FACTORS TO IMPROVE THE FISH PRODUCTS MARKET DEVELOPMENT APPROACHES

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Abstract. This article analyzes the factors that contribute to the development of the fish products market based on marketing approaches. The author offers ways to develop the marketing and service sector for the development of fish markets in the world. Based on econometric methods, the revealed partial and pair correlation coefficients, a regression model is proposed in which the volume of fish products and the volume of investments in the fish sector and the amount of water entering the Amu Darya are considered as factors.
Keywords: marketing, fish, service, small business, factors, Amu Darya, fisheries.

1. INTRODUCTION

In the context of globalization of the world economy, the development of domestic and foreign markets is of great importance in the consumption of the population, especially in the food markets, including fish markets in almost all countries of the world, especially Russia, China, Japan, Indonesia, the Philippines. , Organizational and managerial structures of marketing activities for these products in the UK, South Korea, Finland and other countries and the settings in which special attention is paid to the development of marketing strategies. [1]

One of the most important issues is the development of the marketing and service sector for the development of fish markets in the world and the full formation of the population and its effectiveness in the diet of daily consumption. Therefore, access to and export of fish products to foreign markets, the organization and management of commodity exchange between countries means that the real economy should be used effectively.

2. LITERATURE REVIEW

From foreign scientists M.Dj. Baker, F. Kotler [2], Lindstrom M. [3], M.J. Baker [4], E. Mate [5], P. Cheverton [6], P. Drucker, Cheverton P. [6] and others, leading economists of the Commonwealth of Independent States G.V.Astratova [7], G.A. Bagiev [8], I.K. Belyavsky, T.S. Bronnikova [9]. In the scientific works such as Golubkov [10], B.D. Sekerin, V.S. Shkodin [11], S.E.Chernov [12] investigated issues related to marketing activities.

G.N. Akhunova [13], A.S. Bekmurodov [14],

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J.J. Jalolov [15], M. Ikramov [16], M.S. Have been studied by Kasymova, DM Mukhitdinov [17], M.R. Boltaboev [18], B. Safarov, A.A.Fattakhov [19]. Theoretical issues of Applying of artificial intelligence in the textile industry were researched by Ergashxodjaeva, S. J. and et.al. [25], Yuldashev N.[26;34] and others.

Features of organization of production at light industry enterprises and improving logistics were studied by several scientific works of Tursunov B. [27;28;29;30;31;32;33;34;35]

However, their research does not adequately investigate the formation and development of marketing activities in certain foods, particularly fish and fish products. This led to the choice of this topic.

3. ANALYSIS AND RESULTS

In the Republic of Karakalpakstan, the fishing industry is one of the main agricultural sectors, and the economic processes underlying it have certain characteristics. The study of fish market and its factors using econometric methods allows to determine the volume of demand and supply of fish in this market and a number of factors influencing it.

First of all, we will study the fish market in the Republic of Karakalpakstan, ie we will study the processes related to fish production in the Republic.

Dynamics of fish production in the Republic of Karakalpakstan was calculated as the final factor (Y).

The following factors were influenced by: dynamics of investments in the fishing industry, mln. (X1), number of people employed in the fishing industry, (X2), Amu Darya water volume, mln. m3 (X3) and number of fisheries, unit (X4).

We use data from 2007-2018 to determine the effectiveness of fish breeding in the Republic of Karakalpakstan, and the impact of resource expenditure on fish production. The data are presented in Table 1 below.

Table 1 Dynamics of main indicators of the fishing industry of the Republic of Karakalpakstan for 2007-2018

Years	Fish production volume, tons Y	Investments in the fishing industry (thous. Soums), X1	Number of employed in the fishing industry (units), X2	Volume of water inflow to the Amu Darya, (mln. M3), X3	Number of fisheries, (units), X4
2007	802,8	62452	198	16780	18
2008	1388,2	83502	274	11127	25
2009	979,0	98652	378	20284	39
2010	1089,0	112321	398	37631	57
2011	1112,0	132420	411	11769	54
2012	1895,7	187312	477	27299	64
2013	2654,0	428389	432	17207	77
2014	2658,0	220948	454	17524	83
2015	3410,0	1269333	420	24110	117
2016	4515,0	2261891	488	17411	171
2017	6157,2	623550	550	25531	257
2018	9856,7	3044364	512	13985	273

Source: Based on data from the State Statistics Committee of the Republic of Uzbekistan

Based on the data of Table 1, we calculate the logarithmic values of the data in the fishing industry of the Republic of Karakalpakstan. This is because the data presented in Table 1 are also different.

First of all, we identify the links between the factors. To do this, we calculate the correlation coefficients among the factors.

When calculating the correlation coefficients, the following formula is used [3]:

$$r_{xy} = \frac{\overline{xy} - \overline{x} \cdot \overline{y}}{\sigma_x \cdot \sigma_y},$$

(1)

here: σ_x, σ_y - respectively and the mean square deviation of the factors.

We calculate the correlation coefficients among the factors using the Excel spreadsheet (Table 2).

Table 2 Matrix of correlation coefficients calculated between fish production and the factors affecting fish production in the Republic of Karakalpakstan

	Fish production volume, tonnes ln (Y)	Investments in fishing industry (thous. Soums), ln (X1)	Number of employed in the fishing industry (units), ln (X2)	Amount of water flowing into the Amudarya river, (mln. M3), ln (X3)	Number of fishing farms, (units), ln (X4)
Fish production volume, tonnes ln (Y)	1				
Investments in the fishing	0,9204	1			

industry (thous. Soums), ln(X1)					
Number of employees in the fishing industry (units), ln(X2)	0,7152	0,6728	1		
The volume of water entering the Amudarya river, (billion. м3), ln(X3)	-0,0114	0,0040	0,2936	1	
Number of fish farms, (units), ln(X4)	0,9324	0,8972	0,8726	0,1878	1

When analyzing the correlation matrix between factors, we can see the following. We first analyze the correlation coefficients. Private correlation coefficients are the association between the outcome factor (lnY) and each interaction factor (ln (X1), ln (X2), ln (X3), ln (X4). There is a strong correlation between fishery product volume (lnY) and volume of investments in fishery sector (ln (X1) (0.9204). there is a weak correlation between the volume of fishery production (lnY) and the amount of water entering the Amu Darya (ln (X3)) (-0.0114). There is a close correlation between the number of farms (ln (X3)) (0.9204).

In addition, pairwise correlation coefficients between the factors in Table 2 data are calculated. The pair correlation coefficients are the links between influencing factors (i.e., lnX1 and ln X2, ln X1 and ln X3, ln X1 and ln X4, lnX2 and ln X3, lnX2 and lnX4, lnX3 and lnX4,).

As can be seen from Table 2, some of the influencing factors are multicollinearity. For example, there is a multicollinearity (0.8972) between the number of fisheries (lnX4) and the volume of investments in the fishing industry (lnX1). There is also a multicollinearity (0.8726) between the number of fisheries (lnX4) and the number of fishery employees (lnX2).

Therefore, the correlation matrix can be concluded that some factors are not included in the multivariate econometric model.

The following linear multivariate model is used to create a multifactorial econometric model of fish production in the Republic of Karakalpakstan [page 2, 98]:

$$y = a_0 + a_1 x_1 + a_2 x_2 + ... + a_n x_n ,$$

(2)

y - Resulting factor (production of fish), x_1, x_2,..., x_n - influencing factors and a_0, a_1, a_2,..., a_n - model parameters.

We use the "least squares method" to construct a multivariate econometric model.

Based on the aforementioned factors, the multifunctional econometric model of agriculture in the Republic of Karakalpakstan looks as follows:

$$\ln(\hat{y}) = \ln(9,4663) + 0,1031\ln(x_1) - 0,7319\ln(x_2) - 0,2867\ln(x_3) + 0,9639\ln(x_4)$$

(4)

$$R^2 = 0,9337, \quad F_{хисоб} = 24,65, \quad DW_{хисоб} = 2,036.$$

(4) the multivariate econometric model shows that the investment in fish farming in the Republic of Karakalpakstan, bln. Soums (X1) and the number of fishery units, unit ln (X4) are the most effective. That is, their increase would result in an increase in fish production. Increasing other factors have a negative impact on fish production. That is, as they grow, fish production tends to decline.

Thus, the investment in the fishing industry for every 1,000 Soums would result in an increase of 0.1031 tonnes on average. If the number of employed in the fishing industry increased by 1 unit, the volume of fish production would decrease by an average of 0.7319 tons. The volume of water in the Amudarya river is about 1 mln. The increase in m3 will result in an average reduction of fish production by 0.2867 tonnes.

In the Republic of Karakalpakstan, 93.37% (4) depends on the factors included in the model. The remaining 6.63% were influenced by unaccountable factors.

Nevertheless, (4) shows that the model is statistically significant. We defined this by the Fisher criterion, which is the table value of the Fisher criterion

However, some parameters in the model are unreliable, meaning that the number of people employed in the fishing industry is ln (X2) and the amount of water that comes to the Amu Darya is ln (X3). The reason for this is that the Student's benchmark values calculated for

these variables are less than the table value (X2) and the probability of the t-student criterion is greater than 0.05. This, in turn, causes these factors to be excluded from the multi-factor econometric model.

After removing the above factors (4) from the multivariate econometric model, the newly created multivariate econometric model looks as follows:

$$\ln(\hat{y}) = \ln(2,2665) + 0,2567\ln(x_1) + 0,5112\ln(x_4)$$
(5)

$$R^2 = 0,9054, \qquad F_{\text{хисоб}} = 43,05,$$

$$DW_{\text{хисоб}} = 1,476.$$

(5) The economic significance of the multivariate econometric model parameters is that if the investment in the fishing industry (ln (X1)) increases by 1,000 soums, the volume of fish production (ln (Y)) could increase by 0.2567 tons on average. If the number of fisheries (lnX4)) increased by 1 unit, the volume of fish production (ln (Y)) could increase by an average of 0.5112 tons.

The (5) multivariate econometric model is statistically significant. Because, ($\alpha = 0,05$, $k_1 = 12 - 2 - 1 = 9$ ва $k_2 = 2$) is equal. (5), $F_{\text{жадвал}} = 4,26$ га тенг. $F_{\text{хисоб}} = 43,0523 > F_{\text{жадвал}} = 4,26$ the multivariate econometric model is said to be statistically significant and consistent with the process under study.

We examine the reliability of the parameters in the model (5) using the Student's t-test. If the computed values of the t-criterion are greater than the table values and their probability is less than 0.05, the model parameter confidence is called the opposite and vice versa.

Student's t -value is 2.26. The calculations for the multivariate econometric model (t-Statistic column) show that the estimated values of all the influencing factors () are greater than the table value of the t -value and the probability of the parameters (R-column) is less than 0.05.

Consequently, the structured (5) multivariate econometric model can be used to predict the outcome factor.

We investigate the presence of autocorrelation in the residuals of the causative factor using the Darbin-Watson criterion. The calculated Darbin-Watson criterion is the same $DW_{\text{хисоб}} = 1,58$. The Darbin-Watson criterion $DW_{\text{low}} = 0,95$ is the lower bound value of the table and the upper bound value. Therefore, the calculated value of the Darbin-Watson criterion $DW_{\text{up}} = 1,54$ is greater than the lower and upper bound values of this criterion. This indicates that there is no autocorrelation in the residuals of the causative factor (Figure 1).
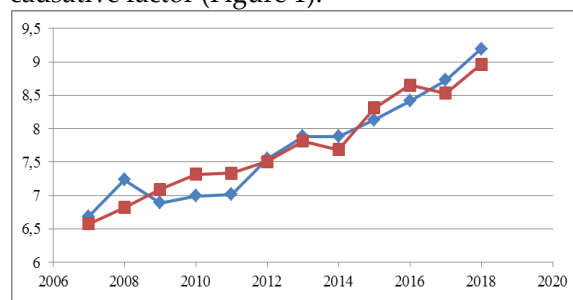

Figure 1. Actual and calculated values of the causal factor

The results of calculations by the author from EViews 10.

To forecast fish production in the Republic of Karakalpakstan in the future, we first create trend patterns of factors influencing it.

The trend pattern for fisheries investments (ln (X1)) is as follows:

$$\ln(x_1) = \ln(10,4286) + 0,3401 \cdot t$$
(6)

$$R^2 = 0,8495, \quad F_{\text{хисоб}} = 56,42, \quad t_{\text{хисоб}} = 7,51.$$

The trend model for the number of fisheries (ln (X4)) is as follows:

$$\ln(x_4) = \ln(2,8089) + 0,2318 \cdot t$$
(7)

$$R^2 = 0,9662, \quad F_{\text{хисоб}} = 285,55, \quad t_{\text{хисоб}} = 16,89.$$

We calculate the values of these (6) and (7) trend models for the forecast period and place these values in (5) on the multivariate econometric model. We then obtain the following prediction results by potentiating these values (Table 3).

Table 3 Dynamics and predicted values of fish breeding in the Republic of Karakalpakstan

Years	Fish production volume, tons Y	Investments in fisheries (thous. Soums), X1	Number of fish farms, (units), X4
2007	802,8	62452	18
2008	1388,2	83502	25
2009	979,0	98652	39
2010	1089,0	112321	57
2011	1112,0	132420	54
2012	1895,7	187312	64
2013	2654,0	428389	77
2014	2658,0	220948	83
2015	3410,0	1269333	117
2016	4515,0	2261891	171
2017	6157,2	623550	257
2018	9856,7	3044364	273
2019	8558,9	2812657	338
2020	10514,6	3951951	426
2021	12917,2	5552729	537
2022	15868,7	7801917	677

Source: The author is based on data from the Statistics Committee of the Republic of Karakalpakstan [36]

The table shows that in 2022, the volume of fish production in the Republic of Karakalpakstan may grow 1.6 times compared to 2018. Investments in the fishing industry can increase by 2.56 times in 2022. According to forecasts, the number of fisheries in the country by 2022 will be 677, or almost 2.5 times more than in 2018.

4.Conclusions

The average fish production in 2007-2018 was 3043.1 tonnes, whereas by the forecast period the average fish production was 11964,8 tonnes. Compared to 2007, fish production in 1922 will increase 19-fold. The main reason for this is the attention paid by the state to the fishing industry.

In the Decree of the President of the Republic of Uzbekistan dated April 6, 2018 No PP-3657 "On additional measures to accelerate the development of the fishing industry" "The fishing industry is one of the strategic directions of food security. Thanks to the measures taken lately, the share of fisheries in the national economy has been steadily increasing ".

Investments in the fishery industry in 2007-2018 made up 710,427,800 soums on average, while investments in the forecast period made up 5029,813,500 sums. Compared to 2007, investment in 2022 will increase by 124.9 times. This is due to the provision of fish products, job creation, investment in the industry and the construction of new facilities.

The average number of fish farms in 2007-2018 was 112. We can see an average increase of 494 during the forecast period. This is the provision of government subsidies to fishermen, and traditional fishing. The increase in the volume of water in the Amu Darya is caused by such factors.

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