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Agricultural Characteristics of the Central Aran Region of Azerbaijan

Abstract

The Central Aran economic-geographical region is one of Azerbaijan's leading agricultural hubs, playing a crucial role in ensuring national food security and supporting rural livelihoods. This study analyzes the region's agricultural resources, crop diversity, irrigation infrastructure, and the socio-economic importance of farming activities. Emphasis is placed on the role of fertile soils, favorable climatic conditions, and traditional agricultural practices alongside modern mechanization and innovative irrigation techniques. The findings reveal that while Central Aran has high agricultural potential, it faces challenges such as water scarcity, soil salinization, and outdated equipment in some rural areas. Recommendations are made for sustainable agricultural development, including modernization of farming technologies, diversification of crops, and eco-friendly land use practices.

Keywords: *Central Aran, agriculture, crop production, irrigation, rural economy, sustainable farming, Azerbaijan*

Introduction

Agriculture has historically been the backbone of the Central Aran economic-geographical region (*Mərkəzi Aran iqtisadi-coğrafi rayonu*), contributing significantly to Azerbaijan's food supply and rural employment. Situated in the central part of the Kur-Araz lowland, the region benefits from fertile soils, developed irrigation networks, and a favorable subtropical semi-arid climate. Administrative districts such as Mingachevir, Yevlakh, Agdash, Goychay, Ujar, Kurdamir, and Zardab form the core of this agricultural zone (Abdullayev, 2020).

The primary objective of this paper is to present an in-depth analysis of the agricultural profile of Central Aran, including land use patterns, major crops, production trends, technological advancements, and environmental concerns. The study also discusses strategies for sustainable agricultural growth.

Geographical Conditions and Agricultural Potential

The Central Aran region lies mostly below 200 meters above sea level, with annual precipitation ranging between 200–400 mm. The flat terrain and alluvial, grey-brown, and chestnut soils are highly suitable for crop cultivation, especially under irrigation. The Kura and Araz rivers, supported by the Upper Shirvan and Upper Karabakh canals, provide essential water resources for farming (Abdullayev, 2020).

Climatic conditions — mild winters and hot summers — allow the cultivation of a wide range of crops, from cereals to horticultural products. However, low natural rainfall means that irrigation remains the key determinant of productivity.

Major Agricultural Sectors

1. Grain Production. Wheat and barley are staple crops, with Yevlakh, Kurdamir, and Agdash leading in cereal production.
2. Industrial Crops. Cotton is a traditional crop of the region, supported by government subsidies and modern ginning facilities.

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3. Fruit Growing. Goychay is famous for pomegranate orchards, while Agdash is known for mulberry plantations and silk cocoon production. Vineyards are also expanding, particularly in Kurdamir.

4. Vegetable Farming. Tomatoes, cucumbers, and eggplants dominate irrigated plots, with some areas experimenting with greenhouse cultivation.

1. Livestock – Cattle and sheep breeding are widespread, supported by natural pastures and forage crop cultivation (Mammadov, 2018, pp. 34–49).

Technological Developments in Agriculture

Over the past two decades, mechanization has increased, with modern tractors, combine harvesters, and drip irrigation systems being introduced. Canal rehabilitation projects have improved water delivery efficiency, though some rural areas still rely on outdated machinery and face seasonal labor shortages.

Greenhouse farming is slowly gaining popularity, especially for off-season vegetable production.

Challenges in Agricultural Development

- Water Scarcity: Limited and uneven water distribution during summer months.
- Soil Salinization: Over-irrigation and poor drainage causing land degradation.
- Climate Risks: Increasing frequency of droughts and extreme temperatures.
- Infrastructure Gaps: Need for modernization of storage facilities, cold chains, and transportation networks.
- **Market Access.** Small-scale farmers often face difficulties accessing stable markets for their produce (Hasanov & Aliyeva, 2022, pp. 15–29).

Sustainable Development Perspectives

To maintain and enhance Central Aran's agricultural productivity, integrated approaches are needed:

• Expansion of smart irrigation and water-saving technologies.
• Promotion of crop diversification to reduce climate vulnerability.
• Adoption of organic farming practices to improve soil health.
• Investment in agro-processing to add value to raw produce.
• Strengthening farmer cooperatives to improve market access and bargaining power (State Statistical Committee of Azerbaijan, 2023).

Conclusion

The Central Aran region occupies a strategically important position in Azerbaijan's agricultural and socio-economic system. As one of the country's primary food-producing zones, it has historically served as a bridge between traditional farming practices and the gradual adoption of modern agricultural technologies. Its geographical position within the Kur-Araz lowland, fertile soils, favorable subtropical semi-arid climate, and extensive irrigation infrastructure have enabled the development of a diverse and productive agricultural sector. Crops such as wheat, barley, cotton, grapes, pomegranates, tomatoes, and cucumbers form the basis of the regional economy, while livestock breeding adds an additional layer of stability to rural livelihoods (FAO, 2021).

The analysis presented in this paper clearly indicates that Central Aran has the capacity not only to meet a substantial share of the domestic food demand but also to contribute to the country's export potential. This dual role — ensuring national food security while participating in international agricultural markets — provides both opportunities and responsibilities. The sustainability of this role depends on the region's ability to address persistent challenges while maximizing its strengths (Ibrahimli, 2017, pp. 112–125).

One of the most pressing issues is water scarcity. Although the region benefits from the Kura and Araz rivers and major irrigation canals, the current distribution system often suffers from inefficiencies, leakages, and unequal allocation. Climate change has intensified this problem by reducing the predictability of precipitation and increasing evaporation rates during hotter summers (UNEP, 2020).

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Soil salinization represents another critical environmental threat. Poor drainage systems and excessive irrigation with mineral-rich water have already degraded certain tracts of arable land, particularly in low-lying areas. If not addressed through systematic reclamation measures — including improved drainage, crop rotation with salt-tolerant species, and organic soil amendments — this process could lead to irreversible productivity losses (Aliyev, 2022, pp. 20–31).

From a socio-economic perspective, the region's demographic potential is both an asset and a challenge. A relatively young and active population can support labor-intensive agricultural practices, but mechanization and technological shifts risk creating underemployment if alternative rural income sources are not developed. This underlines the importance of agro-industrial diversification — developing processing plants, storage facilities, and value-added production chains that can absorb labor and enhance the profitability of farming (Aliyev, 2022, pp. 20–31).

Another dimension is market integration. While Central Aran produces significant volumes of agricultural products, small-scale farmers often face barriers in accessing larger markets due to limited transportation infrastructure, insufficient storage capacity, and lack of cooperative networks. Strengthening regional logistics hubs, particularly in cities such as Yevlakh and Mingachevir, could transform the efficiency of product distribution, reduce post-harvest losses, and open new trade opportunities.

Policy interventions will be crucial to this transformation. Targeted subsidies for modern equipment, preferential credit lines for smallholders, and training programs on sustainable farming can accelerate the adoption of innovative practices. Moreover, collaboration between state institutions, private investors, and research organizations will create a foundation for evidence-based decision-making. Agricultural research stations in the region should focus on developing drought-resistant crop varieties, optimizing irrigation schedules, and promoting integrated pest management (Aliyev, 2022, pp. 20–31).

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