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ECONOMETRIC ANALYSIS OF THE ACTIVITIES OF MULTI-SECTORAL FARMS

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Abstract:

Objective. Studies show that the demand for food products is expected to increase by 60 percent by 2050. This poses a serious challenge to agriculture and food systems around the world in the face of climate change, limited natural resources and the emergence of new types of demand. In developing countries, it is observed that small producers play a leading role as producers of most of the food to meet the needs.

Results. Indeed, in Asian countries, small producers play a crucial role in meeting the demand for food. This is especially true during the Green Economy, when small farmers began to adopt new techniques, increase productivity, and produce enough food to lower and stabilize real consumer prices of staple foods. In rural areas, the demand for labor has increased, jobs have been created for the poor rural population, and their wages are increasing. A combination of these factors helped ensure food security for all.

The progress made in the last 20-40 years is based on the work of small producers **[1].** During the same period, small farmers tended to be more efficient than large farms. In the future, small producers may be more efficient in producing labor-intensive products.

Conclusion. The world food system will face unprecedented pressure from a variety of factors over the next 40 years. In terms of consumption, the world population is expected to increase from approximately seven billion today to eight billion by 2030 and nine billion by 2050.

Keywords: agriculture and food systems, lower and stabilize real consumer, , small producers, agricultural products, animal husbandry.

Introduction. In the meantime, many people are expected to live more prosperous lives, creating a demand for high-quality varieties that require additional resources to produce (Table 1) [2].

Table 1

The main indicators of the agricultural economy

Indicators	2000	2005	2010	2015	2016	2017	2018
Agricultural products, bln. soum	1387.2	5978.3	30856.7	99604.6	115599.2	148199,3	192699.2
Agricultural crops cultivated area, thousand hectares	3778.3	3647.5	3708.4	3694.2	3706.7	3474,5	3396.0
Agriculture, bln. soum	696.8	3323.1	18119.0	55429.2	61755.1	83303,4	102495.1
Animal husbandry, billion soum	690.4	2655.2	12737.7	44175.4	53844.1	64895.9	90204.1

From the data of Table 1, it can be seen that in 2000, 1387.2 bln. 50.2 percent of the output is 696.8 billion soums. agriculture and 49.8 percent of 690.4 billion soums. 3778.3 thousand soums of livestock products were produced in the state where agricultural crops were cultivated.

By 2018, agricultural output will increase by 38.9 times compared to 2000 to 192,699.2 billion. amounted to soum. Agriculture is 53.2 percent 83303.4 billion. soums and livestock products 46.8 percent 64895.9 billion. amounted to soum. At this time, the cultivated area of agricultural crops decreased by 382.3 hectares in 2018 compared to 2000, and the achievement of such a positive result indicates that effective production was established mainly through intensive development, that is, on the basis of land reclamation and efficient use of water.

Methods. The article uses methods such as statistical analysis, monographic observation, induction and deduction, abstract reasoning, economic and mathematical modeling, expert and rating assessment.

Results. The main reason for the low profitability and profitable activity of agricultural enterprises is the development of production at the expense of own accounts and appropriated funds, the reduction of investments, the low wages of employees of agricultural enterprises, and the differences in the prices of products sold in agricultural products and industrial products. In many agricultural enterprises, production profitability is related to low wages of employees. This factor is almost crucial to maintain profitability for most of the farms in the region. If the farm is multi-sectoral, then it should be distinguished by the fact that the accounts of these farms have much more funds compared to a regular farm and the possibility of using these funds for the intended purpose.

Discussions. This, in turn, plays an important role in motivating employees and increasing their enthusiasm for work, as well as ensuring product competitiveness. In order to improve the social conditions of the rural population, to increase their well-

being, to increase human potential, to motivate them to work, employees in the agricultural sector require an increase in wages.

Of course, the increase in wages and the associated additional tax burden will reduce the profitability of the industry. This is especially noticeable in areas with less favorable conditions for agriculture. According to the results of the research, it was observed that after the establishment of multi-sectoral farms, the possibility of overcoming social problems between increasing wages and possible negative consequences in agriculture (decrease in the profitability of agricultural production and weakening of its position in the competitive struggle) increased.

Based on the organization of multi-sectoral farms, it will be possible to organize agricultural products processing, cooperation with neighboring agricultural enterprises and other additional complex structures managed by agricultural producers.

In order to further increase the activities of multi-sector farms, marketing services can be formed to sell the produced products in urban or business structures. The use of this principle in public-private sector cooperation provides the following opportunities:

increase the profitability (income) of multi-branch farms;

strengthening the relations of multi-branch farms, households and peasant (farmer) households and increasing the volume of product sales;

increase the real income and employment of the rural population.

It is possible to solve the problem that arises in the development of rural areas (increasing the income of the population, ensuring employment, etc.) through the sufficiently effective organization of multi-branch farms, and in this regard, first of all, it is necessary to train highly qualified personnel and improve the qualifications of farm managers.

Based on the results of the analysis, it is necessary to implement a number of priority tasks in order to increase the efficiency of multi-branch farms. Including:

balancing the use of agricultural land;

increasing the productivity of agricultural products;

maximum use of export opportunities for agricultural development;

increase the efficiency of the use of budget funds for financing agriculture;

protection of land ownership rights of farms;

improvement of effective management mechanisms of multi-branch farms, development and implementation of modern management methods.

Along with the growth of the gross domestic product, development of its network structure is one of the urgent issues of today's era. In this sense, it is appropriate to study the influence of factors on the change in the volume of the gross product of farms of the Republic of Uzbekistan based on the scope of the research work, for this purpose, the volume of investment in agriculture as factors influencing farm product - Y - X1, population density in the area (per year, population per 1 sq. km). Real total income per capita - X2, the number of people employed in the network - X3 and the population density in the country (per year, the number of people per 1 sq. km) - X4 were selected and the econometric regression equation was determined and analyzed (Table 2).

Table 2

Correlation coefficient between the selected factors of the gross output of farms of the Republic of Uzbekistan

	Y	*X1*	*X2*	*X3*	*X4*
Y	1	-	-	-	-
X1	0,752336	1	-	-	-
X2	0,98506	0,787484	1	-	-
X3	0,897593	0,515908	0,79501	1	-
X4	0,957394	0,81823	0,954609	0,979945	1

According to the data of Table 2, it was found that all the factors are strongly connected with the resulting factor agricultural output, however, the country's population density (population per 1 sq. km per year) − X4 factor with other factors (r_(x1,x4) =0.81823,r_(x2,x4)=0.9546 and r_(x3,x4)=0.9799) r_(~_n,x_(n+1))>0.8 because it creates multicollinearity , in order to ensure the reliability and adequacy of the model, we exclude the factor of population density in the country in the study. Now, based on the selected indicators, we move from the variation of the measurement units to the logarithm and continue the process by defining the regression equation and using the Ewievs program to check its reliability and adequacy (Table 3).

Table 3

Criteria-based testing of regression equation coefficients and reliability

Dependent Variable: LNY
Method: Least Squares
Date: 12/03/20 Time: 12:32
Sample: 2000 2019
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNX1	0.442429	0.402704	1.098645655	0.0120
LNX2	2.192569	0.940448	2.331409073	0.0329
LNX3	0.039426	0.682030	0.057806841	0.0462
C	-13.44545	10.01737	-1.342123177	0.0094
			t_{jad}=2,119905285	

R-squared	0.959137	Mean dependent var	8.512908
Adjusted R-squared	0.951476	S.D. dependent var	2.030439
S.E. of regression	0.447270	Akaike info criterion	1.405550
Sum squared resid	3.200814	Schwarz criterion	1.604696
Log likelihood	-10.05550	Hannan-Quinn criter.	1.444425
F-statistic	125.1851	Durbin-Watson stat	1.845037
Prob(F-statistic)	0.000000	F_{jad}=3,238871522	

Based on the data of Table 3, it should be noted that the determined regression equation (1) is expressed as follows:

$$\mathbf{LnY=0,44LnX1+2,19LnX_2+0,04LnX_3-13,454445} \quad \mathbf{(1)}$$

We can exponentiate this logarithmic equation (1) to bring it to a linear equation, and according to it, the logarithmic equation (1) will look like this:

$$Y = \frac{X1^{0,44} * X2^{2,19} * X3^{0,04}}{e^{13,454445}} \quad \mathbf{(2)}$$

We check the significance of the determined equation (2) ∝=0.05 for the case Fjad=3,239 when k1=3, k2=16. According to the data in the table, the regression equation (2) determined by the fact that Fhis=125.2 and Fhis>Fcondition is fulfilled is significant, but (tjad=2.12>tx1=1.0986; tx3=0.058) according to tjad>this condition MAPE this parameter We check with the criteria <10 and TIC<1 (Fig. 1).

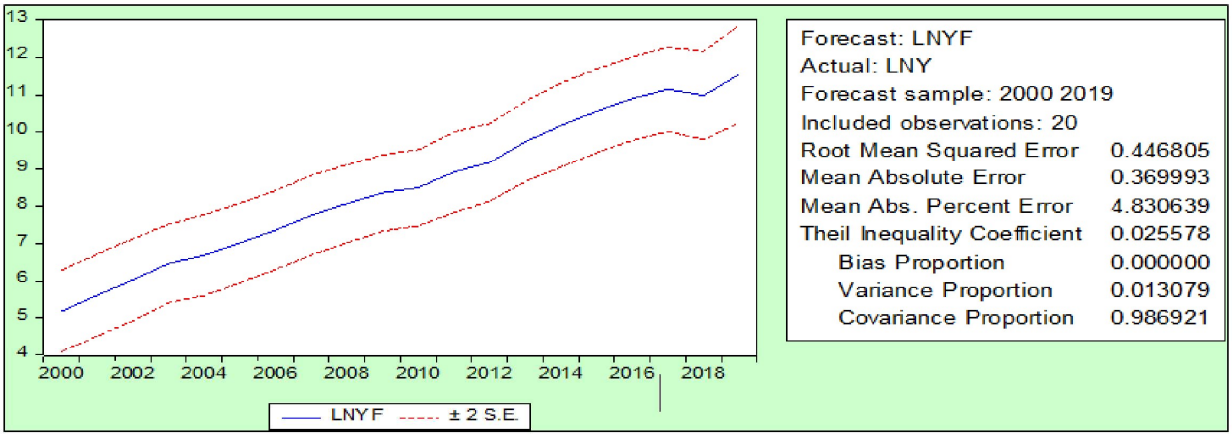

Figure 1. Assessing the retrospective predictive quality of a variable

According to the condition, - due to the good accuracy of the forecast and using MAPE=4.83<10 and TIC=0.026<1, parameters X1 and X3 were also proved to be significant, and model (2) determined from DW=1.85≤2 was reliable and adequacy arises.

According to regression equation (2), 1 bln. increase to 0.6 billion sums of the gross output of farms. to soums, increasing the total real income per capita by 5.6 million soums. 15.8 mln. per soum and by increasing the number of items in the network by one unit. it was found that it is possible to increase it to soum.

Now, in Namangan region, which is the object of the research, the factors affecting the gross output of farms-Y are the number of people employed on the farm - X1, the area of agricultural crops - X2, real total income per capita - X3 and the population density in the area (per year, 1 sq. .population per km)− we will continue the research on X4. According to its results, the following were determined (Table 3).

Table 3

Correlation coefficient between factors of the agricultural product of Namangan region

	Y	*X1*	*X2*	*X3*	*X4*
Y	1	-	-	-	-
X1	0,884914	1	-	-	-
X2	0,794147	0,524794	1	-	-
X3	0,894589	0,798956	0,525572	-	-
X4	0,98861	0,927926	0,881338	0,936035	1

Based on the information in the table, all the factors selected for the volume of agricultural products are strongly connected and the population density in the area (per year, population per 1 sq.km) with other factors (r_(x1,x4)=0.9279,r_(x2, x4)=0.8813 and r_(x3,x4)=0.9360) created multicollinearity under the condition r_(x_ ~~,x_(n+1))>0.8. According to it, we continue to determine the regression equation with the remaining factors, population density (population per 1 sq. km per year)− X4. It should be noted that since the measurement units of the selected factors are different, we logarithmize all indicators, and this, in turn, determines the regression equation will not have a linear form. For the regression equation, it is first required to check the coefficients and their reliability and significance, which is done using the Ewievs program (Table 4).

Table 4

Regression equation coefficients and test results for reliability criteria

Dependent Variable: LNY

Method: Least Squares

Date: 12/02/20 Time: 15:15

Sample: 2000 2019

Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNX1	1.089575	3.61693	0.301243	0.0537
LNX2	0.798733	9,14803	0.087312	0.0319
LNX3	1.241637	0.40453	3.069332	0.0075
C	-13.0831	55.7804	-0.23455	0.0452
			t_{jad}=2.119905	

R-squared	0.989727	Mean dependent var	11.32019
Adjusted R-squared	0.987801	S.D. dependent var	1.545551
S.E. of regression	0.170705	Akaike info criterion	-1.520907
Sum squared resid	0.466241	Schwarz criterion	-1.321761
Log likelihood	9.209074	Hannan-Quinn criter.	-1.482032
F-statistic	513.8349	Durbin-Watson stat	1.9292811
Prob(F-statistic)	0.000000	F_{jad}=3.006917	

According to the table, the defined regression equation (3) looks like this:

LnY=1,089575LnX1+0,798733LnX2+1,241637LnX3-13,0831 **(3)**

We can exponentiate this defined logarithmic equation according to the accuracy of calculations and the rule of use. Then the regression equation (3) is:

$$Y = \frac{X1^{1,0896} * X2^{0,798} * X3^{1,242}}{e^{13,083086}} \quad (4)$$

will have an appearance. Now we check the significance of the coefficients of equation (4) according to the Student's test. It is known that tjad=2.119905 when ∝=0.05 and df=16, and only tx3=3.069 parameter is significant in this model.

According to the condition, MAPE<10, and according to the conditions MAPE=1.236<10 and TIC=0.0067<1, all the investigated parameters were proved to be significant. Now we test the significance of this regression equation according to Fisher's test. When the result is k1=3, k2=16, Fjad=3.006917, according to the table, it is equal to Fhis=513.8 and since the condition Fhis>Fjad is fulfilled, the regression equation (4) is significant and the model determined from DW=1.929≤2 is reliable and adequate. comes out.

Conclusion. According to the regression equation (4), at present, by increasing the employment of the population in the farms of Namangan region by one unit, the land area by one hectare, and the real total income per capita by one thousand soums, the volume of farm products will be 15.9 million, respectively. 39.1 million soums. soums and 0.15 mln. the possibility of an additional increase to soum was determined.

In conclusion, the consistent implementation of these tasks will serve to develop production capabilities and increase the synergistic efficiency of farmers and multi-sectoral farms, as well as the integration of agricultural cooperatives in the framework of joining the World Trade Organization and encouraging cooperation and cooperation with agribusinesses and exporters.

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PROSPECTS FOR THE DEVELOPMENT OF SMALL AND MEDIUM BUSINESS IN NAMANGAN REGION

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Abstract:

Objective. The purpose of the study is to analyze the five-year development of small and medium-sized businesses in Namangan region, and determine the future development prospects of the region.

Methods. Methods such as synthesis, scientific knowledge, statistical analysis, factor analysis, comparison, comparison were used in the research process.

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