SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal
Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2018 **Issue:** 08 **Volume:** 64

Published: 02.08.2018 http://T-Science.org

Abrai Allayarovich Khasanov
PhD student of Termiz State University,
Termez, Republic of Uzbekistan

SECTION 31. Economic research, finance, innovation, risk management.

FORECASTING AND MULTIFACTOR REGISTRATION ANALYSIS OF MAIN CATTLE SPECIES PRODUCTION AT THE SURKHANDARYAN REGION

Abstract: *The article deals with the modeling and forecasting of trends in the dynamics of the related series of key indicators of livestock production in the Surkhandarya region. Using the Frish-Bow method to simulate the basic indicators of livestock production, regression equations were developed and prospective forecasting options developed.*

Key words: *livestock products, modeling, modeling, milk, eggs, feed, trends, multicollinearity, autocorrelation, regression coefficient, projected values, trend.*

Language: *English*

Citation: Khasanov AA (2018) FORECASTING AND MULTIFACTOR REGISTRATION ANALYSIS OF MAIN CATTLE SPECIES PRODUCTION AT THE SURKHANDARYAN REGION. ISJ Theoretical & Applied Science, 08 (64): 23-29.

Soi: http://s-o-i.org/1.1/TAS-08-64-5 ***Doi***: crossref https://dx.doi.org/10.15863/TAS.2018.08.64.5

INTRODUCTION

In the speech at the solemn ceremony dedicated to the Day of Agricultural Workers, the President of the Republic of Uzbekistan noted that in recent years within the framework of livestock sector development programs, many fish, honey growers, poultry, goats, cattle breeding farms have been focusing on establishing high quality meat, milk, eggs and fishery products. It is one of our most important tasks "[1].

In the implementation of this project, additional 35,000 heads of pedigree cattle will be established within the framework of 145 projects for 2018-2019, and additional 3 million 200 thousand heads of poultry farms on 80 projects with a total cost of 280 billion soums will be created in 2018 it will increase the production of eggs by 10%, bringing its total production to 7 billion 800 million pieces. However, one of the serious problems of science in the development of the agricultural sector is one of the serious problems, as stated in the Resolution of the President of the Republic of Uzbekistan "On Measures to Improve the Activity of the State Statistical Committee of the Republic of Uzbekistan" of July 31, 2017, a comprehensive analysis of statistical materials explaining the causes and factors of emerging trends in the development of national sectors and sectors and regions. is not true "[2]. Not later than in 2020, the decree provides for the statistical practice, including the expansion of the GNP base, reflecting the qualitative changes in the development of the sectors and sectors of the economy, including deeper scientific developments and the growing role of the high-tech goods and services in the national economy. the implementation of a comprehensive system of macroeconomic calculations based on the 2008 model of "Livestock breeding" the introduction of innovative ideas and technologies into the industry in the context of the economy diversification, statistical analysis of the factors and trends in the production of basic horses, the development of the system of statistical indicators, the development of statistical models of livestock development strategies and the statistical forecasting, .

LITERATURE REVIEW

To the scientists who conducted the theoretical research in the field of livestock, R.Djessen, K.L.Luis, M.Dj.Kendall, A.Styuart, G.Harris, R.Kats, S.Akis, A. M. McCarthy, M.Bitner and others.

Scientists from Commonwealth of Independent States (CIS) countries Afanashev V.N., Markova A.I. Bashkatov B.I. , Altukhov I.A., Shamin A.E. Gaabe Yu.E., Levitin I.I., Pavlov A.N. Gozulov A.I., Grankov V.P., Merjanov G.S., Ivashchenko G.A., Kildyshev G.S., Shmoylova R.A., Kaso E., Beker M., Nelson A. and others. the issues of statistical study of livestock sector in their work.

Scientists of economics S. Gulyamov, O. Xotamov, T.Shodiev, A.Abdullaev, H.Hojakulov, B.Goyibnazarov, B.Berkinov, Y.Abdullayev, N.Soatov, H.Nabiev, R.Alimov, M.Erkaboev , M. Pardaev, B.Boybulov, A.Siddikov, U.Urzzokov and others have studied some aspects of econometric and statistical surveys of livestock sector. However, these studies do not cover statistical surveys of livestock sector development in the regions, potential of regions and their development, statistical modeling and forecasting. Also, the issues of livestock sector development in the regions of our republic, their statistical study are poorly understood by local scientists and specialists.

The necessity of solving the aforementioned problems was the basis of the choice of the research, determination of its goals and tasks.

ANALYSIS AND RESULTS

Dynamics of the main indicators of livestock production dynamics is based on the modeling of gross milk yield (Y1), breeding of livestock and poultry (live weight) (Y2), egg production (Y3) as well as cattle (x1); number of pigs (x2); Number of poultry (x3); the amount of forage in the forage unit (x4); Average annual number of workers in agricultural enterprises (x5); and fodder crops (x6).

Dynamics of main indicators of production of livestock products generates some serious problems in modeling and forecasting trends of the linked pillars. The most important of these are multicollinear and autocorrelation problems, which do not allow the creation of a scientifically-based and statistically significant model of the study of the object-livestock development of the studied species [3,4].

An analysis of the correlation coefficients is one of the most common methods for determining the multicollinear link between the marks. The essence of this method is that if two or more correlation coefficients are more than predetermined, they are considered as chlineline (multicollinear). In practice, in most cases, two arguments, if the coefficients of correlation between them are greater than 0.8 in absolute size, are considered chlinearine [5].

In order to eliminate multicollinearity, one or more linearly linked indicators are removed from the model, or vice versa, only some of the selected characters are included in the model at the stage of economic and statistical analysis [6,7].

In Table 1, we will look at the matrix of correlation coefficients between gross milk yields and major cattle breeding activities in Surkhandarya region.

Table 1

Gross milk yield and animal husbandry in Surkhandarya region
Correlation between key indicators pair coefficient matrix

	Y1	X1	X4	X5	X6
Y1	1	0,971	0,765	0,993	0,878
X1	0,971	1	0,597	-,0523	0,884
X4	0,765	0,597	1	0,060	0,735
X5	0,993	-0,523	0,060	1	-0,368
X6	0,878	0,884	0,735	-0,368	1

The analysis of the matrix obtained in Table 1 shows that all selected parameters of milk production are the most effective (since the correlation coefficients exceed the critical values). But it is impossible to enter all of the characters in the model, as they are multicollinear, so we can only enter the number of cattle.

Table 2

In the region, the proportion of livestock grown in livestock and bird breeding with the main indicators of livestock activity matrix of double correlation coefficients

	Y2	X1	X2	X3	X4	X5	X6
Y2	1	0,981	-0,925	0,993	0,794	0,991	0,905
X1	0,981	1	-0,969	0,990	0,597	-0,523	0,884
X2	-0,925	-0,969	1	-0,962	-0,521	0,444	-0,853
X3	0,993	0,990	-0,962	1	0,588	-0,597	0,895

X4	0,794	0,597	-0,521	0,588	1	0,060	0,735
X5	0,991	-0,523	0,444	-0,597	0,060	1	-0,368
X6	0,905	0,884	-0,853	0,895	0,735	-0,368	1

In the Table 2, we will examine the matrix of correlation coefficients between livestock production and major livestock activity indicators for slaughter of poultry and livestock. By analyzing the matrix, it is possible to conclude that all the selected parameters for the volume of livestock production for the slaughter of cattle and poultry have the greatest impact (as the correlation coefficients exceed the critical values).

But it is not possible to enter all the characters in the model, as they are multicolline. Therefore, we consider that it is possible to create several models of bonded rows and add them to each of them separately for cattle, number of poultry.

Table 3

Matrix of the correlation coefficients between the volume of egg production and the main indicators of livestock activity in the region

	Y3	X3	X5
Y3	1	0,989	0,993
X3	0,989	1	-0,597
X5	0,993	-0,597	1

The matrix of correlation coefficients between egg production and the main indicators of livestock production (Table 3). Analyzing the matrix, it can be concluded that the number of poultry in the egg production is strongly influenced (because correlation coefficients are significantly higher than critical values). For this reason, we consider that it is possible to create a series of rows that are linked between the indicators.

The second problem with modeling and forecasting with the help of the dynamic linkages of dynamics is the availability of autocorrelation.

There are two types of autocorrelation:

1. Autocorrelation when one or more variables are observed;

2. Autocorrelation of mistakes or autocorrelation in trend distortions.

The existence of the latter leads to distortion of the average square errors of regression coefficients, which makes it difficult to establish confidence intervals for regression coefficients and to check their significance.

Auto-correlation at levels of livestock production indices is measured by the non-conformational correlation coefficients that can be calculated not only between the neighboring (adjacent) one-time levels, but also among the time units (L) shifted to any number. This shift, known as the temporary (lag) lag, determines the order of correlation coefficients: the first order of L = 1, the second order of L = 2.

Dynamic-Worthon criterion can be used to determine the presence of auto-reorganization in the dynamics of the main indicators of livestock production, as well as the following formula:

$$d_p = \frac{\sum(y_{t+1} - y^t)^2}{\sum y_t^2}$$

Darbin-Watson's criterion is a statistical criterion for obtaining a transient series of models, which is designed to check for autocorrelation at both levels and residues. [8] The critical size of the Darwin-Watson criterion is given by the two values in the form d1, d2, depending on the length of the array and the character (V) being examined.

In statistical modeling and forecasting, there are a number of ways to eliminate or reduce autocorrelation in dynamics lines, among which the Frish-Bou method is most common. The essence of this method is that time can be added to the model as an independent factor. Here, the levels of the initial dynamic range can be expressed in any form, including logarithmic figures.

Taking into account the time factor - it is assumed that dynamics eliminate the main tendency of development of all events mentioned in the studied lines. It has also been proved that the theoretical values derived from the time-to-equation trend are similar to the use of deviation from experimental data. The addition of time as additional variables is the best way to handle dynamic array rows.

In implementing the Frish-Bou method, pairings are converted to many factors and the density and direction of influencing the modeling factor on the modeling is based on the correlation coefficient.

If the trend of a change in the value of the tracer, for example, the model of the double-dependence model, using the Frish-Bou method for the condition described by the second-order polyphonic equation, the model will look like the following:

$$y_{x,t} = a_0 + a_1x + a_2t + a_3t^2$$

Parameters of this equation are determined by the least squares method, which minimizes the sum of squared squares from the theoretical values of the experimental values derived from the model.

The practical advantage of the Frish-Bou method in modeling the key indicators of livestock production is that the introduction of time factor - removes the main tendency of development of all indicators with dynamic pumps. This will, first of all, help drive autocorrelation and multicollinear dynamically.

Additionally, the large number of regression model parameters with time factor as arguments are given for good economic interpretation.

Table 4

Main Characteristics of Existence of Autocorrelation of Livestock Production in 2000-2017

Rate	Sign	Darbin-Watson's criterion	
		d_p	Results
Gross milk yield	Y_1	2.733	available
Breeding of livestock and poultry in live weight for slaughter	Y_2	1.723	available
Egg production	Y_3	1.41	available
The number of mammals	X_1	1.767	available
The number of pigs	X_2	2.776	available
Number of birds	X_3	1.682	available
The amount of forage fed in the feeding unit	X_4	2.582	available
Average annual number of workers in agricultural enterprises	X_5	1.702	available
The area of feed crops	X_6	1.921	available

In the article, it is recommended to use the Frish-Bou method described above, which excludes autocorrelation. Creating the model using this method is based on the introduction of the time factor as an additional factor in the regression equation. This model is not dynamic, because it does not take into account the change in the time structure of the link structure. Therefore, it is restricted to use for forecast purposes. However, in the economic practice, such models are widely used, the main indicators of production of livestock are regression equations and their prospective forecast.

The main trends and trends in changing the indicators themselves and the factors affecting them in the design of these models of livestock production are taken into account. Table 5 presents trends for the indicators considered.

Table 5

The trend of the basic indicators of livestock sector activity for 2000-2017

Rate	**The sign**	**Trend equation**
Gross milk yield	Y_1	$\overline{Y_t}$ = exp (-107.0399+0,0564 *t)
Production of livestock and poultry for slaughter (in live weight)	Y_2	$\overline{Y_t}$= exp(4.1786+0.0525376*t)
Egg production	Y_3	$\overline{Y_t}$ = exp (-139.45584+0.075373*t)
The number of cattle	X_1	$Y_{t\,=}$ exp(103.6823-181507.397*t)
Number of birds	X_2	$\overline{Y_t}$ = exp (-167.5622+0.090553*t)

Compliance with the first formal-mathematical terms of regression models does not allow the simultaneous review of all the characters to be taken when the number of factor inputs that are to be modeled should be 6-7 times the size of the study package. In this regard, we consider it desirable to consider creating models by entering a single factor and time.

As a result, the following models of dependence on different indicators, taking into account the time factors of agricultural production, are taken. When considering the model of milk production, x1 and the time factor were included as the mark of factor in cattle cattle (BMD). As a result, the following model was obtained:

$$y_{x,t} = 384.369+1.07x_1-0.267t$$

The importance of regression coefficients on the basis of the t-criterion of Stuudent shows that the regression coefficient is significant (important) if the probability of x1 in the factor x1 is 95%. Regression model (Fcal = 5.355) is statistically significant. From an economic point of view, it can be concluded that the change in milk production (change of coefficient 0.983) to 98.3% was caused by the change in the number of LVLs.

The residual variability of the random and non-random effects on the model is 21.3%.

Calculated elasticity coefficient indicates that the percentage of milk production will increase by 1.07%, when the number of CCs will change to 1%.

By analyzing the parameters of the regression model it can be noted that the number of dairy products increased by more than 1 thousand heads, while the milk production increased by 107,000 tons.

Modeling of milk production volumes depends on the factors characterizing the number of GMDs (dependencies), which is reasonably approximates the current milk production rate because the approximation error is 0.01%.

The Darwin-Watson's criterion for the criterion of 1.789 indicates that the regression model, which is composed of the time factor, does not preserve auto-correction on the remnants of experimental values of the volume of milk produced by this equation of regression. [9]

Thus, the model is sufficiently adequate and statistically significant and can be used for forecasting. As a result of the implementation of the breeding model of x-rays, the number of pallets x1, the number of pigs x2, the number of birds x3 and the time factor, as well as the following link model of the GMO will be generated:

$$y_{x,t} = 648.547 + 0.223x_1 - 1.337t$$

The significance of regression coefficients is that the regression coefficient is significant (crucial) if the probability of the factor in x1 is 95%. Regression model (Fiscal = 4.975) is statistically significant. From the economic point of view, it can be concluded that the change in live weight for the slaughter of animals and parrots was 97.8% (the coefficient of determinants was 0.978) due to the change in the number of LVLs. [10]

The link for breeding livestock and poultry for the slaughter of birds and birds is as follows:

$$y_{x,y} = -3556 + 0{,}026\, x_2 + 1{,}803t$$

The importance of regression coefficients is that the regression coefficient is significant (important) if the probability of the factor in x2 is 95%, based on the t-criterion of Stu- dent's criterion. Regression model (Fiscal = 12.518) is statistically significant. From an economic point of view, it can be concluded that the change in living weight for slaughter of cattle and birds was 99.5% (the coefficient of determinants was 0.995) due to changes in the number of birds.

Calculated elasticity coefficients show that when the number of breeders changes to 1%, meat production grows to 2.23%, and the number of poultry to 1%, while the production of meat grows by 0.26%.

By modeling the dependence on the amount of livestock in the live weight for slaughter of birds and birds, the resulting model accurately approximates the true value of the production, since the relative error of approximation is 4.48 and 2.19% respectively.

The value of Darwin-Watson's criterion indicates that the model of regression, which is composed of the time factor, does not maintain car corrections in the residues of empirical value of the volume of production obtained by this regression equation. Thus, the models discussed are sufficiently adequate and statistically significant.

When modeling egg production as a factor, we model the X3 and the time factor in the model. As a result, we get the following model:

$$Y_{x,t} = 1031.304 + 0{,}083x_3 - 0.507t$$

The importance of regression coefficients was determined by the criterion of Stuudent's T-criterion, whereas the probability of the factor characteristic x3 was 95%, the regression coefficient was significant (important = 8.229) and statistical significance model of statistical significance of regression was obtained.

From the economic point of view, it can be concluded that the change in the egg production by 97.1% (the coefficient of determinants is 0.971) is due to the change in the number of birds. The balance of the residual variation, which is explained by the influence of random and non-random factors on the model, is 2.9%.

The calculated elasticity coefficient indicates an increase in egg production by 0.83% when the number of birds changes to 1%. By analyzing the parameters of the regression model it can be noted that the number of poultry increases by over one million and the amount of eggs grows to 83 million. When modeling the dependence on the amount of egg production, the resulting model accurately estimates the true value of the egg production, since the relative error of approximation is 0.09%.

The value of Darbin-Watson's criterion of 0.598 indicates that the regression model, which is composed of the time factor, does not preserve autocorrelation on the remnants of experimental values of the volume of eggs produced by this equation of regression. Thus, the models discussed are sufficiently adequate and statistically significant.

Created patterns allow us to get forecasted values of main indicators of livestock products, taking into account the factors under consideration, as well as the influence of time factors.

Table 6

Prognostic values for 2012-2020, taking into account factors of the volume of production of livestock products

№	Rate	Model	Prognosis period	Prognostic values of factor signals X1	Prognostic values of factor signals X3	Prognostic values of the indicator
1	Gross milk yield	$y_{x,t}$=3300+1.14x_1-1.74t.	2018	933,35		852,7
			2019	976,31		899,97
			2020	1021,2		949,47
2	Livestock breeding for slaughter of animals and birds	$y_{x,t}$=648.547+0.223x_1-1.337t y=-3067,743+0,23x_3+1,559t	2018	933,35	3919,37	176,67
			2019	976,31	4290,86	185,9
			2020	1021,2	4697,57	195,5
3	Egg production	$y_{x,t}$ = 1031.304+0,083x_3-0.507t	2018		3919,37	333,5
			2019		4290,86	363,8
			2020		4697,57	397,1

The obtained prognostic values are given in Table 6. Prognostic Results The 2000 Milk Growth Rate, which is expected to grow by 2000, will increase to 949,400 tonnes by 2020 (Figure 1).

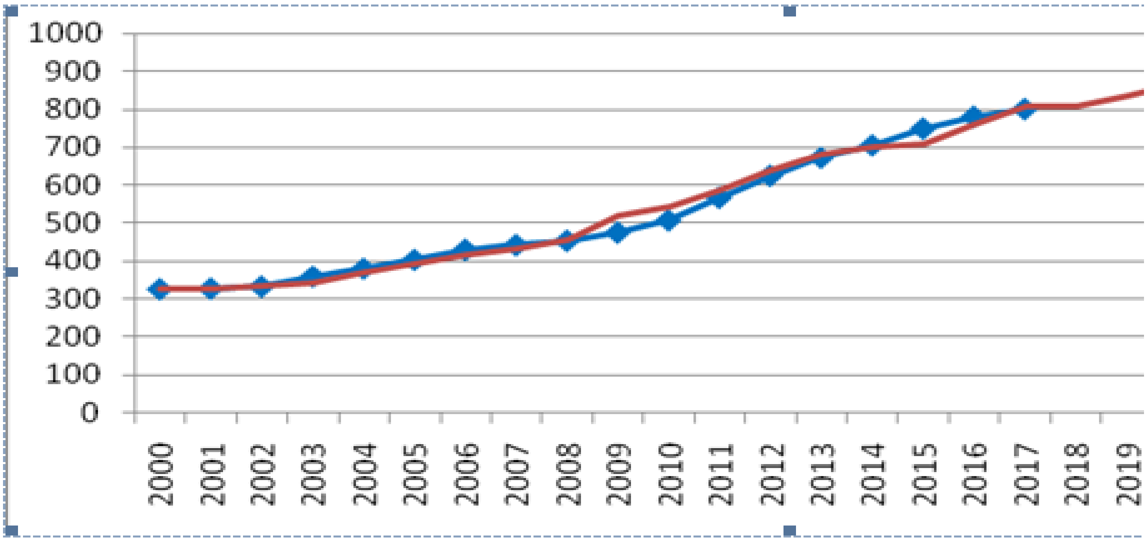

Figure 1. Dynamics of gross milk yield in Surkhandarya region for 2000-2020.

The same is true for other indicators. For example, the volume of production of meat and eggs is steadily rising and by 2020 it will increase to 9.2 million tonnes. tons and 43.6 billion tons. is expected to reach the peak. As can be seen from the above, the article deals with the factors influencing the forecasting of the main indicators of livestock products, and the two methods that have not been taken into account have been taken into account.

CONCLUSION

In summary, the average error in estimation of gross milk yield forecast on the model of eutrophication, trend of eutrophilization, calculated on the basis of prognostic factors, is considerably lower than in the developed model. Thus, we can say that the prognostic value based on the trend trend extrapolation model clearly describes the future dynamics of milk production.

By analyzing the average error of the approximate approximation calculated for the slaughter of livestock and poultry, we can say that when the model is a negative result, extrapolation of the trend to obtain predictive value of livestock and poultry for slaughter it is best to use the model.

Estimated prognostic value of the egg production trend based on the extrapolation model accurately describes the prospects for the development of time events as the average error in the approximation is minimal.

Thus, the trend of extrapolation of trends is characterized by the most accurate description and predictive value of the dynamics of production of the main livestock products.

References:

1. (2017) President of the Republic of Uzbekistan Sh. Mirziyayev "The speech at the solemn ceremony dedicated to the Day of Agricultural Worker". December 9, 2017. http://president.uz/en/lists/view/1331.
2. (2017) Resolution of the President of the Republic of Uzbekistan "On Measures to Improve the Activity of the State Statistical Committee of the Republic of Uzbekistan" No-3165. July 31, 2017.
3. Abdullaev A.M., Hodiyev B.Yu., Ishnazarov A.I. (2007) Econometrics: uchebnik. -T .: TGEU, 2007.- 612 p.
4. Dougerti K. (2009) Vvedenie and econometrics. - M .: INFRA-M, 2009. - 465 p.
5. Eliseeva I.I., Kurqsheva S.V., Kosteeva T.V., et al. (2007) Econometrics: uchebnik. M .: Finance and Statistics, 2007.-339 p.
6. Novikov A.I. (2010) Econometrics: Учебное пособие. M: Infra-M, 2010.-146 p.
7. Hodiev B. Yu, Shodiev T.Sh., Berkinov B.B. (2018) Econometrics: Study Guide. -T.: ECONOMICS, 2018.-178p.
8. Aivazyan S.A., Mkhitaryan B.C. (2001) Applied statistics in problems and exercises. M.: UNITY, 2001.
9. Altukhov I.A., Shamin A.E. (1996) The new agrarian system of Russia. NN: 1996.
10. Venetsky I.G., Venetskaya V.I. (1979) Basic mathematical and statistical concepts and formulas in economic analysis. Directory. 2nd edition. -M .: Statistics, 1979.