ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-515-x, Impact Factor: 9.23
**American Academic publishers, volume 6, issue 03,2026**

Journal: https://www.academicpublishers.org/journals/index.php/ijai

# WAYS TO IMPROVE THE EFFICIENCY OF AGRICULTURAL CLUSTER ACTIVITIES

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**Abstract:** This article discusses the essence, importance, and development directions of agricultural clusters, which play a vital role in improving efficiency in agriculture. It also provides relevant proposals and conclusions.

**Keywords:** Agricultural cluster, technological innovations, infrastructure, logistics, blockchain, investment, political support

## Introduction

Agricultural -clusters are groups of geographically concentrated and interconnected agricultural producers, suppliers, and related organizations. They play a crucial role in enhancing efficiency and competitiveness in agriculture. Through cooperation, innovation, and shared use of resources, agricultural clusters contribute to sustainable agricultural development and economic growth. However, some agricultural clusters face various challenges that prevent them from fully realizing their potential. This article explores directions for improving the efficiency of agricultural clusters, such as technological innovations, infrastructure development, knowledge sharing, political support, and ensuring sustainability.

### 1. Implementation of Technological Innovations

One of the most effective ways to improve the efficiency of agricultural clusters is the adoption of modern technologies. Equipment equipped with GPS management, drones, and sensors allow farmers to use resources efficiently and monitor crop production in real time. For instance, soil moisture sensors help optimize irrigation, reduce water consumption, and increase productivity.

In addition, the introduction of information and communication technologies (ICT) ensures effective collaboration among cluster members. Mobile applications and online platforms provide access to market information, weather forecasts, and best practices, thereby improving decision-making processes. Blockchain technology ensures transparency and consistency in supply chains, increases consumer trust, and opens up new market opportunities.

Investment in research and development is essential to adapt these technologies to local conditions. Governments, universities, and the private sector should promote knowledge and experience sharing by establishing innovation centers.

### 2. Improving Infrastructure and Logistics

Efficient infrastructure is crucial for the success of agricultural clusters. Poor road conditions, insufficient storage facilities, and limited access to processing enterprises result in product losses and increased costs.

To improve efficiency, agricultural clusters need better roads, refrigerated storage units, and warehouses. These facilities help maintain product quality and volume, reducing losses. Moreover, developing integrated logistics systems—by coordinating transportation and distribution—can minimize delays and costs. For example, shared transport services or cooperative warehouses can help optimize resource allocation.

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Investment in digital infrastructure is also necessary. Reliable internet connectivity supports the use of ICT tools, ensuring timely communication and collaboration among cluster members. Public-private partnerships play an important role in financing and maintaining this in.

**3. Knowledge Sharing and Capacity Building**

Knowledge sharing is one of the key aspects of successful agricultural clusters. Continuous training and capacity building enable farmers and other participants to adopt best practices and innovative techniques.

Through seminars, practical workshops, and demonstration fields, members receive information on crop production, pest control, and sustainable farming methods. Establishing farmer field schools or extension services within clusters ensures that farmers have direct access to relevant knowledge.

Furthermore, fostering a culture of collaboration creates a foundation for joint problem-solving and the implementation of collective projects. Regular meetings and information-sharing platforms build trust and strengthen social capital. Mentorship programs and cooperation with research institutions also contribute to skill development and the promotion of innovation.

**4. Political Support and Strengthening Institutional Structures for agricultural lusters inUzbekistan**

Agriculture in Uzbekistan is considered a strategically important sector of the national economy. Establishing and effectively developing agricultural clusters has become one of the priority directions of state policy. This is because agricultural clusters integrate all processes in agriculture - from raw material production to manufacturing finished products, processing, storage, transportation, and market delivery - into a single system.

In the development of agricultural clusters, the political will of the state plays a decisive role. Through presidential decrees and government decisions, the following measures are being implemented:

- providing tax and financial incentives to agribusiness entities,
- attracting investments
- implementing programs aimed at enhancing export potential,
- introducing modern irrigation and resource-saving technologies.

At the same time, foreign economic relations are also important in supporting agricultural cluster activities. Cooperation with foreign investors and international organizations brings in financial resources, innovations, and modern agricultural technologies.

The sustainable development of agricultural clusters depends on an effective institutional system. A series of reforms are being carried out in this direction, including:

- improving the system of state bodies responsible for agriculture and food security,
- strengthening cooperation mechanisms between local authorities and the private sector,
- integrating agricultural clusters with research institutes, universities, and innovation centers.

In addition, the development of logistics, trade networks, and infrastructure also determines the efficiency of agricultural clusters. Therefore, the government places significant attention on the construction of rural roads, refrigerated warehouses, transport services, and digital platforms.

Government policy has a major impact on the effectiveness of agricultural clusters. Supportive policies create a favorable environment for attracting investment, protecting farmers, and ensuring fair competition.

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Government authorities should also optimize procedures for establishing clusters and simplifying their operations. Subsidies, tax benefits, and low-interest loans help introduce new technologies and develop infrastructure.

Institutional support is equally important. The establishment of cluster management organizations or cooperatives improves governance and coordination. Such structures can protect members' interests, manage shared resources, and represent the cluster in negotiations with external parties.

Integrating agricultural clusters into regional and national development plans ensures access to resources and alignment with broader economic objectives.

**5. Implementation of Sustainable and Climate-Adapted Practices**

Sustainability in agriculture is more important than ever due to environmental challenges and the impacts of climate change. agricultural clusters need to adopt climate-smart agricultural (CSA) practices that ensure sustainability while maintaining productivity.

Techniques such as crop diversification, agroforestry, conservation agriculture, and integrated pest management reduce negative environmental impacts and improve soil health. Water-saving methods and the use of renewable energy sources contribute to the efficient use of resources.

Sustainability certifications and eco-labeling increase the value of products and attract consumers who are attentive to environmental standards. Monitoring environmental indicators and sharing knowledge on climate risks enhance the adaptability of clusters.

Investing in sustainability not only protects natural resources but also ensures the long-term economic stability of agricultural cluster members.

**Conclusion**

The development of agricultural clusters in Uzbekistan is closely linked to political support and the strengthening of institutional structures. This allows for:

- increasing the volume of agricultural production,
- ensuring competitiveness in domestic and international markets,
- creating new jobs for the population,
- expanding export potential.

Thus, agricultural clusters are emerging as an important institution that ensures not only the development of agriculture but also the stable and consistent growth of the national economy.

Improving the efficiency of agricultural clusters requires a multifaceted approach, including technological innovations, infrastructure development, knowledge sharing, supportive policies, and sustainability. By focusing on these areas, agricultural clusters can fully realize their potential, contribute to rural development, and play a significant role in food security and economic growth.

Farmers, government agencies, the private sector, and research institutions must work together to build strong and resilient agricultural clusters.

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