. қолданды. Зерттеудің нәтижесі шағын және орта шаруашылықтарды олардың бәсекеге қабілеттілігін арттыру үшін қолдау шараларын қоса алғанда, өңірдің ауыл шаруашылығы құрылымын оңтайландыру жөніндегі ұсыныстарды әзірлеу, сондай-ақ тауар өндірушілер арасындағы ресурстар мен технологияларға қолжетімділігін жақсарту үшін кооперацияны дамыту болып табылады.

Тірек сөздер: эконометрикалық талдау, тауар өндірушілердің құрылымы, кооперация, агроөнеркәсіп, фермерлік шаруашылықтар, мал шаруашылығы, ауыл шаруашылығы.

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ЭКОНОМЕТРИЧЕСКИЙ АНАЛИЗ ВЛИЯНИЯ СТРУКТУРЫ ТОВАРОПРОИЗВОДИТЕЛЕЙ НА ЭФФЕКТИВНОСТЬ СЕЛЬСКОГО ХОЗЯЙСТВА ТУРКЕСТАНСКОЙ ОБЛАСТИ

Аннотация

Цель данного исследования – определить влияние различных форм хозяйствования на эффективность сельского хозяйства Туркестанской области, используя эконометрические модели, что позволит сформулировать предложения по улучшению аграрной политики в регионе. Гипотеза исследования. Предполагается, что структура товаропроизводителей оказывает значительное влияние на эффективность сельского хозяйства Туркестанской области. В частности, более крупные аграрные предприятия демонстрируют высокую производительность и экономическую эффективность благодаря масштабам производства и доступу к более совершенным технологиям. В то же время фермерские и мелкие хозяйства могут вносить важный вклад в разнообразие производства и устойчивость аграрной экономики, однако их эффективность может быть ограничена недостаточным доступом к финансовым и техническим ресурсам. В ходе исследования авторы использовали методы литературного обозрения отечественных и зарубежных исследователей, статистический метод, экономико-математический метод, моделирование и др. Результатом исследования является разработка предложений по оптимизации структуры сельского хозяйства региона, включая меры поддержки мелких и средних хозяйств для повышения их конкурентоспособности, а также развитие кооперации между товаропроизводителями для улучшения их доступа к ресурсам и технологиям.

Ключевые слова: эконометрический анализ, структура товаропроизводителей, кооперация, агропредприятия, фермерские хозяйства, животноводство, сельское хозяйство.