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Factors for Increasing the Export Potential of Agribusiness in the Fruit and Vegetable Sector of Uzbekistan

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Abstract: The fruit and vegetable sector is incredibly important in both developed and developing economies but most significant in developing economies where it contributes to employment, GDP and food security. This sector provides a sizeable proportion of agricultural output and export volume in Uzbekistan, and is an important source of livelihoods for the rural population while also shaping the development of periphery industry. The potential notwithstanding, the sector suffers from lack of matured market mechanisms with low processing & storage capacity, low technological adoption & poor integration of scientific methods, thus hampering improved exports and adding low value. The research objectives are to analyze the export potential of the products of fruits and vegetables and to propose the organizational and economic mechanisms for the formation of structural-structural-efficient production, processing, supply systems under market conditions. The results show that although export volume and geographical diversification is improving, processed production is low, there is outdated infrastructure leading to significant post-harvest losses, as well as lacking resource, logistics, and certification to maintain competitiveness. It systematizes sectoral problems based on Uzbekistan's reforms and underlines clusters, cooperation and agro-industrial integration as structural solutions. The team writes that the findings indicate that immediate and medium-term policy measures for sustainable sectoral development are modernization of infrastructure, expansion of processing capacities, adoption of innovative and digital technologies, strengthening of institutional and financial support mechanisms to unleash export potential and enhance food security.

Keywords: export, import, cluster, cooperation, households, agribusiness, agro-industry, agropark.

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1. Introduction

In developed countries, approximately 5–6 percent of the population is employed in agriculture, whereas in most developing countries this figure reaches as high as 60–70 percent. Thus, agriculture plays a far more significant role in developing countries than in developed ones. In developed economies, the share of agriculture in gross domestic product averages 4–5 percent, while in developing countries it ranges from 20 to 25 percent [1]. This difference is explained not only by the scale of agricultural production itself, but also by the penetration of processing industries and service sectors into agriculture, as well as by employment patterns within these sectors.

At the same time, in order to address the food supply problem, the volume of agricultural production must increase by approximately 6 percent annually. This implies that agriculture faces a dual task: not only to expand production volumes, but also to integrate industrial methods and technologies into agricultural activity. Solving these problems is directly linked to the development of entrepreneurial activity within the agro-industrial complex [2][3].

In the Republic of Uzbekistan, fruit and vegetable production accounts for 32.2 percent of total agricultural output and contributes 8.7 percent to GDP, while also serving as one of the main sources of income for the rural population. Moreover, this sector exerts a direct influence on the development of a number of industrial branches. It also occupies a leading position in the country's agricultural exports. The development of the processing industry stimulates demand for fruit and vegetable products produced by the population and, ultimately, contributes to an increase in production volumes [4].

2. Literature Review

The development of entrepreneurship in the fruit and vegetable sector encourages the expansion of production in peasant and household farms by creating opportunities for marketing and processing their output. One of the important latent functions of small business is the formation of a competitive environment in a market economy. Certainly, when small firms compete directly with large corporations, they often suffer defeat. However, in the broader relationship between the small business sector and large capital, small firms continue to serve as an essential driving force [5].

Among Uzbek scholars, A. Ulmasov and N. Tukhliyev define entrepreneurship as an income-generating economic activity and as engagement in economic activity with responsibility assumed for the purpose of earning income [6]. These definitions are conceptually close to each other and do not clearly distinguish one notion from the other. On this basis, it may be concluded that A. Ulmasov further developed his own interpretation of these concepts and offered a more complete definition of business. In particular, he defines business as activity aimed at obtaining income through lawful means in a broad sense, while entrepreneurship is considered an economic activity through which individuals, as owners of property, place material and financial resources into actual economic circulation with the aim of earning income. In his view, entrepreneurship does not simply mean making money; rather, it implies generating income through creative activity [7].

Under conditions of a free market economy, small entrepreneurship changes its organizational forms and types over time and, depending on its own capacities and the impact of the external environment, may alter its fields of activity and shift from one form to another. In the global economy, agriculture, including fruit and vegetable production, occupies a special place in supplying the population with food products and the processing industry with raw materials. According to official statistics, global demand for fruit and vegetable products increased by an average of 5–7 percent annually during 2024 [8].

F. Kotler studied methods of delivering fruit and vegetable products to consumers. According to him, the main methods of supplying consumers with fruits and vegetables are as follows:

- delivery in freshly harvested form to markets and supermarkets;
- storage;
- temporary storage in warehouses;
- storage using specialized refrigeration chambers;
- storage of individually quick-frozen fruit and vegetable products;
- processing;
- drying of products [9].

3. Research Methodology

In recent years, a number of regulatory documents aimed at developing fruit and vegetable production have been adopted in Uzbekistan. These include Presidential Decree

No. PF-5388 of March 29, 2018, “On Additional Measures for the Accelerated Development of Fruit and Vegetable Production in the Republic of Uzbekistan,” Presidential Decree No. PF-5853 of October 23, 2019, “On Approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020–2030,” Resolution No. PQ-3978 of October 17, 2018, “On Additional Measures to Increase the Efficiency of Bringing Fruit and Vegetable Products to Foreign Markets,” and Resolution No. PQ-4239 of March 14, 2019, “On Measures to Develop Agricultural Cooperation in the Fruit and Vegetable Sector.” In addition, the methodological basis of this study relies on the work of A. S. Khudjaev, who economically and statistically examined the introduction of advanced innovations based on an analysis of the economic development of specialized farms in the United States, Japan, Israel, and European Union countries, as well as on modern forms such as clustering in the systematic development of state programs [10]. It also draws on the work of E. D. Yusupov, who investigated the organizational and economic mechanisms for selecting and locating fruit tree varieties in line with changing market demand as a factor in the sustainable development of horticulture [11].

4. Analysis and Results

In the Republic of Uzbekistan, the overwhelming majority of fruit and vegetable products are produced by household plots and peasant farms. Agro-firms are mainly engaged in the storage, processing, and export of fruit and vegetable products. The principal destinations for Uzbekistan’s fruit and vegetable exports are Kyrgyzstan, Kazakhstan, Russia, and Turkey. According to available data, by the end of 2024, 1.4 million tons of fruit and vegetable products were exported from the republic, accounting for 7.3 percent of total production [12].

According to statistical data, fruits and vegetables accounted for 7 percent of total exports in 2024. The largest share of fruit and vegetable exports in 2024 went to the Republic of Kazakhstan, which accounted for 39 percent of total exports, or 557 thousand tons. In 2024, 245 thousand tons of fruit and vegetable products were exported to the Russian Federation, representing a 3 percent increase compared with 2023. This accounted for 17.1 percent of total fruit and vegetable exports. In 2024, 127 thousand tons of fruit and vegetable products were exported to the Kyrgyz Republic, which was 41 percent higher than in 2023 and represented 9 percent of total exports [13].

The geographical scope of Uzbekistan’s fruit and vegetable exports is steadily expanding. In 2024, compared with the previous year, exports increased to Turkey by 2.7 times, to Pakistan by 2.5 times, to Ukraine by 3.6 times, to Tajikistan by 3.6 times, to Iran by 1.3 times, to Iraq by 3.4 times, to Belarus by 1.6 times, to Azerbaijan by 1.5 times, and to Germany by 7 percent (Table 1).

Table 1. Geography of Fruit and Vegetable Exports from the Republic of Uzbekistan, thousand tons

Countries	2023	2024	Change in 2024 vs. 2023, %	Share in total exports, 2023, %	Share in total exports, 2024, %
Kyrgyzstan	89,9	127	141	7,2	9,03
Kazakhstan	598	557	93	47,9	39,6
Russian Federation	239	245	103	19,1	17,4
Turkey	23,5	65,1	277	1,88	4,63
Pakistan	29,8	76,2	256	2,39	5,42
Afghanistan	73,4	45,5	62	5,88	3,23
People’s Republic of China	66,9	55,3	82,7	5,36	3,93
Ukraine	15,1	55,2	366	1,21	3,92
Tajikistan	5,8	21	362	0,46	1,49
Iran	13	16,2	125	1,04	1,15

Iraq	6,1	20,5	336	0,49	1,46
Belarus	8,5	14,3	168	0,68	1,02
UAE	11,6	27,5	237	0,93	1,95
Turkmenistan	9,5	8,5	89,5	0,76	0,6
Azerbaijan	4,3	6,5	151	0,34	0,46
Germany	2,7	2,9	107	0,22	0,21
Other countries	51,8	64,1	124	4,15	4,56
Total	1249	1407	113	100	100

Fruit and vegetable production accounts for 32.2 percent of total agricultural output and 8.7 percent of national GDP, while serving as one of the main sources of income for the rural population. The sector directly influences the development of several industrial branches and occupies an important place in the country's agricultural exports [14].

The efficiency of sustainable fruit and vegetable development within agribusiness directly affects not only the living standards of the rural population, but also the social welfare of the country's entire population. Ultimately, the main objective of these reforms is to ensure food security and to reflect the positive outcomes of the economic reforms being implemented across all processes of New Uzbekistan's development, thereby improving living standards.

At the same time, as emphasized in official discourse, effective market mechanisms have not yet been systematically established, particularly in the development of fruit and vegetable growing and viticulture, and the insufficient application of scientific approaches prevents full use of the sector's existing potential. According to estimates, compared with raw cotton produced on one hectare of land, grapes can generate seven times more income, cherries six times more, and walnuts five times more [15].

Likewise, it cannot be said that the existing opportunities for processing, storing, and exporting these products are being fully utilized. As President Sh. Mirziyoyev noted, only a relatively small share of the fruit and vegetables grown in the country is processed and exported, and these indicators remain especially low in Syrdarya, Jizzakh, Khorezm, Kashkadarya, and Tashkent regions. This export performance still does not correspond to the country's opportunities and production potential. Based on the experience of developed countries, the sector still lacks sufficient machinery for orchard and vineyard cultivation, as well as for planting and harvesting vegetables and potatoes. The provision of fuels and lubricants, mineral fertilizers, seeds, and plant protection measures for farms and peasant households has also not been organized at the required level.

Another underutilized opportunity is the processing of fruit and vegetable products without spoilage and the extension of their seasonal availability. A broader assortment of fresh and preserved fruit products would help prevent artificial price increases during the winter-spring season, positively affect social protection, and reduce the need for imports of related products in winter.

One of the key factors in developing competitive production and improving its product assortment is the preparation of a wide range of food additives based on the processing of locally available natural raw materials. For example, most sweet soft drinks are currently produced using imported artificial additives such as tinctures and extracts purchased with foreign currency. However, the country's existing raw material potential and the competitive natural food additives that can be obtained through the processing of fresh fruits could open dozens of new possibilities for the assortment of soft drinks. At the same time, this could create opportunities to revive hundreds of beverage enterprises of various capacities in the regions that currently lack foreign-currency resources to import raw materials.

The findings indicate that the growing annual volume of fruit and vegetable production requires a fundamental transformation in the storage and processing sector, including the elimination of a number of existing problems and deficiencies and the

extensive use of modern innovative, resource-saving, and digital technologies in sectoral reform.

- only 18.9 percent of fruit, 5.6 percent of vegetables and melons, and 9.5 percent of grapes are processed industrially relative to total production volumes in the republic;
- the level of refrigeration capacity available for storing fruit and vegetable products in the regions is only 3.7 percent, while cold-storage facilities are utilized at merely 20–22 percent of their annual capacity;
- most existing refrigeration facilities are physically and technologically outdated, and modern technologies and digital innovations have not been introduced at the required level;
- the issue of training qualified personnel for the sector requires an innovative approach, as insufficient attention is paid to preparing specialists capable of working with advanced modern equipment in storage and processing;
- there is no systematic approach to ensuring that storage and processing enterprises are adequately supplied with products in the required volumes and according to modern technological standards;
- the transport and logistics sector lags behind contemporary requirements;
- in recent years, fruit and vegetable production has increasingly relied on intensive technologies. As a result, the use of agricultural resources, including fuels, lubricants, and chemical inputs, has intensified. For fruit and vegetable production alone, there is a shortage of 255 thousand tons of phosphorus fertilizers and 290 thousand tons of nitrogen fertilizers. Rising seed prices, low rural incomes, increased use of mineral fertilizers and chemicals, heavy machinery, declining land quality, and disruption of ecological balance are also becoming serious concerns.

Therefore, according to analyses and data from the Food and Agriculture Organization of the United Nations (FAO), losses during the harvesting, transportation, and storage of fruit and vegetable products range from 22 to 45 percent, while waste accounts for 12 to 18 percent [16].

Another important issue is the absence of information and advisory centers and digital technologies that provide buyers with necessary information about products grown in the regions. In addition, the unresolved transport and logistics problems in the republic continue to hamper sorting, processing, packaging, and delivery to buyers.

The level of fruit and vegetable processing in Uzbekistan has increased over the last two years. In 2024, exports of processed fruit and vegetable products amounted to USD 47.9 million, which was 56 percent higher than in 2023. In the same year, exports of vegetables exceeded exports of processed products. Vegetable exports totaled USD 542.4 million in 2024, representing an increase of 70.1 percent compared with 2023. Fruit and berry exports reached USD 658.1 million, which was 16.1 percent higher than the previous year. Although the export value of fruits and berries exceeded that of vegetables, its growth rate was lower (Table 2).

Table 2.
Export Structure of Fruit and Vegetable Products in the Republic of Uzbekistan
in 2024, million US dollars

Product name	Million US dollars	Compared with 2023, %
Fruits and berries	658.1	116.1
Vegetables	542.4	170.1
Processed fruit and vegetable products	47.9	156.0

Global demand for organic products continues to increase. Consumers in Europe and Asia are willing to pay higher prices for certified organic products. Uzbekistan's fruit and vegetable products are naturally close to organic, but most of them are not certified by the relevant certification bodies. As a result, Uzbek agricultural products are often re-exported through third countries after being processed or packaged in accordance with international requirements.

International Experience.

In developed countries, only 2–5 percent of labor resources are employed in agriculture, whereas in most less developed countries the figure may reach 90 percent. Agricultural production plays a much larger role in developing countries than in developed ones. The share of agriculture in GDP averages 22 percent in developing countries and 4 percent in developed countries. More than half of the world's agricultural products are produced in developing countries. According to UN experts, solving the food problem requires annual production growth of 6 percent.

According to FAO, trade in dried nuts and fruits in Europe amounted to EUR 11 billion, while trade in dried vegetables exceeded EUR 8 billion. The experience of new market participants such as Vietnam demonstrates that, if the right strategy is adopted, it is possible to export products worth more than EUR 1 billion annually.

Analyses show that productivity in orchards and vineyards in Uzbekistan remains very low. For example, in agriculturally advanced countries such as the United States, China, Italy, and France, intensive orchards yield 80–120 tons per hectare, and in some cases up to 140 tons. In Uzbekistan, however, yields range from 10 to 30 tons per hectare, while traditional orchards and vineyards produce only 4–5 tons. This clearly indicates economically inefficient agricultural production.

Recommended Measures for the Sustainable Development of the Fruit and Vegetable Sector

First, it is necessary to modernize and renew the fruit and vegetable sector and to develop and implement measures that provide a strong impulse for sustainable development and ensure the competitiveness of the products produced.

Second, given the increasing dependence of consumer markets around the world on imports, it is necessary to ensure food security and improve the mechanisms of state support and governance in the agrarian sector.

Third, because water scarcity is intensifying from year to year and the possibilities for effective use of irrigated land are becoming increasingly limited, special attention should be paid to advanced irrigation methods based on innovative technologies, especially the widespread introduction of drip irrigation.

Fourth, among the factors affecting the sustainable development of fruit and vegetable production, it is important to conduct an in-depth analysis of the economic, technological, legal, and other capacities and achievements of farmers and agricultural enterprises and to mobilize existing scientific and innovative potential through the elimination of identified shortcomings.

Fifth, programs should be adopted that aim to replace imported fruit and vegetable products with domestic production by making full and effective use of internal capabilities in order to meet population needs.

Furthermore, analyses of the experience of developed countries in the cultivation, storage, processing, and export of fruit and vegetable products show the need to develop cooperation and clusters among producers of these goods.

The economic growth of the fruit and vegetable sector should not be achieved merely by expanding the use of existing domestic resources. Rather, it should be secured through the introduction of production cooperation and cluster systems capable of generating competitive products that meet modern quality requirements.

Proposals for Further Supporting the Fruit and Vegetable Sector in Uzbekistan. Based on the above analysis, it is advisable to focus on the following priorities in ensuring the sustainable development of the sector under Uzbekistan's conditions:

- further strengthen financial incentives for model enterprises operating in rural areas and specializing directly in the storage and processing of agricultural products through innovative resource-saving methods, while introducing tax, customs, and other benefits for such enterprises;
- economically stimulate the expansion of preparation, storage, and processing of agricultural raw materials through the development of compact and small industrial branches in every rural area of the republic, as well as the production of marketable and competitive finished products for domestic and foreign markets through measures such as foreign-currency allocation, preferential taxation, and credit support;
- establish export-credit institutions, or assign the relevant responsibilities to a competent ministry or agency, in order to provide entrepreneurs with comprehensive practical assistance before the export process, including access to credit, insurance, market entry, management of geographical, economic, financial, and quality risks, transport and logistics, certification, food safety (HACCP), standards compliance, and participation in international exhibitions and trade fairs;
- establish multi-sectoral “Agropark” and “Agro-Industrial” agrologistics complexes based on digital innovative technologies in convenient locations, equipped with all necessary facilities for product sales, storage, processing, packaging, biolaboratory services, standardization, and all procedures up to export;
- introduce a “Fruit and Vegetable Clinic” service;
- develop legal, regulatory, and technical documents governing quality and safety requirements for fruits, vegetables, and processed products.

In recent years, the expansion of opportunities for exporting agricultural products has led to increased demand for them. In particular, the growing demand for fruit and vegetable products necessitates not only support for household producers, who remain the primary growers, but also the establishment of other forms of agricultural enterprises.

In Uzbekistan, large cooperative-type agricultural entities did not justify expectations and were therefore transformed into farmer enterprises. Since farmer enterprises have mainly specialized in cotton and grain production, attention to fruit and vegetable cultivation declined. However, the increasing foreign-exchange earnings from fruit and vegetable exports now make it necessary to establish enterprises specialized in this field.

Over the last two years, the country has created a regulatory and legal framework for establishing market-oriented clusters and cooperation systems specializing in fruit and vegetable production, processing, and export. In particular, this framework provides for:

- the establishment of fruit and vegetable clusters for the cultivation, processing, and export of fruit, vegetable, and grape products;
- the activation of underutilized capacities for product storage and processing based on available experience and opportunities;
- the conclusion of voluntary supply contracts and the formation of product prices on the basis of actual costs;
- the provision of agrotechnical and agrochemical services, recommendations on the application of new innovative technologies, and information and advisory services.
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5. Conclusion.

In conclusion, it is necessary to further strengthen financial incentives for model enterprises specializing directly in the innovative, resource-saving storage and processing of agricultural products, as well as to introduce tax, customs, and other benefits for them. It is also essential to promote the preparation, storage, and processing of agricultural raw materials through the development of compact industrial branches in every rural area of the republic and to economically stimulate the production of competitive finished products for domestic and foreign markets. Moreover, the establishment of export-oriented enterprises capable of providing practical assistance in transport and logistics, certification, food safety, standards compliance, and participation in international exhibitions and fairs will serve as a solid foundation for the development of fruit and vegetable enterprises..

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