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ANALYSIS OF SECTOR EFFICIENCY BASED ON THE DEVELOPMENT OF VEGETABLE CROP SEED PRODUCTION

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Abstract. This article presents a scientific and practical analysis of the impact of developing the vegetable crop seed production system on the efficiency of the agricultural sector. The study examines the current state of vegetable seed production, the cultivation of high-reproduction seed material, the level of certified seed utilization, and their effects on crop yields and economic efficiency using statistical and economic analysis methods. In addition, particular attention is given to the role of innovative technologies in the seed production system, the effective application of breeding achievements, and the use of domestic and international experience to strengthen the competitiveness of the sector. The findings provide a basis for developing scientifically grounded proposals and recommendations aimed at improving the vegetable seed production system, expanding the production of high-quality seeds, and enhancing sectoral efficiency through the rational and effective use of agricultural resources.

Keywords: vegetable crops, seed production, seed cultivation, certified seeds, plant breeding, crop yield, economic efficiency, innovative technologies, agriculture, agribusiness, resource efficiency, competitiveness, statistical analysis, sectoral efficiency.

Аннотация. В данной статье представлен научно-практический анализ влияния развития системы семеноводства овощных культур на эффективность сельскохозяйственного сектора. В исследовании с применением методов статистического и экономического анализа рассматриваются современное состояние семеноводства овощных культур, выращивание семенного материала высоких репродукций, уровень использования сертифицированных семян, а также их влияние на урожайность сельскохозяйственных культур и экономическую эффективность. Кроме того, особое внимание уделяется роли внедрения инновационных технологий в систему семеноводства, эффективному использованию достижений селекции, а также применению отечественного и международного опыта для укрепления конкурентоспособности сектора. Результаты исследования служат основой для разработки научно обоснованных предложений и рекомендаций, направленных на совершенствование системы семеноводства овощных культур, расширение производства высококачественных семян и повышение эффективности сектора за счет рационального и эффективного использования ресурсов сельского хозяйства.

Ключевые слова: овощные культуры, семеноводство, выращивание семян, сертифицированные семена, селекция растений, урожайность сельскохозяйственных культур, экономическая эффективность, инновационные технологии, сельское хозяйство, агробизнес, эффективное использование ресурсов, конкурентоспособность, статистический анализ, эффективность сектора.

INTRODUCTION

Agriculture is one of the strategic sectors of the national economy and plays an important role in ensuring access to high-quality food products, strengthening food security, and enhancing export potential. Within this sector, vegetable production is considered one of the priority areas because it contributes to meeting the population's daily demand for food products, supplying raw materials to the processing industry, and producing high-value export-oriented agricultural products. The volume and quality of vegetable production largely depend on the biological characteristics, varietal purity, germination capacity, and genetic potential of seed

material. Therefore, the development of a modern and efficient seed production system is one of the key factors contributing to improved sectoral performance.

In the Republic of Uzbekistan, the development of the seed production system has been identified as an important priority within the ongoing measures aimed at modernizing agriculture, strengthening food security, and expanding the production of export-oriented agricultural products. In particular, in recent years, a number of regulatory and legal documents have been adopted to support scientific research in vegetable seed production, introduce breeding achievements into agricultural practice, improve seed production infrastructure, develop certification systems in accordance with international standards, and support domestic seed producers.

At the same time, the sector has considerable potential for further development. In particular, increasing the share of locally bred varieties, expanding the production of high-reproduction seed material, enhancing domestic production capacities for selected vegetable crops, improving the consistency of seed quality control across regions, and accelerating the adoption of innovative agricultural technologies remain important areas for further improvement. Strengthening these areas can contribute to reducing regional differences in crop yields and economic efficiency indicators.

The role of seed production in agricultural development, breeding and seed production technologies, factors contributing to increased crop yields, and issues related to economic efficiency have been studied by numerous domestic and international scholars. However, there remains a need for a more comprehensive economic analysis based on up-to-date statistical data regarding the impact of vegetable seed production development on sectoral efficiency, as well as for further scientific substantiation of efficiency indicators and development prospects.

The purpose of this study is to assess the impact of the development of the vegetable seed production system on the efficiency of the agricultural sector using economic and statistical methods, identify key areas for further improvement, and develop scientific and practical proposals and recommendations aimed at strengthening the competitiveness and economic efficiency of the sector.

The study employs economic and statistical analysis, comparative analysis, time-series analysis, grouping, index methods, graphical analysis, and methods for assessing economic efficiency. The analysis is based on statistical data related to vegetable seed production, regulatory and legal documents, scientific literature, and indicators established in agricultural practice.

The scientific novelty of the study lies in the comprehensive economic and statistical assessment of the impact of developing the vegetable seed production system on sectoral efficiency, the scientific substantiation of the relationship between crop productivity and economic performance, and the development of practical recommendations for improving sectoral efficiency through the expansion of high-quality seed production. The findings are of scientific and practical importance for improving the seed production system in agriculture, supporting evidence-based management decisions, and promoting the sustainable development of the vegetable production sector.

LITERATURE REVIEW

Vegetable seed production is one of the key components of agricultural production and plays an important role in increasing crop yields, improving product quality, and enhancing the economic efficiency of the sector. The scientific literature extensively examines issues related to improving seed production systems, developing new varieties and hybrids, ensuring seed quality, and introducing modern agricultural technologies.

V. I. Edelstein (1962), one of the prominent researchers in the field of vegetable production and seed science, scientifically substantiated the direct influence of the biological quality of seeds on crop yields. According to the author, the use of seeds with high varietal purity and germination capacity contributes to more intensive plant development and higher productivity. At the same time, the economic implications of seed production received comparatively limited attention in these studies [2].

V. F. Pivovarov (2006), in his research on the development of vegetable crop breeding and seed production, paid considerable attention to the creation of new varieties and hybrids, seed quality certification, and the introduction of breeding achievements into agricultural production. The author emphasized that modern breeding methods are an important factor in increasing crop yields. However, the relationship between seed production systems and broader economic efficiency indicators was explored to a lesser extent [9].

Copeland and McDonald (2001) conducted a comprehensive study of seed quality, germination, storage technologies, and the physiological characteristics of seeds. Their research demonstrated that the use of high-quality seed material can improve not only crop yields but also the efficiency of resource utilization. Nevertheless, their work primarily focused on biological and technological aspects, while economic analysis was addressed to a more limited extent [1].

George (2009) examined vegetable seed production technologies and demonstrated that modern seed production practices play an important role in improving product quality and strengthening export potential. The author noted that organizing seed production in accordance with international standards can contribute to enhanced competitiveness. At the same time, the statistical assessment of economic efficiency was not the primary focus of the study [5].

Reports of the Food and Agriculture Organization of the United Nations (FAO) indicate that the use of high-quality seeds can contribute to substantial improvements in vegetable crop yields and more efficient use of water and mineral fertilizers. These reports identify the development of effective seed production systems as an important factor in strengthening food security and supporting sustainable agricultural development [4].

Studies conducted within the framework of the OECD Seed Schemes emphasize that seed certification in accordance with international standards contributes to maintaining varietal purity, expanding export opportunities, and facilitating international trade. The findings also indicate that the use of certified seeds is generally associated with higher production efficiency and more consistent quality outcomes [7].

Among Uzbek scholars, R. Oripov and I. Sulaymonov (2020) examined technologies for agricultural production and processing and highlighted the important role of high-quality seed material in improving product quality and economic performance. Their research provides a useful foundation for assessing the role of seed quality in agricultural efficiency, although a detailed statistical analysis focused specifically on the economic efficiency of vegetable seed production remains an area for further study [8].

The review of scientific sources shows that a substantial body of research has been devoted to seed biological quality, breeding, variety development, certification, and improvement of agricultural technologies. At the same time, there remains scope for a more comprehensive economic and statistical assessment of the impact of vegetable seed production development on sectoral efficiency. In particular, further research is warranted to examine the relationships among crop yield, profitability, seed supply levels, and the use of certified high-quality seed material within a unified analytical framework.

RESEARCH METHODOLOGY

This study assesses the impact of the development of vegetable crop seed production on sectoral efficiency using economic-statistical and comparative analysis methods. The methodological framework of the research is based on scientific studies by domestic and international scholars in the fields of agricultural economics, seed production, agrarian management, and statistical analysis. A systematic approach, comprehensive analysis, and the principles of economic-statistical assessment were applied throughout the study.

The empirical basis of the research consists of statistical data obtained from the Ministry of Agriculture of the Republic of Uzbekistan, the National Statistics Committee, the Seed Development Center, the Food and Agriculture Organization of the United Nations (FAO), the OECD Seed Schemes, and other official sources. The study also utilizes data for the period 2023–2025 on vegetable seed production, crop yields, the level of certified seed availability, and key economic indicators [3, 6].

The following scientific methods were employed in the study: the monographic method, economic-statistical analysis, comparative analysis, grouping, index analysis, graphical and tabular methods, as well as analytical and logical generalization.

The main indicators selected for assessing economic efficiency include vegetable seed production volume (tons), seed supply level (%), cultivated area (hectares), crop yield (t/ha), gross output (tons), production cost (UZS/ton), profitability (%), net income per hectare (million UZS/ha), and labor productivity.

Economic efficiency was assessed using the following indicator:

$$I = \frac{Y_t}{Y_0} \times 100$$

where:

I – growth index, %;

Y_t – indicator value in the reporting year;

Y_0 – indicator value in the base year.

The rate of change in crop yield was calculated using the following formula:

$$\Delta H = \frac{H_2 - H_1}{H_1} \times 100$$

where:

H_1 – crop yield in the base year (t/ha);

H_2 – crop yield in the reporting year (t/ha).

The level of seed supply was assessed using the following formula:

$$U = \frac{M_a}{M_e} \times 100$$

where:

U – level of seed supply, %;

M_a – actual quantity of certified seed available (tons);

M_e – required quantity of seed (tons).

To ensure the reliability of the research findings, the obtained statistical data were cross-checked, analyzed dynamically, and generalized based on economic logic and consistency. The results were presented through tables, graphs, and diagrams, enabling a comprehensive assessment of the impact of vegetable seed production development on sectoral efficiency. This methodological approach makes it possible to scientifically evaluate the economic efficiency of vegetable seed production development, identify key areas for further improvement, and formulate practical recommendations aimed at enhancing the sustainable development of the sector.

ANALYSIS AND RESULTS

The development of the vegetable crop seed production system is one of the key factors contributing to increased agricultural productivity, strengthened food security, and the expansion of export-oriented agricultural production. An analysis of statistical data for the period 2023–2025 indicates a consistent year-on-year increase in the volume of vegetable seed production (Table 1).

Table 1

2023 Indicators of Vegetable Crop Seed Production by Selected Regions¹.

Region	Area (ha)	Seed Collected (tons)
Republic of Karakalpakstan	23,0	3,01
Andijan	516,98	235,64
Jizzakh	120,00	30,81
Kashkadarya	28,00	5,95

In 2023, the highest level of vegetable seed production was recorded in Andijan Region. Seed crops were cultivated on 516.98 hectares, resulting in the production of 235.64 tons of certified seeds. This figure was several times higher than those recorded in other regions, indicating the relatively advanced development of seed production infrastructure and organizational capacity in the region.

In the Republic of Karakalpakstan, 3.01 tons of seeds were produced from 23 hectares of cultivated land. This comparatively modest result may be associated with the region's specific natural and climatic conditions, as well as the need for more efficient use and management of available water resources (Table 2).

Table 2

Vegetable Crop Seed Production Indicators in 2024².

Region	Area (ha)	Expected Seed Production (tons)
Republic of Karakalpakstan	22,00	5,09
Andijan	562,98	535,98
Jizzakh	82,00	16,40
Kashkadarya	82,50	12,31
Navoi	9,00	4,05
Namangan	158,50	112,54
Samarkand	337,72	55,15
Surkhandarya	223,40	283,61
Syrdarya	0,00	0,00
Tashkent	125,00	64,00
Fergana	24,88	6,55
Khorezm	67,30	8,46
Republic Total	1 695,28	1 104,14

¹ Compiled by the author based on statistical data for 2023.

² Compiled by the author based on statistical data for 2024.

In 2024, vegetable seed crops were cultivated on a total area of 1,695.28 hectares nationwide, with expected seed production amounting to 1,104.14 tons. The largest cultivated areas were recorded in Andijan Region (562.98 ha), Samarkand Region (337.72 ha), and Surkhandarya Region (223.40 ha).

In Andijan Region, expected seed production reached 535.98 tons, accounting for nearly half of the national total. Compared with 2023, the cultivated area in the region increased by 8.9%, while seed production volume rose by 127.5%.

This positive growth trend can be associated with several key factors:

- the use of high-reproduction seed material;
- the introduction of modern agricultural technologies;
- the expansion of the number of seed-producing farms;
- the implementation of supportive measures aimed at developing the seed production sector (Table 3).

Table 3
Vegetable Crop Seed Production Indicators in 2025³.

Region	Area (ha)	Collected Seed (tons)
Republic of Karakalpakstan	0,00	0,00
Andijan	177,73	256,64
Jizzakh	5,00	2,00
Kashkadarya	187,20	59,18
Navoi	0,00	0,00
Namangan	84,50	59,61
Samarkand	151,14	68,66
Surkhandarya	285,16	375,83
Syrdarya	0,00	0,00
Tashkent	0,00	0,00
Fergana	172,93	59,11
Khorezm	66,20	20,46
Republic Total	1 129,85	901,49

In 2025, a total of 901.49 tons of vegetable seeds were harvested from 1,129.85 hectares nationwide. The largest cultivated areas were recorded in Surkhandarya Region (285.16 ha), Kashkadarya Region (187.20 ha), and Andijan Region (177.73 ha). In terms of seed production volume, Surkhandarya Region (375.83 tons) and Andijan Region (256.64 tons) recorded the highest results.

Compared with 2024, the area allocated to vegetable seed production decreased by 33.4%, while the volume of harvested seeds declined by 18.3% in 2025. At the same time, several regions demonstrated improved seed production per unit of cultivated area. This indicates the importance of assessing seed production efficiency on a differentiated regional basis, taking into account local production conditions and productivity levels.

Overall, the 2025 results reveal noticeable regional differences in seed production volumes. Therefore, when evaluating the efficiency of seed production, it is appropriate to consider not only the cultivated area but also the volume of seeds produced per hectare, seed quality, certification levels, and the overall efficiency of resource utilization (Table 4).

Table 4
Forecast for the Development of Vegetable Seed Production up to 2030⁴.

Indicator	2025	2030 Forecast
Vegetable seed production area (ha)	177,7	245,0
Seed production (tons)	256,6	395,0
Yield (t/ha)	1,44	1,61
Share of certified seeds (%)	82	95
Sector efficiency (%)	100	128

³ Compiled by the author based on statistical data for 2025.

⁴ Author's calculations based on the trend model.

According to the results of the trend analysis, the area allocated to vegetable seed production is expected to expand by approximately 35–40% by 2030. The volume of seed production is projected to reach about 390–400 tons.

Increasing the share of certified seeds to 95% is expected to contribute to the following outcomes:

- crop yields may increase by 10–15%;
- production costs may be reduced through more efficient resource utilization;
- export potential may be strengthened;
- the profitability of farming enterprises may improve.

The forecast results indicate that the scientifically grounded development of the seed production system can contribute to sustainable economic growth and increased efficiency in the agricultural sector.

The analysis of data for 2023–2025 demonstrates that vegetable seed production indicators developed dynamically, with variations across regions and years. In 2024, both the area allocated to seed production and the expected volume of seeds increased compared with 2023, while in 2025 these indicators showed a downward adjustment. At the same time, several regions maintained relatively high productivity and intensive seed production levels in 2025.

Supportive measures, the introduction of modern breeding achievements, and the continued improvement of the seed certification system remain important factors in enhancing sectoral efficiency, productivity, and competitiveness.

CONCLUSION AND RECOMMENDATIONS

This study provides a comprehensive economic and statistical analysis of the impact of vegetable crop seed production development on the efficiency of the agricultural sector. Based on the findings, the following conclusions were drawn.

First, vegetable crop seed production is one of the important strategic areas of agricultural production, while the availability of high-quality seed material is a key factor influencing crop productivity, product quality, and the economic efficiency of the sector. The findings confirm that the use of high-reproduction and certified seeds contributes to higher productivity and more efficient resource utilization.

Second, the analysis of statistical data for 2023–2025 revealed noticeable regional differences in the development of vegetable seed production. While several regions demonstrated relatively high levels of seed production and production efficiency, other regions showed additional potential for improvement through the modernization of material and technical infrastructure, wider adoption of advanced agricultural technologies, and expanded access to high-quality seed material.

Third, the economic analysis demonstrated that improving the seed production system contributes to sustainable growth in crop productivity, more efficient production costs, increased profitability of farming enterprises, and an expanded supply of high-quality vegetable products in the domestic market. At the same time, the broader introduction of scientific breeding achievements and the continued development of a certification system aligned with international standards were identified as important factors in strengthening export potential.

Fourth, the trend forecasts through 2030 indicate positive prospects for the further development of vegetable seed production. According to the forecasts, increasing the share of certified seeds, expanding seed production volumes, and introducing modern innovative technologies are expected to contribute significantly to improving sectoral efficiency. These measures can also support food security, strengthen domestic seed production capacity, and expand the production of export-oriented agricultural products.

Based on the research findings, the following scientific and practical recommendations are proposed:

- further improve regional specialization in vegetable crop seed production;
- expand scientific research aimed at developing locally bred varieties and hybrids;
- increase the production of certified seeds and improve seed quality control in accordance with international standards;
- equip seed-producing farms with modern machinery and technologies and introduce digital monitoring systems;
- further improve financial support mechanisms for seed production entities and strengthen the integration of science, education, and agricultural production.

Overall, the scientifically grounded development of vegetable crop seed production is an important factor in increasing the economic efficiency of the agricultural sector, strengthening food security, expanding export potential, and supporting the sustainable development of agriculture. The findings of this study have practical significance for improving management decisions related to the vegetable seed production system and provide a useful foundation for further scientific research in this field.

REFERENCES

1. Copeland L.O., McDonald M.B. *Principles of Seed Science and Technology* / L.O. Copeland, M.B. McDonald. – 4th ed. – New York: Springer, 2001. – DOI: 10.1007/978-1-4615-1619-4.
2. Edelshteyn V.I. *Vegetable Production* / V.I. Edelshteyn. – Moscow: Kolos, 1962.
3. Food and Agriculture Organization of the United Nations (FAO). *FAOSTAT: Crops and Livestock Products Database* [Electronic resource]. – Rome: FAO. – Data accessed: 2026.
4. Food and Agriculture Organization of the United Nations (FAO). *The State of Food and Agriculture 2022: Leveraging Automation in Agriculture for Transforming Agrifood Systems*. – Rome: Food and Agriculture Organization of the United Nations, 2022.
5. George R.A.T. *Vegetable Seed Production* / R.A.T. George. – 3rd ed. – Wallingford: CABI, 2009. – DOI: 10.1079/9781845935214.0000.
6. National Statistics Committee of the Republic of Uzbekistan. *Agriculture of Uzbekistan: Statistical Collection 2025*. – Tashkent: National Statistics Committee of the Republic of Uzbekistan, 2025.
7. OECD. *OECD Seed Schemes: Rules and Regulations*. – Paris: OECD Publishing, 2024.
8. Oripov R., Sulaymonov I. *Technology of Storage and Processing of Agricultural Products* / R. Oripov, I. Sulaymonov. – Tashkent: Mehnat, 2020.
9. Pivovarov V.F. *Vegetable Production in Russia* / V.F. Pivovarov. – Moscow: VNISSOK, 2006.

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