

THE IMPORTANCE OF USING FOREIGN INNOVATIVE PRACTICES IN THE DEVELOPMENT OF AGRICULTURE IN UZBEKISTAN

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Annotation: This article examines the role and significance of adopting foreign innovative agricultural practices in accelerating the modernization, productivity, and export potential of Uzbekistan's agricultural sector. It analyzes international best practices, such as precision irrigation, Dutch greenhouse and protected-cropping technologies, digital and IoT solutions for smart farming, and value-chain modernization, evaluating their applicability to Uzbekistan's agro-ecological and institutional context. The study highlights the importance of technology transfer, capacity building, and investment in infrastructure for ensuring sustainable agricultural development. The paper concludes with policy recommendations for scaling innovative solutions and strengthening public-private partnerships.

Keywords: Uzbekistan agriculture, technology transfer, precision irrigation, greenhouse technology, smart farming, agricultural exports, innovation adoption, water efficiency, value chains

Agriculture remains a strategic sector in Uzbekistan, providing livelihoods for a substantial portion of the population while contributing significantly to food security and exports. Although the sector's share of GDP has decreased compared to services and industry, agriculture still accounts for approximately 18–20 percent of the national gross value added. At the same time, the proportion of employment in agriculture has declined to about 13.9 percent of total employment, creating an opportunity for higher-value, technology-enhanced agriculture that increases productivity and rural incomes.

Recent gains in high-value horticultural exports, totaling roughly 1.7 million tonnes and valued at nearly USD 1.2 billion, demonstrate both the sector's comparative advantages and the potential for improvement through modern technologies. Critical challenges remain in water efficiency, season extension, greenhouse productivity, quality certification, and cold-chain logistics—areas where established foreign innovations have proven effective.

Irrigated agriculture in Uzbekistan faces pressing water-use efficiency challenges due to the semi-arid climate and competing demands from multiple sectors. International experience shows that modern irrigation technologies, including drip and sensor-based systems, can achieve water savings of 30–40 percent and yield increases of 25–35 percent when applied and managed properly. Scaling these innovations could conserve water resources while enhancing crop productivity across Uzbekistan's agro-ecological zones.

Greenhouse and protected-cropping systems, particularly Dutch technologies, enable year-round production, water efficiency, disease control, and high yields per hectare. Pilot projects in Uzbekistan using advanced greenhouse systems for tomatoes and other horticultural crops indicate clear commercial benefits, highlighting the potential for wider implementation.

Digital agriculture and smart-farming approaches, such as IoT sensors for soil moisture and microclimate monitoring, remote sensing for field conditions, mobile-based Agricultural Marketing Information Systems, and data-driven decision-support tools, are essential

complements to physical technologies. These tools reduce input waste, improve harvest timing and quality, and support climate-resilient production systems.

Beyond production-level innovations, foreign expertise in post-harvest logistics, cold-chain infrastructure, quality certification, and access to premium markets can convert higher yields into increased incomes. Strengthening downstream capabilities ensures that innovations deliver both economic and social benefits.

Adopting foreign innovations offers Uzbekistan numerous benefits, including higher yields, improved water and input efficiency, year-round production, enhanced product quality, increased export earnings, and improved rural incomes. However, challenges exist, such as the high initial costs of some technologies, potential mismatch with local conditions, limited financing options for smallholders, and gaps in technical knowledge for operating and maintaining new systems. Successful technology transfer therefore requires adaptation, capacity building, financial support, and supportive institutional frameworks.

Technology transfer should follow a strategic approach that links pilot projects with scalable solutions. Policies should provide blended financing instruments, combining concessional loans and grants with private investment to lower entry barriers. Technical assistance and training are critical to ensure that local technicians and farmers can operate and maintain new systems effectively. Public-private partnerships with experienced foreign providers can accelerate knowledge transfer, encourage local production of technology components, and reduce dependence on imports.

Investments in digital infrastructure, connectivity, and data platforms are essential to amplify the impact of physical innovations. Developing quality assurance and export-support mechanisms, including laboratory networks, certification agencies, and trade facilitation, will convert higher yields into sustained export revenues. Water governance reforms and targeted subsidies for smallholders can further support technology adoption while promoting equitable access to innovation.

Foreign innovative practices provide Uzbekistan with a proven pathway to modernize agriculture, improve resource efficiency, and increase rural incomes and export earnings. Agriculture's continued economic significance and rising horticultural exports underscore the urgency of adopting new technologies. Scaling innovations such as precision irrigation, modern greenhouse systems, and smart-farming platforms requires integrated policies encompassing finance, capacity building, adaptive research, and public-private cooperation. When implemented strategically and inclusively, technology transfer can support Uzbekistan's transition to a more productive, water-efficient, and market-oriented agricultural sector, ensuring long-term sustainability and competitiveness.

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