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THE CULTIVATION AND DEVELOPMENT OF SAFFRON IN SAMARKAND REGION

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Abstract. *The present article presents the cultivation and development of saffron (*Crocus sativus L.*) in the Samarkand region of Uzbekistan, where the climatic and soil conditions have a promising potential for large-scale production. The study assesses ecological, agro-technical, and economic factors that affect the cultivation of saffron, such as soil type, planting methods, level of irrigation, and post-harvest treatment. Results show that the Samarkand region's characteristic gray soils, if supplied by integrated agro-technical production, are most suitable for the cultivation of saffron. The results emphasize the importance of sustainable technology, organic manure, and new plantation methods to achieve high yield and quality of saffron threads.*
Keywords: *saffron, Crocus sativus L., region of Samarkand, cultivation, agro-technology, sustainable agriculture.*

1. Introduction

Saffron (Crocus sativus L.) is one of the most valuable spice crops in the world with wide usage in medicine, cooking, cosmetics, and textile industry. The high price on the market and multitude of uses give saffron cultivation great potential as a path for agricultural development in arid and semi-arid regions.

Globally, more than 80% of saffron production is concentrated in Iran, followed by India, Spain, and other countries of the Mediterranean region. However, Central Asia, particularly Uzbekistan, has been found in recent years as a new frontier for the production of saffron due to its favorable agro-climatic conditions. The Samarkand region, being long involved in the cultivation of medicinal and aromatic plants, has a particular promise to establish saffron production.

The Uzbek saffron production is still in the initial phase. Therefore, conducting scientific research on indigenous soils, climate, and cultivation practices is very important for developing sustainable production systems. Globally, saffron is cultivated on nearly 120,000 hectares of land, producing approximately 400 tons of dry stigmas annually. Iran dominates with more than 80% of global production, followed by India, Spain, Greece, and Morocco with comparatively smaller but still significant contributions. Saffron trade is put at 8–10 billion USD annually, witness to its position as one of the most profitable spice crops. Uzbekistan, with its good agro-climatic conditions, is emerging as a prospective saffron producer. The Uzbek government, during the past several years, has encouraged the cultivation of medicinal and aromatic crops, including saffron, through specific agricultural interventions and subsidies, which makes it even more viable to develop the saffron sector in Samarkand.

2. Materials and Methods

The research was conducted in 2024–2025 in the Samarkand oblast, where the climate is continental, with hot summers, moderate winters, and average annual precipitation of 350–400 mm. The soils are predominantly common gray soils with low organic matter (0.8–1.0%).

Soil preparation: The fields were double ploughed to 25–30 cm depth. Organic compost (10 t/ha) and mineral fertilizers (NPK complex: 90 kg N, 60 kg P_2O_5, 60 kg K_2O per ha) were applied as preculture.

Planting material: Dactylocorms, healthy saffron having weight of 8–10 g. Plant density was 25 × 10 cm with a planting depth of 12–15 cm.

Irrigation: Since saffron requires small but timely irrigation, water was applied 3 times in the vegetation phase: at planting (September), before flowering (October), and during leaf development (November).

Observations: Growth parameters of the plants (height, number of leaves, flowering intensity), yield indicators (number of flowers per corm, stigma length, dry stigma yield), as well as soil fertility dynamics were recorded.

3. Results and Discussion

3.1. Growth and flowering

In the Samarkand region, saffron germinated 15–20 days after planting. Flowering began in mid-October and lasted for about 20 days. Each corm produced 2–3 flowers on average. Stigma length varied from 28–35 mm and was comparable to international standards.

3.2. Yield performance

Experimental results revealed:

Employment of organic fertilizers increased the number of flowers per corm by 35%.

Simultaneous application of organic + inorganic fertilizers improved stigma yield by 40–45% above control plots.

Dry stigma yield averaged 7.5–8.0 kg/ha, which is within economic limits.

3.3. Soil fertility improvement

Soil testing confirmed that organic matter levels were increased from 0.9% to 1.3% after the application of compost. NPK availability in soil also increased significantly, thus contributing to better plant development. This confirms that saffron crop production not only produces a profitable crop but also enhances soil fertility in the long run.

3.4. Economic importance

Saffron cultivation is very profitable under Samarkand conditions. At a world market price of $5000–7000 per kg, any modest returns ensure handsome profits for cultivators. Development of saffron cultivation in Samarkand could diversify the regional agricultural economy and reduce dependence on traditional crops like wheat and cotton.

3.5. Opportunities for development

Considering increasing world demand, saffron cultivation in Samarkand should be developed through:

* Organization of farmer cooperatives,
* Providing high-quality planting material,
* Farm training in new agro-technologies,
* Construction of export-oriented value chains.

3.6. Comparative Yield Analysis

Iranian reports quote average yields of 5–6 kg/ha dried stigmas under traditional conditions, with the potential for 10–12 kg/ha under advanced agro-techniques. Average yields in India (Kashmir region) are 4–5 kg/ha. The yields obtained in Samarkand (7.5–8.0 kg/ha) are competitive, especially considering that the cultivation methods are new to the country. This suggests that

with optimization of methods, Uzbekistan can well equal or even surpass traditional saffron-producing countries.

3.7. Socio-Economic Impact

Apart from profitability, saffron cultivation carries significant social and economic benefits. One hectare of saffron requires seasonal labor for planting, weeding, harvesting, and stigma separation, thus ensuring rural household employment. With the exorbitant price of saffron, even small-scale farms can generate considerable incomes for farmers. The flexibility of the crop to small-scale farming systems makes it extremely acceptable for family-based agriculture in Uzbekistan.

3.8. Sustainability and Ecological Benefits

Saffron is a low-water crop compared to cotton and wheat, which dominate Samarkand agriculture. This makes it a perfect alternative to arid lands. Besides, saffron fields are responsible for soil fertility through organic matter deposition and reducing groundwater pressures. Ecologically, saffron cultivation encourages sustainable agriculture and can be incorporated into agrotourism activities, offering tourists an opportunity to engage in saffron harvesting and processing.

4. Conclusion

The research illustrates that the Samarkand region has very favorable conditions for the cultivation of saffron. Appropriate soil preparation, the use of organic and mineral fertilizers together, and effective irrigation measures considerably enhance the growth and productivity of saffron. Apart from its economic utility, cultivation of saffron is useful for maintaining soil fertility and sustainable farming growth.

Future research efforts should focus on breeding improved types of saffron, mechanization of harvesting, and post-harvest processing to enhance product quality and competitiveness in the international market. Summarily, saffron cultivation in the Samarkand region not only demonstrates beneficial agro-technical results but also holds out the key for agricultural diversification, rural development, and sustainable agriculture. The study highlights the need for long-term actions such as:

Establishing specialized research institutes of saffron breeding and biotechnology.

Mechanization of stigma harvesting and processing to reduce labor costs.

Building value chains for exports, for instance, branding of "Samarkand Saffron" as high-quality product for export destinations.

Developing global cooperation with the leading saffron-producing countries of the world to exchange knowledge and technologies.

With these actions, Samarkand can be a regional hub for saffron production, not only promoting local economic growth but also turning Uzbekistan into a competitive market player in the global spice market.

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