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Assessment of Factors Affecting Competitiveness of Fruit and Vegetable Products: In Case Uzbekistan

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Abstract--- *According to international experts, the number of people suffering from hunger as a result of the pandemic will double to 1.6 billion. The development of agriculture, the scarcity of resources, and at the same time the pollution of the environment pose a serious problem for the growing population in terms of nutrition. This article identifies the factors influencing the competitiveness of fruit and vegetable products and evaluates them on the basis of correlation-regression models. The results can be used to increase the competitiveness of the fruit and vegetable industry.*

Keywords--- *Competitiveness, Agriculture, Fruits and Vegetables, Quality, Agriculture 4.0, Investment, Food.*

I. INTRODUCTION

Agriculture is an important sector of the Uzbek economy. This sector will meet the demand of the country's population for food products, and the processing industry for raw materials. About 90% of food products are produced in the agricultural sector. Agriculture is a guaranteed market for the products of a number of industries, such as agricultural machinery, chemical industry, as well as the supply of food products and raw materials to the consumer market of the republic.

In order to ensure food independence in the first years of independence, specific directions of gradual reform of agriculture have been identified in the country. If we take into account that today almost 1 billion people on earth are malnourished and the problem is getting worse, it is not difficult to understand how important this issue is for humanity. So, today life itself shows the correctness of the strategy of Uzbekistan to ensure food independence.

However, according to international experts, the number of people suffering from hunger as a result of the pandemic will double to 1.6 billion. This, in turn, will further increase the urgency of growing agricultural products, increase their quality and efficiency, and further reform the sector.

No matter how long the pandemic and quarantine lasts, the population’s need for food will not decrease. Therefore, the task is to double the production of fruits and vegetables and livestock. [25]

In this regard, as stated in the Decree "On the Strategy for further development of the Republic of Uzbekistan", "... the development of fundamentally new products and technologies, based on which to ensure the competitiveness of national goods in domestic and foreign markets." [1]

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One of the main tasks of the Action Strategy for Agricultural Modernization and Accelerated Development is to improve the reclamation of agricultural lands, increase productivity, as well as expand the area of new intensive orchards and vineyards, thereby exporting surplus crops.

II. LITERATURE REVIEW

While the scientific work of M.Porter [3], K.Flyaysher [2], F.Kotler, P.Drucker, B.Carloff, A.Strickland, A.Owen and others on increasing the competitiveness of products has become a classic work, R. Ernst, J. Haar and others have given their modern approaches.

In particular, according to the theory put forward by M. Porter and his followers, competitiveness is based on two factors, the first factor - quality, the second factor - price, and the determinant of competitiveness in the competition strategy. He also defines competitiveness based on M. Porter's production efficiency and focuses on the microeconomic fundamentals of competitive advantages that support productivity across countries, regions, and clusters. [4]

R. Ernst and J. In his book Globalization, Competitiveness and Governability, Haar points out that in the 21st century, three powerful symbiotic forces, globalization, competitiveness, and management, can destroy business. Globalization and competitiveness are largely regulated by market forces, which reinforce significant changes in the benefits of globalization, i.e., increasing efficiency for traditional "invisible" hand use. It has been shown that not only the private sector but also the government is responsible for making these changes.

A group of scientists also acknowledged that competitiveness and the future development of industries are linked to a quality management system.

The issue of quality assurance in accordance with international standards is important in maintaining the competitiveness of products, especially fruit and vegetable products in the domestic market and enhancing their position in the world market.

The issues of improving quality management systems and their use in the agricultural sector have been discussed by many foreign scientists, in particular, I. Ansoff, R. Kunts, A. Thompson, A. Feigenbaum, J. H. Harrinton [5], V. Schuhart, P. Samuelson, F.U.Taylor, V. E.. Covered in the scientific works of Shvets et al.

In a competitive market environment, the perception of quality doesn't stop there, my face changes, says A.V. Feigenbaum also states that "Quality is determined by the consumer's decision, not by the engineer or marketer." [6]

In addition, the future development of agricultural activities is reflected in the research work of a number of scientists. [10]

A common way for small producers to introduce technology and practice is through a farm cluster. This is achieved through the establishment of network and collaborative links between farmers and other participants in the supply chain. The role of agricultural clusters in adopting farmers 'practices and technologies has been studied and it

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is important to understand the decisions that lead to adoption, as they have a major impact on sustainable land use. Farmer clusters have been shown to increase trust and strengthen relationships between members, relying on existing farming networks (i.e. clusters) as a reliable tool for introducing sustainable technologies and achieving land use planning goals. [11]

At present, agriculture is facing a serious problem related to the nutritional needs of the growing population, with limited resources and, at the same time, a negative impact on the environment. Thus, integrated agriculture has been proposed as the best way to solve the problems. Integrated agricultural production has become a promising model of sustainable agriculture. Some political incentives have been proposed to increase the financial attractiveness of integrated agricultural production and to promote a beneficial cycle for the harvester in the future.

The main purpose of this study is to identify the existing structural shortcomings in enterprises and the impact of these vulnerabilities on the ability of the region's sustainable development to increase competitiveness. Structural and focus interviews were used as data collection tools in the study. The results show the shortcomings associated with the organization's capabilities, financial knowledge, and low-tech innovations, indicating that businesses are paying more attention to bogus competitiveness.

Those who were among the first in organic farming often faced social problems because their innovative agricultural ideas not only met resistance in traditional farming societies, but also stigmatized organic farmers as a social deviant. This study examines how organic farmers view stigma control strategies to create an alternative, positive image. The results of the study show the process of institutionalization of organic farming by demonstrating how organic overcame the negative features associated with farming identification by creating a new agricultural category as opposed to the traditional farming category.

D. Tilman and et.al investigated agricultural sustainability and intensive production practices, [12], E. Fonseca [13], K. Marzall [14] and Coteur F.[15] worked at guiding sustainability assessment and on-farm strategic decision making.

Other scientists S. Rodrigues Filho [16], J.M.L. Ferreira [17], Kamilaris A. [18] researched practice of big data analysis in agriculture, so, K.E. Giller and others investigated communicating complexity: integrated assessment of trade-offs concerning soil fertility management within African farming systems to support innovation and development.

On the other hand, M.S. Xuan [20], A.J. Chen [21], E.M. De Olde [22], N. Van Cauwenbergh [23], M. Kropff [24], R. Shaw [25], R. Nikkilä [26], S. Fountas [27], A.Z. Abbasi [28], B.A. Aubert [29], Juan Infante Amate [30] and other economists studied systems approaches for the design of sustainable agro-ecosystems and about making software architecture for farm management information systems in precision agriculture.

In Uzbekistan methods for control efficiency evaluation of the production capacities were studied by Khodiev B. Y. [31], Mustafakulov Sh.I. [33], Tursunov B.O. [32]. They proposed own methodology for assessment the efficiency of production capacities management at textile enterprises

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Issues of quality management and increasing the competitiveness of products in the countries of the Commonwealth of Independent States G.G.Azgaldov, V.A. Dedekaev, S.T.Lapikus, V.S.Mkhitrayan, I.V.Kalinina, N.V.Fatkullin, V.S. Kuxar, I.I.Chayka, Yu.M.Sapego, S.V.Karpova, V.V. Karpuzov, M.M.Kane, B.V.Ivanov, V.N.Koreshkov, A.G.Shirtladze, I.M.Lifits.

S.V.Karpova in her textbook "International Marketing". He defined the concept of competitiveness as a relative quality that is clearly linked to a specific market and a specific selling time. It also emphasizes that a product that is competitive in one market does not have to have this quality in another, that competitiveness is determined only by features that are important to the buyer (consumer).

E.N.Golubkova and M.E.Seyfullaeva in her textbook "International Marketing", the basis of the assessment of competitiveness is the study of market conditions. "Competitiveness" is defined as "a comparative characteristic of a product, which includes a comprehensive assessment of the sum of its consumption and cost qualities in relation to the identified market requirements or the quality of other products."

Our local scientists A.Sh.Bekmurodov, N.K.Yuldashev, N.Mahmudov, Z.Dj.Adylova [7], T.M.Akhmedov, B.T.Salimov, M.U.Badalova [8], U.A.Sadullaev [9], O.A.Safarov and other scientists carried out research work.

At the same time, the issues of increasing the competitiveness of fruit and vegetable products on the basis of the quality management system are not sufficiently covered. This situation necessitates scientific research in these areas, as well as determines the relevance of the research topic.

At the same time, the issues of increasing the competitiveness of fruit and vegetable products on the basis of the quality management system are not sufficiently covered. This situation necessitates scientific research in these areas, as well as determines the relevance of the research topic.

One of the most pressing issues of our time is to increase the competitiveness of agricultural products, especially fruits and vegetables, and to ensure that they have quality indicators that meet the requirements of the world market. Quality says a major American expert, A.V. Feigenbaum “determines the decision of the consumer, not the engineer or marketer. In a competitive market, the perception of quality does not stop, my face changes.” [6]

III. Analysis And Results

According to the results of 2017, the volume of exports of fruits and vegetables and processed products, which are expected to make up one of the main share of the country's foreign trade in the near future, amounted to 708.8 million. USD or increased by 15.6% compared to the previous 2016.

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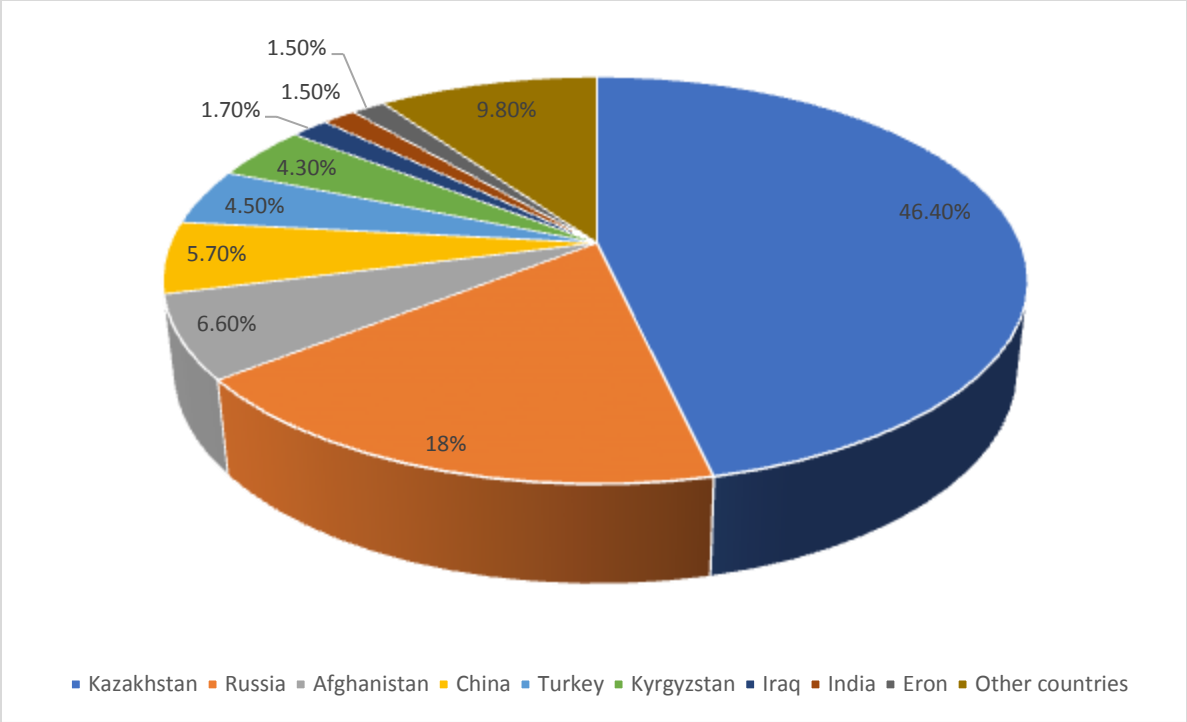

Fig. 1: The Share of Fruit and Vegetable Products and Processed Products in Exports of Major Partner Countries, in%

The main partners in the export of fruits and vegetables and processed products in foreign trade are Kazakhstan (46.4% of the total), Russia (18.0%), Afghanistan (6.6%), China (5.7%), Turkey (4.5%), and Kyrgyzstan (4.3%). Our statistical analysis shows that in 2016, fruit and vegetable products were exported to 51 countries by 697 exporters, while in 2017, 929 exporters exported to 62 countries.

The types and geography of fruit and vegetable exports have been expanding year by year, with fruit and vegetable products and processed products exported to Bulgaria, Sri Lanka, Indonesia, the Philippines, Greece, Qatar, Croatia and Malta for the first time in 2017. According to the study, Uzbekistan is the second largest exporter of dried apricots in the world, the fourth largest supplier of apricots, the seventh largest exporter of plums, the ninth largest exporter of cabbage and raisins, and the tenth largest exporter of peaches and grapes.

Ensuring sustainable fruit and vegetable production requires not only a short-term approach to increasing production, but also a long-term approach to product processing and the balanced distribution of products across the supply chain. The development of value-added production in the fruit and vegetable sector and the development of this market requires the following measures: commercialization of production, identification of potential markets, attracting more farmers to the fruit and vegetable supply chain, using quality varieties of fruits and vegetables cultivation, establishment of an efficient processing system, development of export-oriented processing enterprises, production IFAT standards, achievements of the process of production of knowledge and maximize the use of existing research institutions in the development and potential use of the geographical location of the region.

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Multivariate statistical analysis were used by Mustafakulov Sh. I., Zarova E. V. and others [33], they researched of efficiency of use of production capacity at the enterprises of textile industry of the Republic of Uzbekistan. In this paper we also used multivariate statistical analysis.

The results of research and analysis show the following conclusions:

Wider attraction of investments into the sector, which is the engine of economic development;

Also, increase the number of agro-logistics centers in order to preserve agricultural products and ensure their quality supply to foreign and domestic markets;

Creating more facilities for enterprises engaged in storage, transportation, packaging, primary processing and export of agricultural products;

Implementation of proposals and recommendations, such as further simplification of processes related to the export of agricultural products.

Research shows that the development of innovative technologies has ushered in a new stage of development of the industry in advanced countries in the field of agriculture. At the same time, the efficiency of agriculture depends on "Agriculture 4.0", which is based on innovative techniques and technologies at a new stage of development of science and technology, information technology, similar to the development of industry, not only manual labor, water, soil and fertilizers.

Given that the current increase in employment in the industry, in turn, leads to a decrease in labor productivity, it is desirable to move to a new stage of development of the industry, including the formation of "Agriculture 4.0" increases.

In order to more fully and effectively use the export potential of our country, to study the increase in volumes and types of export of competitive fresh and processed fruit and vegetables in demand in foreign markets on the basis of in-depth marketing research of world markets, the Republic of Uzbekistan Y_{export} fruit and vegetable products export, X_1-area of fruit and vegetable products, volume of investment in the network- X_2 and the number of people employed in the network- X_3 econometric m Delia and determine the process for the purpose of scientific study, it is the first level of contact between the selected factors to determine the value of the coefficient correllation.

Table 1: Correlation between the Factors Influencing the Change in the Export Volume of Fruit and Vegetable Products

	Y, thousand ton	*X_1, thousand ha*	*X_2, billion UZS*	*X_3 , million person*
Y	1			
X_1	0,771056	1		
X_2	0,980635	0,662979	1	
X_3	0,689611	0,765006	0,614352	1

According to the results of the table, all selected factors are correlated with the resultant factor at a moderately strong density and between the factors $|r_{x_1,x_2}| > 0{,}8$ it was found that there was no multicollinearity between the factors since the condition was met. The process of growing and selling fruits and vegetables should be based on the requirements and laws of the free market. This will serve to increase the volume of fruit and vegetable production in

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agriculture and saturate the consumer market, increase export potential. In the context of global climate change, it is necessary to improve the process of growing and selling fruits and vegetables, as well as to prioritize economic support without giving up the possibility of state regulation in the effective management of activities.

Using the Eviews program and statistical data obtained by the State Statistics Committee of the Republic of Uzbekistan for 2000-2018 to make a clear decision and scientifically substantiate the process, the normalized regression equation of changes in fruit and vegetable exports is based on the values determined by the criteria (Table 2).

Table 2: Verification of the Adequacy of the Factor-dependent Regression Equation of the Volume of Fruit and Vegetable Exports by Criteria

Dependent Variable: Y				
Method: Least Squares				
Date: 01/13/20 Time: 20:37				
Sample: 2000 2018				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
			$t_{жад}$=2,100922	
X1	0,323364	0,084412	3.830796	0.0070
X2	0,242392	0,090253	2.685695	0.0051
X3	-0,19394	0,025067	-7,73702	0.0094
C	297,3769	195,5695	1.520569	0.0042
R-squared	0.739076	Mean dependent var		626.2684
Adjusted R-squared	0.686892	S.D. dependent var		123.2411
S.E. of regression	68.96092	Akaike info criterion		11.48962
Sum squared resid	71334.12	Schwarz criterion		11.68845
Log likelihood	-105.1514	Hannan-Quinn criter.		11.52327
F-statistic	14.16270	Durbin-Watson stat		1.971306
Prob(F-statistic)	0.000001			

It can be seen from the table data that the table value for t - $\alpha = 0{,}05$ Statistic criterion and the number of degrees of freedom $df = 18$ are t_{table} = 2.10 for each parameter $t_{x_1} = 3{,}83\ 3$, $t_{x_2} = 2{,}69$, $t_{x_3} = -7{,}74 < t_{table}$, $t_{table} < t_{cal}$ whether t_{x_3} is insignificant or significant according to the condition

Estimation Command:			
==========			
LS Y X1 X2 X3 C			
Estimation Equation:			
==========			
Y = C(1)*X1 + C(2)*X2 + C(3)*X3 + C(4)			
Substituted Coefficients:			
==========			
Y = 0.323364*X1 + 0,242392*X2 -0,193944*X3 + 297.376858957			

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$$Y_э = 0{,}32 * X_1 + 0{,}24 * X_2 - 0{,}2 * X_3 + 297{,}4 \qquad (1)$$

The correlation (1)- coefficient between the retrospective, forecast, and practical values of a variable is usually used as a criterion for evaluating the prognostic properties of the (1) -regression equation. However, a high correlation coefficient between the predicted and observed values does not always indicate that it has been well tested, so it is advisable to check on the criteria of Tale forecast accuracy 0≤TIC≤1 and absolute percentage error MAPE <10% (- high forecast accuracy). Fig.1).

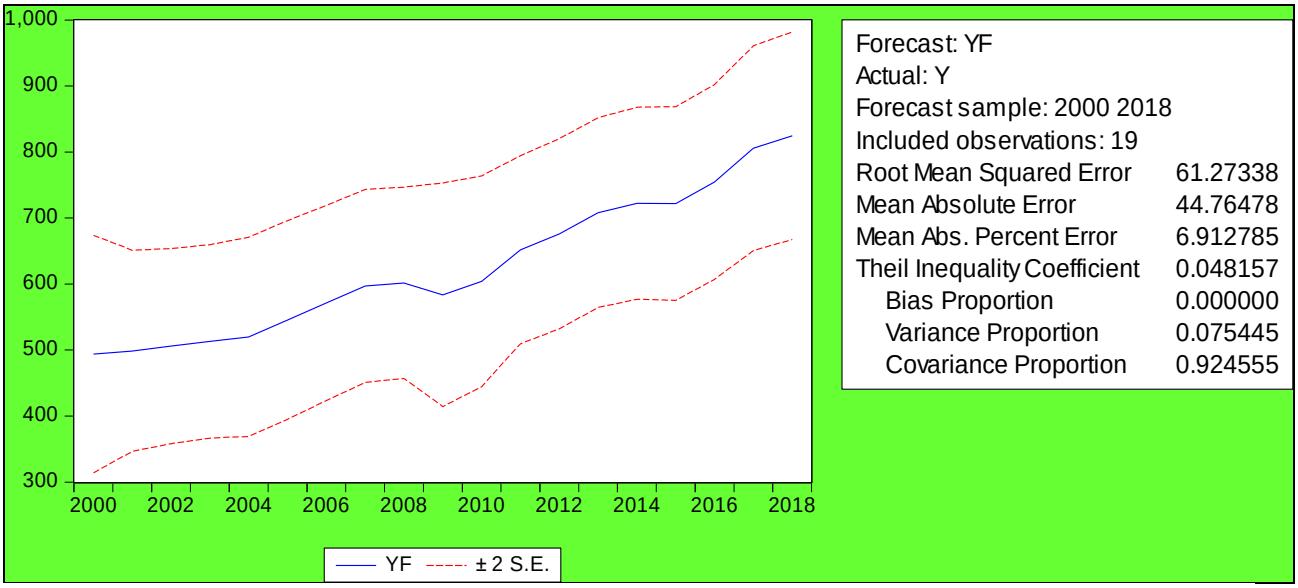

Fig.1: Evaluate the Prediction Properties of the Significance of the Parameters

The forecast quality is very good, we have MAPE = 1.035 <10% and also the TIC = 0.0047 in this process, so the forecast quality is very high and equation (1) -regression is reliable and adequate.

The economic interpretation of the regression equation (1) shows that the volume of fruit and vegetable exports in the country increased by 32% and 24%, respectively, due to a 100% increase in the area of land currently allocated for fruit and vegetable production and investment in fruit and vegetable production. additional upgrades are possible. It should be noted that the current employment in the industry has increased, which leads to a decrease in labor productivity, which leads to a decrease in exports of fruits and vegetables by 20%.

IV. Discussion Of Results

The results of research and analysis show the following conclusions:

improving the reclamation of lands and thereby increasing the volume of fruit and vegetable production;

One of the important indicators of economic efficiency of fruit and vegetable growers is to further increase the level of productivity by crop type;

Further increase the volume of investments in the sector;

Increase the number of agro-logistics centers in order to preserve agricultural products and ensure their quality supply to foreign and domestic markets;

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Creating more facilities for enterprises engaged in storage, transportation, packaging, primary processing and export of agricultural products;

Implementation of proposals and recommendations, such as further simplification of processes related to the export of agricultural products.

We now determine the multifactor forecast of fruit and vegetable export volume based on model (1). In this regard, it is a forecast of changes in the volume of fruit and vegetable exports by identifying a time-dependent model of each factor and replacing the appropriate parameters in model (2).

Fruit and berry field - X_1=164,4+6,4*t;

Investment in the network - X_2=-254,7+125,5*t;

The number of bands in the network -X_3=1,9+0,1*t.

$$Y=0,32*X_1+0,24*X_2-0,2*X_3+297,4 \quad (2)$$

Table 3: Multifactor Forecast of Changes in the Volume of Fruit and Vegetable Exports

Years	Exports of fruits and vegetables, thousand tons	Fruit and berry area, thousand hectares	Investments, bln. sum	Number of employees in the network, mln. person
2020	963,6	298,8	2380,8	4,0
2021	995,8	305,2	2506,3	4,1
2022	1027,9	311,6	2631,8	4,2
2023	1060,1	318,0	2757,3	4,3
2024	1092,2	324,4	2882,8	4,4
2025	1124,3	330,8	3008,3	4,5

As can be seen from the table data. By 2025, compared to 2019, the number of jobs in the industry will increase by 15.4%, the volume of investments in the industry - by 33.4 and the area of fruits and vegetables - by 13.1%. It is expected to reach 1124.3 thousand tons.(table-3)

V. CONCLUSIONS

In short, the fruits and vegetables grown in Uzbekistan are very rich in variety, unique quality, invaluable consumer properties, unique taste and aroma, growing in greenhouses from early spring to late autumn, even in winter, as well as processing. is important in the domestic and global market with its delivery to markets at any time of the year through processing and drying. In general, ensuring the competitiveness of fruit and vegetable products in domestic and foreign markets, thereby creating import-substituting, export-oriented products, primarily by increasing employment in the country, ie providing employment to the rural population and thereby increasing their income, increasing foreign exchange earnings together it enhances its image in the global agricultural and food market.

Ensuring the competitiveness of fruit and vegetable products in the domestic and world markets, as a result of further increasing the export potential, ensuring compliance of products with international standards for quality and safety, further strengthening the "Uzbek quality" in international markets requires the introduction of modern technologies in agriculture. The formation of "Agriculture 4.0" by accelerating the introduction of innovative

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technologies, including information technology, in the agricultural sector, as in all sectors, will increase the efficiency of agriculture in the country and bring the sector to a new stage of development.

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