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Research Article

Review on contribution of fruits and vegetables on food security

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Abstract

This article examines the normative-legal documents adopted in our country to cultivate fruit and vegetable products to support entrepreneurs and future tasks. At the same time, the role of agricultural products in the country's GDP was considered in figures and econometric analysis. In conclusion, there are proposals for the cultivation of agricultural products to ensure food security.

1 Introduction

Uzbekistan's temperate natural climatic conditions and fertile soil are very conducive to agriculture and considered an important economic sector. In today's world of food security, it is precise by accelerating the production of agricultural products, including agricultural products, to ensure food security and saturate the domestic market and expand the export geography of agricultural products possible. In order to implement radical reforms in the development of this sector, some necessary regulations have been adopted.

In particular, PD-5388 of the President of the Republic of Uzbekistan dated March 29, 2018 "On additional measures for the accelerated development of the fruit and vegetable industry in the Republic of Uzbekistan" and PD-5388 dated October 23, 2019 "On approval of the agricultural development strategy of the Republic of Uzbekistan for 2020-2030" PR-5853 and PR-3978 of October 17, 2018 "On additional measures to increase the efficiency of exports of fruits and vegetables", PR-4239 of March 14, 2019 "On measures to develop agricultural cooperation in the field of fruits and vegetables", PR-4821 of September 9, 2020 "On measures to accelerate the development of the food industry in the Republic and the full provision of the population with quality food".

These documents include creating conditions for mutually beneficial relations between enterprises that grow (produce) fruits, vegetables, meat, dairy, and other agricultural food products and enterprises involved in the processing, manufacture, and sale of these products. Moreover, development of strategies and models for the development of the food industry based on increasing the competitiveness and diversification of local food products, effective use of the existing natural and economic resources of the regions; financial and non-financial measures to support enterprises engaged in the processing of fruits, vegetables, meat, dairy products, and other food products - the creation of new tools and information systems.

Simultaneously, the Resolution of the President of the Republic of Uzbekistan dated February 26, 2021, No. PR-5009 "On measures to implement the tasks set in the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 in 2021" was accepted. With this decision, in order to timely solve the problems of fruit and vegetable clusters, farms, and other producers, to increase the export potential and investment attractiveness of the

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country, from September 1, 2021, agricultural producers have been established several benefits, such as "Provision of compensation for interest expenses at the expense of the State Fund for Entrepreneurship Support" for purchase of seeds and seedlings of certified crops on loans from commercial banks.

In general, the development of agriculture would never lose its relevance. The practical results of all of the above aim to ensure food security in the country, saturating the domestic market and increasing exports of fruits and vegetables. Indeed, even in a global pandemic, it has become clear that food security is a significant concern.

2 Materials and Methods

The study used a correlation method of econometric analysis to study the relationship between agricultural production and the country's GDP, using the following correlation coefficient [3].

$$r_{yx} = \frac{\overline{xy} - \overline{y} * \overline{x}}{\sigma_y * \sigma_x} \quad (1)$$

The regression method of econometric analysis was also used to determine the impact of changes in agricultural production on GDP, using the following two-factor regression equation:

$$y = a_0 + a_1 x \quad (2)$$

The following are quantitative results of the correlation density and changes in the bond between agricultural production volume and GDP studied using correlation and regression analysis.

3 Results

The role of the agricultural sector in the Uzbek economy was of particular importance. This sector would meet the food industry's raw material needs and saturate the domestic market to some extent. Also, exports of fruits and vegetables to foreign markets would strengthen the country's foreign exchange reserves. Furthermore, suppose productivity is achieved by increasing land productivity through efficient use of land in agriculture. In that case, agriculture would develop sustainably, as the efficient use of the land would increase the economic independence of agricultural producers, reduce their external influence on their activities and increase the gross agricultural output. Table 1 below showed the gross domestic product and the level of agricultural production.

In recent years, demand for agricultural products increased by 6-8% on average. Moreover, as a result of radical food security reforms, table 1 showed that agricultural production was growing year by year. In this regard, farmers in our country had great potential to meet the needs of the population and export agricultural products.

Table 1

Gross domestic product of the Republic of Uzbekistan and the volume of agricultural production in 2010-2020 (trillion soums)

Years	Economic indicators	
	Gross Domestic Product	Agricultural products
2010	74,042	18,119
2011	96,949	25,874
2012	120,242	30,592
2013	144,548	36,237
2014	177,153	43,194
2015	210,183	55,429
2016	242,495	61,755
2017	302,536	83,303
2018	407,514	98,414
2019	510,177	108,386
2020	580,203	123,619

Some targeted measures aimed at increasing the production of fruits and vegetables, melons, potatoes, and grapes, increasing the capacity of processing enterprises and export volumes while fully satisfying the domestic market, establishing small and semi-small intensive orchards new vineyards based on modern technologies are being done. As a result, Uzbekistan annually produced more than 19 million tons of agricultural products, of which more than 750,000 tons were exported. Such development of the agricultural sector meant ensuring food security, creating new jobs, expanding the geography of agricultural exports, and attracting foreign currency to our country. We used correlation-regression analysis methods in the econometric analysis of the role of agricultural products in the country's GDP.

According to the results of the study (2010-2020), based on an econometric analysis of the influence of factors (according to the State Statistics Committee of the Republic of Uzbekistan) on the volume of GDP - Y (result factor), the volume of agricultural production - X (influencing factor), studying the influence of these factors, it would be possible to develop scientific advice for the future development of the industry. For this, the correlation coefficient is first checked to check the correlation between the resulting factor and the influencing factor (Table 2).

Table 2Matrix of mutual pair correlation coefficients between factors

	The volume of GDP (*Y*)	agricultural production (*X*)
The volume of GDP (*Y*)	1	
Agricultural production (*X*)	0,987880837	1

From the data in Table 2, it can be seen that the influencing factor had a solid correlation with the outcome factor. Now, this, in turn, requires the construction of a two-factor regression equation. We carried out this process using the Eviews program, which allowed us to assess the quality of a created simultaneously econometric model. (Table 3)

Table 3 Results of econometric analysis of the GDP model (depending on the volume of agricultural production)

Dependent Variable: Y		
Method: Least Squares		

Sample: 2010 2020				
Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	1.053540	0.054096	19.47551	0.0000
C	1.190708	0.214034	5.563177	0.0004
R-squared	0.976822	Mean dependent variation		5.309091
Adjusted R-squared	0.974246	S.D. dependent variation		0.683307
S.E. of regression	0.109657	Akaike info criterion		-1.419959
Sum squared resid	0.108221	Schwarz criterion		-1.347615
Log-likelihood	9.809777	Hannan-Quinn criteria.		-1.465563
F-statistic	379.2955	Durbin-Watson stat		1.211134
Prob (F-statistic)	0.000000			

According to the results of the analysis, the econometric model of GDP, which depended on the volume of agricultural production, consisted of the following expression:

$$y = 1.19 + 1.05x \tag{3}$$

Also, according to the results obtained, the coefficient of determination value was 0.976, the calculated value of Fisher was 379.295, the complimentary limit value was 1.19, and the regression coefficient value was 1.05.

The retrospective forecast obtained based on this model and its qualitative indicators were reflected in the following graph (Figure 1).

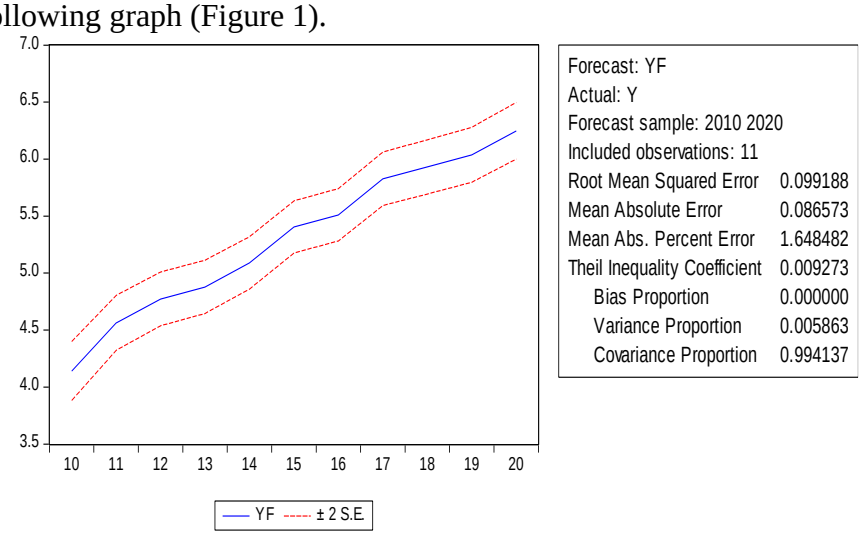

Figure 1. Quality indicators of the GDP model (depending on the volume of agricultural production)

In assessing the quality of the forecast, we used the medium absolute percentage error (MAPE) indicator and calculated it as followed:

$$MAPE = \frac{1}{n}\sum_{t=1}^{n-1}\frac{\left|F_t - F_t^*\right|}{F_t}\cdot 100\% \qquad (4)$$

According to him $MAPE < 10\%$ - the forecast accuracy was high, $10\% < MAPE < 20\%$ - the forecast accuracy was good, $20\% < MAPE < 50\%$ - the forecast accuracy was satisfactory and $MAPE > 50\%$ - the forecast accuracy was unsatisfactory.

According to our calculations, the average absolute percentage error of the forecast was 1.64%. It appeared that the accuracy of this forecast is considered to be very high.

In assessing the quality of the forecast of Tayl used the U-coefficient as an alternative measure of forecast accuracy.

In this case, P –t was the forecast value, and A-t was the observed value, and this coefficient varied in the range $0 \leq U \leq 1$. The higher the accuracy of the forecast, the greater the coefficient $U \rightarrow 0$ tend to zero. According to the results obtained, since the Tayl coefficient was 0.009, the quality of this forecast fully met the demand.

5 Discussion

The study results carried out using econometric methods showed that the country's gross domestic product indicators and indicators of agricultural production were closely related. Therefore, it should be noted that agricultural production development and increased productivity ensured food security, which was a global problem and led to an increase in GDP.

It was no secret that the coronavirus pandemic, which continues today, was devastating the economies of all countries and, most importantly, eliminated food security. However, the agricultural sector did not remain excluded from the global crisis.

It was known that more than a quarter of the existing labor force worked in the agricultural sector in our country, and the results of the above econometric analysis showed that this sector accounted for a third of GDP.

Naturally, radical reforms carried out in this area would yield positive results in the coming years. In particular, the recognition of the development of the fruit and vegetable industry as one of the priorities for the modernization of the agricultural economy, the expansion of land allocated for the development of fruit and vegetable products, included intensive orchards and vineyards, the introduction of advanced technologies in the fruit industry and vegetable growing. Furthermore, it should be noted that large-scale state programs for the storage and processing of products were being implemented.

In addition, the development of agriculture, of course, referred to the term "clusters". At this point, to clarify the concept of clusters, it should be said that a cluster was a group of enterprises operating in the same or interrelated sectors of the economy and geographically close to each other. The use of clusters was of great importance for the regions where interconnected enterprises were located, including strengthening economic factors.

At the initiative of the President, in the Strategy for the Development of Agriculture for 2020-2030, along with ensuring food security, exports and diversification of agricultural products were increasing, it implied the rational use of natural resources through the introduction of new innovative technologies, such as drip irrigation, and an increase in investment attractiveness.

The set of measures defined the tasks to double the volume of agricultural production and increased exports, and diversified geography while fully meeting the demand for food in the global food shortage. The implementation of this strategy, in a sense, would ensure the sustainable growth of the country's economy. To achieve these results, it was necessary to develop strategies and models for the development of the food industry, based on the effective use of the available natural and economic resources of the regions; and financial and non-financial measures to support enterprises processing fruits, vegetables, meat, dairy products, and other agricultural products - several challenges, such as the creation of new tools and information systems.

6 Conclusion

According to the analysis, the annual growth of fruit and vegetable production required the elimination of several problems and shortcomings in the storage and processing industry, a radical shift in the reform of the industry with the widespread use of modern innovative, resource-saving digital technologies. Therefore, in the future, structural reforms in the agricultural sector of the country should be aimed at accelerating the process of modernization and technological renewal of agriculture, the application of modern methods in the agro-environment, deepening the processing of agricultural raw materials, as well as improving the quality of life. To achieve this, we consider it expedient to take the following measures.

One of the essential factors in developing competitive products and improving its assortment was the receipt of feed additives and other necessary raw materials from domestic producers based on the processing of existing natural raw materials in our region. A simple example could reveal new aspects of the range of natural pure food additives beverages obtained by processing wet fruits using the potential of existing raw materials. On the one hand, it would at least eliminate the loss of fruit and vegetable products. On the other hand, it could create an opportunity to restore enterprises producing non-alcoholic beverages without imported raw materials. Moreover, losses in the collection, transportation, and storage of fruits and vegetables were also a significant problem and, in a sense, require consideration of such factors as the quality and price of seeds, mineral fertilizers, the use of chemicals, the use of heavy machinery in agriculture, and the deterioration of land resources.

Today's agricultural products require expansion as well as structural changes. At the same time, it was necessary to ensure the specialization-zoning of crops depending on the regions' climate, demographic characteristics, and soil conditions. At the same time, it was advisable to switch to market approaches in harvesting and harvesting vegetables and fruits, stimulating farmers and reducing the monopoly of processing enterprises. Refrigerated warehouses for agricultural products provided only 20-22% of production during the year. Given that most of the existing refrigerators were obsolete, there was a need for technological modernization, the active introduction of modern technologies, and digital innovations. At the same time, it was advisable to take a systematic approach to meet warehouse and processing enterprises' modern technological requirements and ensured sufficient products.

In short, to develop agriculture in our country, to achieve its place and position in world markets in the future, it was expedient to equip the infrastructure serving agriculture with new equipment and technologies to improve service activities further.

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