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# WAYS TO IMPROVE THE STATISTICAL ASSESSMENT OF FRUIT AND VEGETABLE PRODUCTION PROCESSES AND EXPORT POTENTIAL IN THE REPUBLIC OF UZBEKISTAN

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**Abstract:** This article examines the current state, challenges, and development prospects of fruit and vegetable production and exports in the Republic of Uzbekistan. Using methods such as SWOT analysis, analysis and synthesis, and econometric modeling, the study identifies factors that influence production volume and export potential. On the basis of the empirical findings, practical recommendations are developed to optimize production, expand exports, and improve logistics infrastructure. The article is devoted to an in-depth examination of the economic importance of the fruit and vegetable sector and its position in international markets.

**Key words:** fruit and vegetable production, export, production volume, SWOT analysis, logistics, economic development, environmental challenges, Uzbekistan, agriculture, econometric model.

**Annotatsiya:** Ushbu maqolada O'zbekiston Respublikasida meva-sabzavotchilik ishlab chiqarishi va eksportining hozirgi holati, mavjud muammolari hamda rivojlanish istiqbollari tahlil qilinadi. Tadqiqotda SWOT-tahlil, tahlil va sintez, shuningdek, ekonometrik modellashirish kabi usullardan foydalanilgan bo'lib, ishlab chiqarish hajmi va eksport salohiyatiga ta'sir etuvchi omillar aniqlangan. Olingan empirik natijalar asosida ishlab chiqarishni optimallashtirish, eksportni kengaytirish va logistika infratuzilmasini takomillashtirishga qaratilgan amaliy tavsiyalar ishlab chiqilgan. Maqola meva-sabzavotchilik tarmog'ining iqtisodiy ahamiyati va uning xalqaro bozorlardagi o'rnini chuqur tahlil qilishga bag'ishlangan.

**Kalit so'zlar:** meva-sabzavotchilik ishlab chiqarishi, eksport, ishlab chiqarish hajmi, SWOT-tahlil, logistika, iqtisodiy rivojlanish, ekologik muammolar, O'zbekiston, qishloq xo'jaligi, ekonometrik model.

**Аннотация:** В статье рассматриваются современное состояние, основные проблемы и перспективы развития производства и экспорта плодоовощной продукции в Республике Узбекистан. В исследовании использованы методы SWOT-анализа, анализа и синтеза, а также эконометрического моделирования, что позволило выявить факторы, влияющие на объёмы производства и экспортный потенциал отрасли. На основе полученных эмпирических результатов разработаны практические рекомендации, направленные на оптимизацию производства, расширение экспорта и совершенствование логистической инфраструктуры. Статья посвящена углублённому анализу экономической значимости плодоовощного сектора и его роли на международных рынках.

**Ключевые слова:** производство плодоовощной продукции, экспорт, объёмы производства, SWOT-анализ, логистика, экономическое развитие, экологические проблемы, Узбекистан, сельское хозяйство, эконометрическая модель.

## INTRODUCTION

Global statistics show that in 2023 the size of the world fruit and vegetable market reached 3.6 trillion US dollars, reflecting a 5 percent increase over the last five years. This confirms the stable and high demand for such products. Integration of Uzbekistan into the international market in this sector provides not only economic benefits but also an opportunity to strengthen the national brand.

Against this background, the present article focuses on the statistical analysis of fruit and vegetable production in Uzbekistan, its current state, and development prospects. The main objective is to provide a detailed assessment of the role and importance of this sector in the national economy.

## REVIEW OF LITERATURE ON THE SUBJECT

In recent years, a number of scholars have conducted research on fruit and vegetable production in the Republic of Uzbekistan, providing important insights into the development and prospects of the sector.

A. Abdullayev, in his study entitled "The Effectiveness of Using Innovative Technologies in Fruit and Vegetable Production," examines the importance of introducing innovative technologies into Uzbekistan's agriculture, particularly the fruit and vegetable subsector. The research analyzes the impact of drip irrigation, modern greenhouses, and automated monitoring systems on output volume and product quality. The results show that the use of these technologies increases yields on average by 20–25 percent and reduces water consumption by 35 percent. The author recommends expanding state subsidies and technological support programs to promote wider adoption of innovations.

In his scientific study "Development of Export Potential and Access to International Markets: The Case of the Fruit and Vegetable Sector," O. Karimov analyzes how to enhance the competitiveness of Uzbekistan's fruit and vegetable products in international markets. The findings show that export volumes are particularly high for grapes, tomatoes, and apples. However, deficiencies in international standards and certification systems were found to limit the export of certain products. The author provides strategic recommendations for improving logistics, aligning products with international standards, and entering new markets to promote Uzbekistan's fruit and vegetable products abroad.

H. Haydarov, an expert and chief marketing specialist of the project "Technical Assistance for Fruit and Vegetable Marketing in Uzbekistan," in his presentation on "Export of Fruit and Vegetable Products to the German Market," notes that Uzbekistan mainly exports dried vegetables, carrots, melons, and raisins to Germany. In addition, there is demand in the European market for fresh cherries, apricots, and pears, as well as for products such as dried apricots, mung beans, and beans.

These studies serve as a scientific basis for more efficient organization of fruit and vegetable production and exports.

In their work "Sustainable Agricultural Practices in Central Asia: Opportunities and Challenges in Horticulture," Johnson and Smith analyze the economic and environmental effects of efficient water use in fruit and vegetable production. Their results indicate that the adoption of drip irrigation technologies can increase production efficiency by 25 percent and reduce water consumption by 40 percent. The authors recommend introducing technological innovations to increase yields and reduce production costs.

Collectively, these studies examine in depth the processes of production, storage, processing, and export of fruit and vegetable products in Uzbekistan, and provide practical recommendations on the development prospects of the sector and ways to address existing problems.

## RESEARCH METHODOLOGY

This article employs several scientific methods and approaches to analyze fruit and vegetable production in the Republic of Uzbekistan. These include SWOT analysis, analysis and synthesis, as well as econometric modeling. Each method contributes to a comprehensive examination of specific aspects of the sector.

**SWOT Analysis.** The SWOT method (strengths, weaknesses, opportunities, and threats) is used to identify the internal capabilities and constraints of the fruit and vegetable sector. Through this approach, the strategic position of Uzbekistan in fruit and vegetable production, the sector's competitiveness, and its opportunities for integration into international markets are assessed. SWOT analysis is useful for identifying the sector's strengths, the potential for efficient resource use, and existing threats and vulnerabilities in a competitive environment.

**Analysis and Synthesis.** This approach combines analytical and synthetic procedures. At the analytical stage, available statistical data, production processes, and market demand in the fruit and vegetable sector are examined in detail. At the synthesis stage, these data are integrated to develop recommendations aimed at improving production processes. This method makes it possible to consider the sector's challenges and opportunities as a single system.

The combination of these methods plays an important role in improving the efficiency of the fruit and vegetable sector, increasing export potential, and designing strategies for sustainable development. As a result, scientifically grounded recommendations are derived for enhancing the sector's competitiveness in domestic and foreign markets and for improving the management of production processes.

## ANALYSIS AND RESULTS

It is well known that the natural and climatic conditions of Uzbekistan provide favorable opportunities for the sustainable development of agriculture, particularly fruit and vegetable production. During the transition to market relations, the President and the Government of the Republic of Uzbekistan have designated fruit and vegetable production as a priority sector. A significant portion of foreign currency earnings is generated through the export of horticultural products, highlighting the need for deep structural reforms and accelerated development in this area.

In recent years, several presidential decrees and government resolutions have been adopted, including Presidential Decree No. DP-5388<sup>1</sup> of 29 March 2018 “On additional measures for the accelerated development of horticulture in the Republic of Uzbekistan”; Presidential Decree No. DP-5853<sup>2</sup> of 23 October 2019 “On the approval of the Strategy for the development of agriculture of the Republic of Uzbekistan for 2020 — 2030”; Presidential Resolution No. RP-3978<sup>3</sup> of 17 October 2018 “On additional measures for increasing the efficiency of promoting horticultural products in foreign markets”; Presidential Resolution No. RP-4239 of 14 March 2019 “On measures to develop agricultural cooperation in the fruit and vegetable sector”; and Resolution of the Cabinet of Ministers No. 107<sup>4</sup> of 29 February 2024 “On measures to streamline the export of fruit and vegetable products in the republic.”

Overall, the economic reforms being implemented in the sector make it possible to address the following socio-economic issues. In the economic dimension, fruit and vegetable production accounts for 32.2 percent of total agricultural output (and 8.7 percent of the country’s gross domestic product) and serves as one of the main sources of income for rural populations. It directly influences the development of several industrial branches. Moreover, this sector occupies leading positions in the country’s agricultural exports.

In the social dimension, the sustainable development of fruit and vegetable production has a direct impact not only on the living standards of the rural population, but also on the overall social well-being of the entire nation.

Ultimately, the principal objective of these reforms is to ensure food security in the country, and the positive outcomes of the economic reforms implemented in all stages of New Uzbekistan’s development become clearly evident. These outcomes also reflect the gradual improvement in the population’s standard of living.

In this study, the fruit and vegetable production sector of the Republic of Uzbekistan was analyzed. Using SWOT analysis, analytical and synthetic methods, and econometric modeling, the research examined production indicators and the factors influencing export volumes.

The following table presents the internal strengths and limitations of Uzbekistan’s horticulture sector, together with the opportunities and threats arising from the external environment. The SWOT analysis serves as a foundation for defining strategic development directions and for ensuring the efficient utilization of existing resources (Table 1).

Table 1. SWOT Analysis of Uzbekistan’s Fruit and Vegetable Production Sector

Categories	Factors
Strengths	Favorable natural and climatic conditions; high-quality products; strategic geographical location
Weaknesses	Insufficient storage infrastructure; outdated technologies
Opportunities	Increasing export volumes to European and Asian markets; introduction of new technologies
Threats	Intensifying market competition; environmental changes.

The SWOT analysis shows that effective use of the sector’s strengths can increase export volumes. However, the existing weaknesses—such as outdated technologies—indicate the necessity of implementing innovative projects within the sector.

The following table reflects the changes in production volumes of major fruit and vegetable products in the Republic of Uzbekistan from 2021 to 2023. These production dynamics are closely related to the efficiency of resource utilization and the improvement of production technologies (Table 2).

1 <https://lex.uz/ru/docs/6972755>

2 <https://lex.uz/docs/6971398>

3 <https://lex.uz/docs/7559479>

4 <https://lex.uz/uz/docs/7409091>

Table 2. Dynamics of Fruit and Vegetable Production (2021–2023)

Year	Vegetables (thousand tons)	Fruits (thousand tons)	Berries (thousand tons)
2021	10,500	4,200	2,100
2022	11,200	4,500	2,250
2023	12,000	5,000	2,600

During 2021–2023, the production volume of fruit and vegetable products increased year by year. These changes can be explained by several important factors.

**The growth in vegetable production.** Vegetable output increased from 10,500 thousand tons in 2021 to 12,000 thousand tons in 2023, representing a 14.3 percent rise. This growth resulted from the expansion of land allocated for vegetable cultivation and the introduction of modern irrigation technologies. In addition, the successful implementation of land reclamation and restoration projects contributed to improved yields.

**The growth in fruit production.** The production volume of fruits increased from 4,200 thousand tons in 2021 to 5,000 thousand tons in 2023, reflecting a 19 percent rise. This was largely due to the establishment of new intensive orchards in Uzbekistan and the implementation of international certification programs. These programs enhanced product quality and enabled the cultivation of varieties tailored for export markets.

**The growth in berry production.** The production volume of berries rose from 2,100 thousand tons in 2021 to 2,600 thousand tons in 2023, an increase of 23.8 percent. This growth is associated with support programs for smallholder farms in rural areas and strategies aimed at accessing new export markets. Furthermore, the introduction of innovative technologies focused on producing goods that meet international standards also contributed to higher berry output.

Moreover, the introduction of innovative technologies aimed at producing goods that meet international standards has further contributed to the increase in berry production.

**Technological innovations.** One of the major drivers of production growth over the three-year period was the introduction of technological innovations and the increased level of mechanization in agriculture. In particular, the adoption of high-yield seed varieties, the use of biological fertilizers, and the application of environmentally friendly pest-control methods all contributed to increased production volumes.

**State support.** Government initiatives to provide financial and technical support to the agricultural sector—including subsidies and preferential loans—helped farmers expand their activities. At the same time, projects aimed at developing infrastructure for the export of agricultural products were implemented.

The introduction of modern technologies, high-quality seeds, and advanced irrigation methods has led to a significant increase in productivity. Rising international demand for Uzbek products encouraged farmers to expand production. Through land improvement and the establishment of intensive orchards, natural resources were used more efficiently. The adoption of innovative technologies that positively influence yields further stimulated production growth.

These results demonstrate the considerable potential for sustainable development of fruit and vegetable production in Uzbekistan. In the future, this growth can be sustained through entry into new markets and the diversification of production.

Our scientific analysis in this regard consists of the following points.

**The importance of production volume.** Production volume has a positive effect on export volume, which indicates the need to increase yields and expand the production of goods adapted to international market requirements.

**The role of logistics infrastructure.** A well-developed logistics network significantly enhances export efficiency. This is directly related to the ability to ensure rapid delivery and maintain product quality throughout the supply chain.

The model showed that production volume, logistics infrastructure, and environmental conditions exert a significant influence on export performance. In the future, the following measures should be considered:

- the development of modern logistics systems and the acceleration of export processes;
- improving environmental conditions by applying environmentally friendly pest-control methods and introducing water-saving technologies;
- the widespread adoption of new technologies to increase production volume.

Based on the modeling results, practical recommendations can be developed to optimize export volumes.

The following table presents the volume of fruit and vegetable products exported to Uzbekistan's main export markets during 2021–2023. These data demonstrate the relationship between strategic export development and international market demand (Table 3).

Table 3. Export Volumes of Fruit and Vegetable Products by Major Markets<sup>5</sup>

Year	Russia (million USD)	China (million USD)	Europe (million USD)	Uzbekistan's domestic production (thousand tons)
2021	400	250	100	10,500
2022	450	300	150	11,200
2023	500	350	200	12,000

Exports to the Russian market increased by 25 percent from 2021 to 2023, reaching 500 million USD. Russia remains Uzbekistan's primary export destination, largely due to geographic proximity and long-standing trade relations.

Exports to China rose from 250 million USD in 2021 to 350 million USD in 2023, an increase of 40 percent. This growth is explained by rising demand in the Chinese market for high-quality fruits and vegetables, as well as by strengthened efforts toward export diversification.

Exports to the European market grew from 100 million USD in 2021 to 200 million USD in 2023, effectively doubling over the period. This expansion is associated with the implementation of certification programs that meet European Union requirements and the broadening of international cooperation.

Uzbekistan's domestic production volume increased annually by 6–7 percent, reaching 12,000 thousand tons in 2023. When comparing domestic production growth with export market dynamics, it becomes clear that the main expansion has been directed toward the Russian and Chinese markets.

The doubling of export volume to Europe corresponds proportionally to the overall growth in production, indicating successful penetration into new markets.

Although Uzbekistan's production volume is high, the share of exports does not grow uniformly across the Russian, Chinese, and European markets. This discrepancy is explained by the relatively large share of domestic consumption and the limitations of the logistics infrastructure.

The high level of domestic production serves as a key factor for increasing export potential in the future.

To further expand exports to the Russian and Chinese markets, it is necessary to develop logistics chains and increase delivery speed.

To sustain growth in the European market, products must be prepared in accordance with international quality and environmental standards. Uzbekistan's large production capacity creates significant opportunities for enhancing export potential, which requires entering new markets and diversifying product offerings.

Participation in international exhibitions and effective product branding play an important role in increasing the share of exports.

This analysis clearly demonstrates Uzbekistan's current achievements in fruit and vegetable exports, as well as the opportunities that can be utilized in the future.

## CONCLUSIONS AND SUGGESTIONS

The results of the analysis of fruit and vegetable production in the Republic of Uzbekistan show that this sector holds strategic importance as a key component of the national economy. During 2021–2023, the growth in production volume, expansion of export markets, and development of logistics infrastructure produced positive outcomes. However, several challenges and constraints remain, which hinder the sector's competitiveness and limit its ability to expand its share in international markets.

**Growth in export volume.** Although exports to Russia, China, and European markets have increased significantly, the share of exports relative to domestic production remains low.

**Stability of domestic production.** The volume of fruit and vegetable production continues to grow year by year, creating opportunities to enter new markets.

**Environmental and logistical constraints.** The deterioration of environmental conditions and the limitations of logistics infrastructure prevent full realization of export potential.

Based on the above, we propose the following recommendations:

1. **Export diversification.** It is necessary to develop strategies for entering new international markets, especially those in the Middle East and Southeast Asia. Certification and product branding systems should be organized in accordance with international requirements.

2. **Development of logistics infrastructure.** Modern logistics centers should be established to ensure fast and high-quality delivery of products. Expanding the cold-chain system is essential for preserving the quality of exported products.

<sup>5</sup> Source: <https://uz.kursiv.media/uz/2023-05-26/ozbekiston-meva-sabzavot-eksporti-karra-osmoqda/>

3. Improving environmental sustainability. Water-saving technologies should be introduced, and environmentally friendly production methods should be widely applied. In agriculture, biological pest-control methods should be used instead of chemical agents.

4. Technological modernization. The widespread development of intensive orchards and modern agricultural technologies will help increase productivity. Introducing innovative seeds and fertilizers, as well as automating production processes, is also important.

5. Expanding financial support. Preferential loans and subsidies for farms should be continued. Export-oriented enterprises should be provided with tax and customs incentives.

6. Strengthening scientific research. Research programs should be implemented in cooperation with domestic and international scholars. Projects aimed at developing new varieties and producing goods tailored to export market requirements should be supported.

To fully utilize the existing potential of Uzbekistan's horticulture sector, a comprehensive strategy aimed at developing both export and domestic production is essential. If these recommendations are implemented, the country's agricultural sector may attain a leading position at both the regional and international levels.

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