International Journal of Modern Agriculture
ISSN: 2305-7246
Volume 10 Issue 1, Month 2021

Econometrical Assessment of Factors Affecting Diversification of Production in Farms Ensuring Food Security

Jamshid SharafetdinovichTukhtabaev[1]
+99891-5409939jamshidtukhtabaev@gmail.com

Gulnoza ToxirovnaSamiyeva[2]
+99897-2791881samieva_g@mail.ru

Suratjon AbdullayevichTashnazarov[3]
+99893-7225786s_toshnazarov@mail.ru

Dilafruz BaymamatovnaTaylakova[4]
+998 90-6723225dilafruz_t@mail.ru

Khurshid UralovichChuyanov[5]
+99891-9593214chuyanov_x@gmail.com

Tashkent State University of Economics (TSUE), Tashkent, Republic of Uzbekistan[1,2,3,4,5.]

Abstract.This article reflects the essence, goals and objectives of diversification of production in farms of the Republic of Uzbekistan, the need for the development of farms through diversification to ensure food needs and food security of the country. Also, identified the factors influencing diversification to ensure food security, developed a multivariate model to calculate their impact and analyze "correlation" and "regression" based on SPSS Statistics (Statistical Package for the Social Sciences), which is widely used in mathematical modeling. The indicators for forecasting the production of additional agricultural products using exponential and level functions have been developed and scientific recommendations for their achievement have been given.

Keywords:food sustainability, farms, landowners, diversification, non-food production, modeling, correlation, regression.

1. Introduction

Food development is one of the most important issues in increasing global production and protecting the consumer market. Indeed, "... more than 840 million people in the world, or each one out of nine people, are currently malnourished, and more than 30 percent of the world's population suffers from malnutrition" [1]. Therefore, the issue of food security is becoming more acute from year to year on the basis of mitigating the gap between the limited opportunities to increase agricultural production in accordance with the medical norms per capita.

Due to the high role of farms in maintaining the stability of food supply in the Republic of Uzbekistan, large-scale reforms are being carried out to develop these businesses. However, "there are a number of problems and shortcomings in the reliable protection of the rights and legitimate interests of farmers and landowners, the introduction of market mechanisms in the system, ... the steady increase in agricultural production and efficient use of land are being observed" [2]. Therefore, issues such as "deepening structural reforms and consistent development of agricultural production, further strengthening of the country's food security, expanding the production of environmentally friendly products, significantly increasing the export potential of the agricultural sector" [3] have been identified as priorities. The implementation of these tasks show the need to develop agricultural activities on farms.

The high role of farms in improving the socio-economic well-being of the country makes it necessary to conduct research and analysis of scientific and practical problems in these areas. This is primarily due to their growing contribution to social issues such as employment and welfare. Therefore, S.A.Belozyorov [4], E.Budko [5], A.Bobok [6], A.Rasskazov [7], J.Sh.Tukhtabaev[8], P.N.Sizova [9], A.Oleynik [10], R.X.Husanov [11], B.T.Salimov [12], A.E.Absamatov [13], R.X.Ergashev [14] and others conducted scientific research in the study of the socio-economic essence of the farmer economy, the laws of its development, which are becoming increasingly important for the economy of the country as a business entity that is rapidly adapting to market relations.

Today, the rapidly growing demand of the population for agricultural products shows the need for diversification in agriculture as well. As a result of the diversification of agriculture, it is possible to achieve an increase in marketable agricultural products, processing, cooperation and increase the income of direct agricultural producers. It has been found in our research and analysis that economic efficiency can be achieved through diversification, even in farms that grow the most basic food products.

2. Methods

Econometric models are the main analytical tool in the study of issues related to the development of diversification of farms in our country. Econometric models not only provide a quantitative analysis of the production performance of these entities, but also to determine the composition of the factors influencing it and the scope of these factors, as well as they allow to form an econometric model of multivariate analysis and ultimately increase agricultural production.

The process of econometric modeling consists of building a model based on the initial observation of an object or process, distinguishing its functional features and characteristics, entering collected data, comparing modeling results with real data about the object, correcting and clarifying the model if necessary. The developed model should serve as an important tool for scientific understanding of the scale of the impact of factors influencing the diversification of agricultural production and the prospects for further increase in production. In developing a model of factor analysis, we form using the type of "multifactor model" of economic modeling. The multifactor model expands the possibility of modification and processing, taking into account the sequence of a group of factors, the relationships between the variables and indicators that affect the resulting character, while maintaining the logical structure of the factors represented, the scale of their impact. Based on this multifactor model, it consists of obtaining analytical information about the system being modeled and making the necessary decisions in the future. Given that the analysis of factors influencing the diversification of production in farms on the basis of the econometric model is a complex process and consists of a lot of economic and financial information, so, it was decided to conduct computational experiments on a personal computer.

We emphasize the importance of the following steps in the modeling of computational factor indicators:

- coordination of primary data for reliable and systematic assessment;
- grouping of factors influencing the diversification of agricultural production;
- ordering of comparable and complementary factor values;
- to determine the general trends of the resulting sign and the degree of structural changes of the associated variables;
- assessment of the correlation of economic and financial indicators with the resulting feature and related variables;
- express the results of multivariate analysis;
- development of a future model using the results of multifactor analysis.

The main purpose of the expression of these indicators is to identify the factors influencing the diversification of farm production and to develop scientific and practical recommendations on the final outcome of the analyzed process (figure 1).

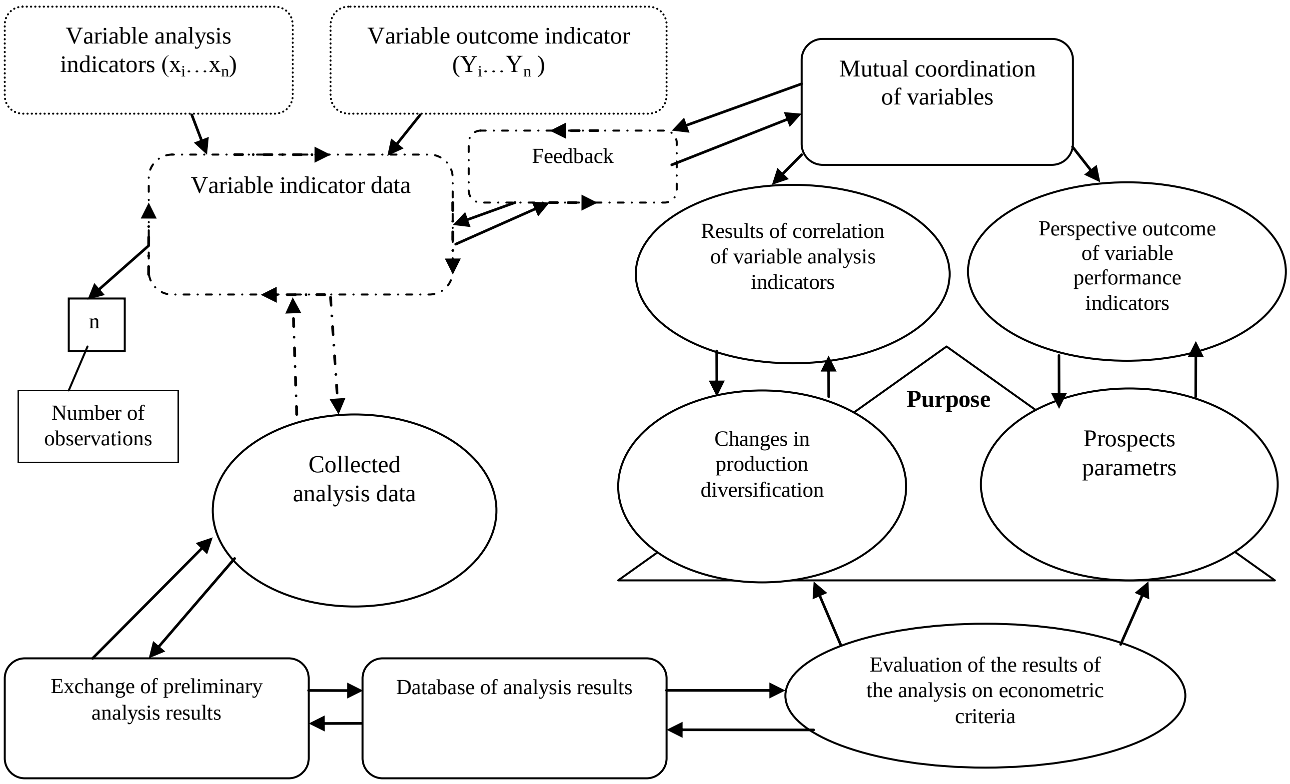

Figure 1.Model of multifactor analysis of diversification of farm production*

*Developed by the author.

In this model, the indicators required for factor analysis of production diversification are initially identified, these indicators are entered into a database, on the basis of which a database for factor analysis is formed. When obtaining the results of the analysis, information is exchanged between the database and the initial analysis data on the accuracy of the data. If the detected analysis results do not reflect the required analysis data (unreliability), the variables are re-entered into the database using the initial information exchange. The results of the analysis allow to coordinate the results of the analysis with the initial necessary indicators, expressing the degree of change of the variables and the prospects for increasing the resultant sign.

It is important to develop and implement effective economic and management decisions to increase agricultural production using a multi-factor analysis model to diversify farm production. Modern management systems require the use of reliable methods and tools to determine the future state and scale of economic processes and events. In the econometric assessment of the factors influencing the diversification of farm production through economic-mathematical methods allows to study the strength of the relationship of complex socio-economic phenomena, to determine their laws and to observe them experimentally. Currently, a large number of computer programs have been developed that speed up the process of applying these methods and allow the selection of a significant model of evaluation. We present the analysis of the following analysis using the SPSS program, which is widely used in mathematical modeling, as well as econometric analysis, i.e. correlation-regression analysis, and we have made extensive use of the scientific researches by Yo.Abdullaev [15], M.A.Ivanova [16], Ya.R.Magnus [17], who developed methods for improvement.

Based on the analysis of the increase in production in the activities of farms using correlation-regression analysis methods, the strength of the relationship between the factors and the direction of measures for the correct organization and regulation of production is determined taking into account each factor. In this case, the most important step in the construction of the model is the selection of an econometric expression that describes the dependence of the resulting, predicted indicator on the selected factors. The clearer and more detailed the prospects for diversification of farm production, the higher the level of effective management of achieving this result and ensuring its economic efficiency.

At present, the identification of factors influencing the diversification of farm production using correlation-regression methods, the forecasting of its development through the development of a multifactorial regression model is an urgent problem. Therefore, this study begins with the identification of all the factors influencing the diversification of farm production and the selection of the most important of them using correlation-regression methods.

Taking into account the nature of the growth rate of gross agricultural output and the specifics of the agricultural sector, using the analyzed economic results to create an econometric model of increasing the volume of agricultural production, the volume of gross agricultural output (bln. sum) - Y (t) was selected. The related variables that affect the outcome trait, i.e. the increase in production of important agricultural products: gross agricultural output, gross livestock production, the population employed on farms, the area attached to farms and other factors were selected (table 1):

Y - gross agricultural output (billion soums);
x_1 - gross agricultural output (at current prices, billion soums);
x_2 - total livestock production (billion soums);
x_3 - total number of farms (in thousands);
x_4 - population employed on farms (thousand people);
x_5 - crop area attached to farms, thousand hectares.

Table 1. Values of factors included in the correlation-regression analysis

Years	*Y*	X_1	X_2	X_3	X_4	X_5
2001	306.2	925.5	619.3	3243.6	1180.2	401.5
2003	653.2	2087.3	1434.1	3312.4	1205.5	404.1
2005	862.2	2867.8	2005.6	4377.1	1240.2	433.3
2007	1624.4	4698.7	3074.3	4631.7	1429.7	454.8
2009	2832.6	7367.3	4534.7	4703.4	1431.1	466.7
2011	6214.2	10468.9	4254.7	4773	1432.5	471.5
2013	6068.4	15474.2	9405.8	4716.3	1433.2	467.7
2015	10076.4	24067.3	13990.9	4690.5	1435.1	474.3
2017	13472.1	28067.2	25821.6	4780.4	1434.6	476.7
2019	16375.6	34125.6	31395.3	5089.8	1432.8	483.1

A multi-factor correlation-regression analysis method was used to determine the econometric model of factor dependence. The following econometric model (multivariate regression equation) was used to analyze the production efficiency indicators in the study:

$$y = \beta_0 + \sum_{i=1}^{m} \beta_i x_i \qquad (1)$$

Linear model, where β_0 is the free limit; *y* - is the share of farms in gross agricultural output; x_i - factors affecting the share of farms in gross agricultural output;

β_i - multifactor model parameters; (i = 1,2,3 ... n);

m - is the number of selected factors.

Given $y = f(x_1, x_2, ..., x_n)$, it is necessary to find the relationship. We use the least squares method to determine this relationship (table 2).

A feature of multivariate correlation is that several important factors are involved in its regression equation. It is important to choose the most important of these factors correctly and include them in the regression equation. It is based on a theoretical analysis in terms of factor selection and quality and this is done in three stages.

Table 2. Characters used in multivariate regression analysis

№	Denomination	Expression
1.	Constanta, free series	β_0
2.	Multifactor correlation coefficient	R^2
3.	Unknown parameters of themultivariate regression equation	$\beta_1, \beta_2,... \beta_k$
4.	Standard error of evaluation	The smaller the value, the more significant the model
5.	Determinationcoefficient	The model whose value is close to the number 1 is adequate
6.	F – Fisher coefficient	*If $F_{true}>F_{tabl}$ the determination coefficient is significant*
7.	P- value	(Criterion for the significance of the "zero" hypothesis) a value less than 0.05 is considered relevant model

In the initial analysis, the factors are selected unconditionally. In the second stage, they are analyzed using double correlation coefficients. To do this, a matrix of double correlation coefficients between the symbols y_1, x_1, x_2,..., x_n is constructed. In the third stage of factor analysis, the regression equation is determined and its parameters are evaluated on the basis of specific criteria. Correlation analysis methods can be used to determine the effect of these factors on the outcome mark. In this case, the double correlation coefficient is determined as follows:

$$r_{ij} = \frac{\left(\sum x_i x_j - \sum x_i \times \sum x_j / n\right)}{\sqrt{\left(\sum x_i^2 - \left(\sum x_i\right)^2 / n\right)\left(\sum x_j^2 - \left(\sum x_j\right)^2 / n\right)}} \quad (2)$$

To determine which factors should be included in the regression equation, we construct a matrix of double correlation coefficients between the factors (table 3). This method allows us to exclude from the econometric model being constructed factors that are repetitive and have a weaker relationship with the resulting factor.

Table 3. Matrix of mutual correlation coefficients of influencing factors

Factors	Y	X_1	X_2	X_3	X_4	X_5
Y	1.000	-	-	-	-	-
X_1	0.99	1.000	-	-	-	-
X_2	0.968	0.966	1.000	-	-	-
X_3	0.67	0.675	0.696	1.000	-	-
X_4	0.635	0.648	0.534	0.91	1.000	-
X_5	0.765	0.772	0.67	0.967	0.958	1.000

In the table 3, r_{ij}, x_i and x_j are the double correlation coefficient between the factors. It is well known that "in a multi-factor regression equation, strongly linearly correlated factors should not be present simultaneously" [15]. It can be seen from the table that the mutual correlation coefficient (r_{ij}) of the selected factors (x_i and x_j) is smaller than its critical value in absolute value, i.e. $<r_{kr}$. Therefore, in the study, it was planned to include all factors in the econometric model, with $r_{kr} = 0.9$ as the critical value of the correlation coefficient.

The most important step in the analysis of socio-economic development using the method of correlation-regression analysis is the selection of an econometric expression that describes the dependence of the outcome indicator on the selected factors. The quality, relevance and reliability of the structured econometric expression are evaluated on the basis of the following criteria:

1) the overall quality of the econometric model is assessed using a multi-factor correlation coefficient and a determination coefficient;

2) the significance of econometric models is assessed using the Fisher criterion and approximation error;

3) the significance of the parameters of the econometric model is assessed using the Styudent criterion.

Using the determination coefficient (R^2) to determine the overall quality of the determined regression equation, this value is calculated using the following formula:

$$R^2 = 1 - \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2} \qquad (3)$$

In this case:

y_i - observed values of the result indicator;

$\bar{y}$ - arithmetic mean of the result;

$\hat{y}$ - determined, projected, flattened quantities of the result indicator;

n - is the number of observations.

The coefficient of determination indicates the proportion of the variance of the resulting variable, which is explained by the influence of the determined model, i.e. the factors under consideration. This indicator takes values between "0" and "1". The closer its value is to the value "1", the more the factors included in the regression equation justify the actions of the resultant indicator.

The analysis of the significance of the identified model is performed by examining the "zero hypothesis". Represented as a "zero hypothesis", $H_0 : \beta_1' = \beta_2' = ... = \beta_k' = 0$ it represents the general significance of the regression coefficient. If the results of the analysis do not refute the "hypothesis of zero", then it is concluded that the effect of factors on the resultant indicator "y" is insignificant, $x_1, x_2, ..., x_k$ the overall quality of the regression equation is low. The "zero hypothesis" is tested using variance analysis, and the "zero hypothesis" is expressed as: $H_0: D_{fact} = D_{residue}$alternative hypothesis: $H_1: D_{fact} > D_{residue}$. The F-Fisher criterion is used to test these hypotheses.

In this case, the actual value of the criterion is determined by the following formula:

$$F = \frac{\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2 / k}{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2 / (n-k-1)} = \frac{R^2}{1-R^2} * \frac{(n-k-1)}{k} \quad (4)$$

Here: - $\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2 / k$ factor variance corresponding to one degree of freedom (number of degrees of freedom $\gamma 1 = k$); $\sum_{i=1}^{n}(y_i - \hat{y}_i)^2 / (n-k-1)$ - residual variance corresponding to one degree of freedom (number of degrees of freedom γ1 = n-k-1); n is the number of observations; k is the number of factors (parameters) in the multivariate regression equation.

F is the true value of the Fisher criterion (F_{true}) compared to the critical value of the criterion (F_{table} (a; k; n-k-1)). If $F_{true} > F_{table}$, then the defined model is significant.

3. Results

In the model shown in the table, the true value of the F-Fisher criterion is F_{true} = 69.64, and the number of degrees of freedom is γ1 = 5 in the figure and γ2 = 8 in the denominator. F_{table} = 2.73. So, our generated multifactor regression equation is significant (table 4).

Table 4. Criteria for checking the quality and importance of the model

Themultifactorcorrelation coefficient R	Thecoefficient of multi-factor determination is R-square	Corrected R-square	Standard error of evaluation	F-true	P-value	DW
0.994	0.988	0.974	2112.85	69.64	$3.96*10^{-4}$	1.95

The importance of individual parameters of multivariate regression in the analysis is assessed using the Styudent criterion (T-statistic). In this case, the actual value of the criterion is determined by the following formula:

$$t_{b_j} = \frac{b_j}{m_{b_j}} \quad \left(\text{ёки } t_a = \frac{a}{m_a} \right) \qquad (5)$$

Where: *bj (a)* - regression coefficients (parameters); m_{bj} (m_{aj}) is the default error of parameter b_j *(a).*

The t-statistic determined for the corresponding parameters of the regression equation by formula 5 is compared with the critical point |t|>t (*α*; *n-p*-1) of the Styudent's distribution. If |t|>t (*α*; *n-p*-1),the corresponding parameter is significant and the "zero hypothesis" expressed as $H_0{:}b_j=0$ or $H_0{:}a=0$ is rejected.

In addition, the significance of the parameters of the regression equation can be assessed by the following simple comparative analysis:

- if $|t| \le 1$, the regression coefficient is statistically insignificant;
- if $1 < |t| \le 2$, the regression coefficient is statistically significant;
- if $2 < |t| \le 3$, the regression coefficient is statistically significant;
- if $| t |> 3$, the regression coefficient is statistically significant. This idea applies to cases (n-p-1)> 20 and $\alpha \ge 0.05$

Hence, the factors included in the regression equation are considered to be highly significant, significant, relatively significant, and insignificant. Based on the results of the analysis, we highlighted the high-profile and significant factors included in our model (table 5).

Table 5. Significant factors included in the linear regression model

Significantfactors	Non-standardizedcoefficients		Standardized coefficients	t- criterion	P-quantity
	β	Defaulterror	B		
(Constant)	-32086.399	57175.019	-	-2.638	0.034
X_1	0.2287	778.743	-0.223	-1.741	0.125
X_2	0.1858	592.884	0.533	2.480	0.042

X_3	-3.290	0.016	0.216	0.933	0.382
X_4	-14.478	126.026	0.368	1.775	0.119
X_5	148.919	3206.002	0.084	0.309	0.767

In the studied processes, the presence of autocorrelation in the remnants of the resultant factor (y) series was checked. The Darbin-Watson (DW) criterion was used for this and was calculated according to the following formula:

$$DW = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2} \qquad (6)$$

The calculated DW is compared with the DW in the table. If there is no autocorrelation in the residuals of the resulting factor, then the value of the calculated DW criterion will be around 2. The value of the DW criterion calculated in our example is 1.95. This indicates that there is no autocorrelation in the resulting factor residues. Thus, the linear regression model developed by estimating the coefficient of the analysis results has the following form:

$$Y = -32086.399+0.2287\times X_1+0.1858\times X_2 - (-3.290) \times X_3-14.478\times X_4+148.919\times X_5$$

$$R^2 = 0.994;\ F_{true} = 69.64;\ DW = 1.95$$

4. Discussion

Analyzing the results of the identified factor analysis, the weight of R^2 in the total variance analysis is 99.4% (product production, Y (t)), which is the variational dependence of the analyzed factors, the remaining 0.6% forms random factors without taking into account the variational dependence. From this, it can be noted that the selected variables are the factors that directly affect the resulting character change. The change in the regression coefficient per unit of variable represents the average change in the resulting sign.

In constructing a prospective model of factors influencing the diversification of farm production using the above methods (using exponential and hierarchical function), the factors affecting gross agricultural output for X_1, X_2, X_3, X_4 and X_5we have created the following perspective model (table 6).

Table 6. Prospective models on the factors influencing the economic efficiency of farming

№	Model view	F - of the Fisher criterion calculated value
1.	$X_1=105.8t^2-232.6t+1258.1$	992.0
2.	$X_2=8.225t^3-97.14t^2+588.1t+323.5$	462.59
3.	$X_3=1.033t^3-39.36t^2+503.9t+2571$	92.0
4.	$X_4=-1.666t^2+48.07t+1106$	62.175
5.	$X_5=4.518t+408.1$	39.34

Using the results obtained using our regression analysis, it was possible to develop future prospects for the growth of gross agricultural output in the analyzed farm.

According to Table 6, the forecast parameters of each factor analyzed in 2021-2023 (table 7) and the change in gross agricultural output by summarizing them were calculated.

Table 7. Prospective indicators of factors involved in regression analysis [18]

Years	Y	X_1	X_2	X_3	X_4	X_5
2001	306.2	925.5	619.3	3243.6	1180.2	401.5
2003	653.2	2087.3	1434.1	3312.4	1205.5	404.1
2005	862.2	2867.8	2005.6	4377.1	1240.2	433.3
2007	1624.4	4698.7	3074.3	4631.7	1429.7	454.8
2009	2832.6	7367.3	4534.7	4703.4	1431.1	466.7
2011	6214.2	10468.9	4254.7	4773	1432.5	471.5
2013	6068.4	15474.2	9405.8	4716.3	1433.2	467.7
2015	10076.4	24067.3	13990.9	4690.5	1435.1	474.3
2017	13472.1	28067.2	25821.6	4780.4	1434.6	476.7
2019	16375.6	34125.6	31395.3	5089.8	1432.8	483.1
2020	21009.7	38926.1	39029.5	5169.0	1401	498.5
2021*	**23576.8**	**43031.3**	**46006.6**	**5361.8**	**1380.8**	**503.0**
2022*	**26227.7**	**47348.1**	**53825.7**	**5605.9**	**1357.2**	**507.5**
2023*	**28951.3**	**51876.5**	**62536.3**	**5907.8**	**1330.3**	**512.0**

It can be seen from Table 7 that in 2023, compared to 2011, the gross agricultural output (non-traditional livestock and agricultural products) will increase by 4.9 times, gross livestock production by 14.7 times, the number of farms by 123.8%. The area under crops will increase by 108.6%, while the number of people employed in farms will decrease by 7.1 thousand people.

According to the data in this table, all the main productivity indicators of farms have a growth rate (figure 2). That is, according to the analysis, the volume of agricultural production in 2023 is expected to increase by 1.76 times compared to 2019, the number of farms will increase by 1.16 times. Accordingly, the area of land for farms in 2023 will need to increase by 1.06 times compared to 2017.

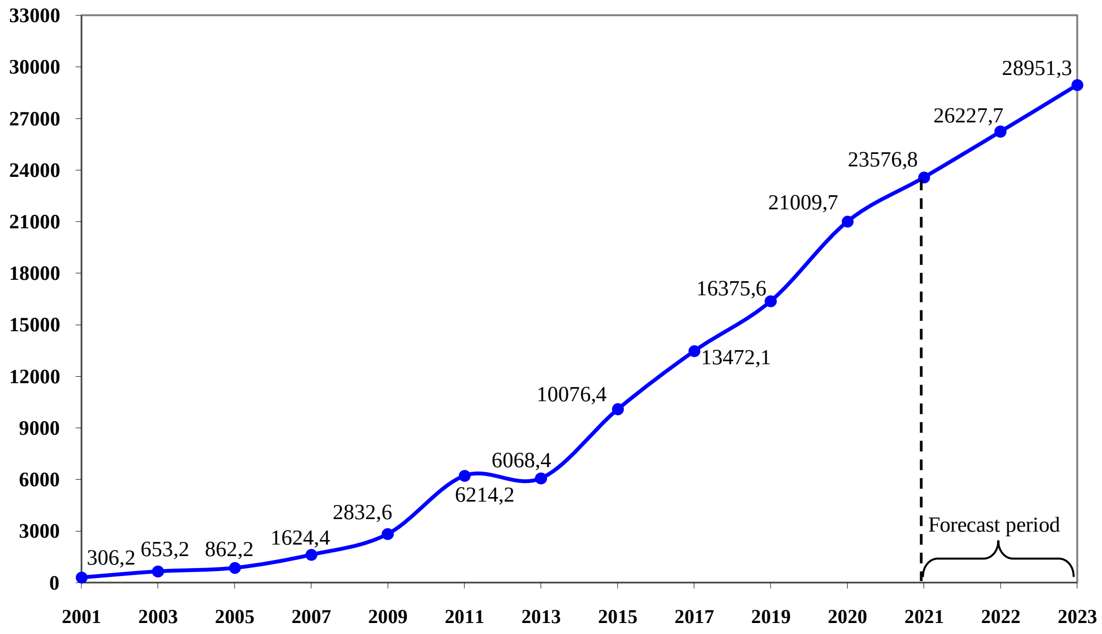

Figure 2. Prospects for the efficiency of farms in the Republic of Uzbekistan

The rapid development of non-traditional livestock and farming in farms is primarily the result of targeted measures taken in our country to develop this sector. In particular, it was predicted that the number of camels in farms specializing in the development of camel breeding will increase by 874 by 2023 or 1.7 times compared to 2019, by 1.1 times in horse breeding, by 3.6 times by goats, by 1.7 times by rabbits and by 3.8 times by ostriches. In the future, in non-traditional agriculture, the total area under medicinal plants in 2023 will be 3028.6 hectares, which is 2.6 times more than in 2019, including the area under artichokes – 1.6 times, watermelon – 1.3 times, anzur onion 1.2 times, retail 1.4 times, bitter almonds 1.4 times, and brier 1.2 times.

5. Conclusions

Using the results of the above multifactor analysis, it will be possible to determine the prospects for the growth of gross agricultural output in farms and to do scientific analysis. On this basis, it will serve as a scientific basis for the development of effective organizational and economic decisions for the further diversification of agricultural production.

In the future, it would be expedient if the development of effective organizational and economic decisions to increase the efficiency of crop production on farms is organized on a scientific basis, with the recommendations of experienced farmers and landowners. Also, the future development of the market, the innovative approach to providing products to consumers is associated with product diversification. Product diversification serves to provide the market with a wide range of goods and services. As a result of agricultural diversification, it is possible to produce additional agricultural products in line with market demand, establish non-traditional livestock and agricultural production, processing, cooperative relations and increase incomes of new agricultural producers and create new jobs.

References

[1] www.fao.org – data from the official website of the International Food and Agriculture Organization.
[2] Decree of the President of the Republic of Uzbekistan PD-5199 of October 9, 2017 "On measures to protect the rights and legitimate interests of farmers, dehkan farms and landowners, to radically improve the system of efficient use of agricultural land".
[3] Decree of the President of the Republic of Uzbekistan PD-4947 of February 7, 2017"On the Action Strategy for further development of the Republic of Uzbekistan".
[4] Belozerov S.A."Household finances: essence, structure, management".Author's abstract.diss.econ.sciences.-St. Petersburg, 2006. – p. 35.
[5] Budko E. "Cash incomes of the rural population: Analysis and growth prospects". International agricultural journal. – M., № 1, 2008. – pp. 25-26.
[6] Bobok A. "Develop small forms of management". Agro-industrial complex: economics, management. - Moscow, № 9, 2008. – pp. 36-37.
[7] Rasskazov A. "State support for households". Economy of agriculture in Russia. - Moscow, № 8. 2005. – p. 21.
[8] Tukhtabaev J.Sh. Econometric Evaluation of Influential Factors to Increasing Labor Efficiency in Textile Enterprises. Webology, Volume 18, Special Issue on Information Retrieval and Web Search, 2021.
[9] Sizova P.N. "Development of peasant (farmer) households in the regions of Russia". Agrarian science. - Moscow, № 6. 2009.
[10] Oleinik A. "Households in a transitional economy: types and characteristics of behavior in the market". Economic Issues, № 12. 1998. – pp. 56-66.
[11] Husanov R.X., Qosimov M.Ch. "Scientific and practical bases of farming". - T.: Cholpon, 2010. – p. 104.
[12] Salimov B.T., Berkinov B., Hakimov R. "Peasant and farm economics". - T.: TSUE, 2004.
[13] Absamatov A.E. "Ways to stimulate the development of farms and increase incomes". Author's abstract dis.econom.sciences. - T., 2004.– p. 24.
[14] Ergashev R.X., Shoxujaeva Z.S. "Peasant and farm economics". - T.: Economics and Finance, 2016.– p. 468.
[15] Abdullaev Yo. "General Theory of Statistics". - T.: "Science", 1993. – p. 240.
[16] Ivanova M.A. "Economic statistics". – Moscow.: "INFRA", 2000. – p. 210.
[17] Magnus Ya.R., Katyshev P.K., Peresetskiy A.A. "Econometrics". -M., 2005. – p. 499.
[18] Bulletin of the State Statistics Committee of the Republic of Uzbekistan for 2000-2019 years.