

## ECONOMIC AND SOCIAL ASPECTS OF AGROTECHNOLOGY

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***Annotation.*** *This article analyzes the economic and social indicators of agrotechnology. Uzbekistan is trying to become sustainable and efficient through the use of agrotechnology in agriculture. High costs, low e-literacy levels, and the environment are hindering this effort. It emphasizes the need for government support, training, and upgraded infrastructure to address these challenges.*

***Keywords:*** *agrotechnology, food security, agricultural innovations, digital farming, economic impact, agricultural mechanization, environmental issues.*

***Introduction.*** Agrotechnology, or the application of sophisticated technologies in agriculture, has revolutionized the industry by promoting efficiency, sustainability, and productivity. This innovation has far-reaching economic and social impacts on world food security, rural development, and employment patterns. With the world facing ever-more serious issues such as climate change, population growth, and resource scarcity, the role of agrotechnology in a stable and sustainable agricultural sector grows more and more crucial.

From an economic point of view, agrotechnology has been instrumental in reducing the cost of production, increasing crop yields, and enhancing the competitiveness of global markets [1]. Precision farming techniques such as GPS-guided tractors, automated irrigation systems, and AI-driven crop monitoring allow farmers to optimize the utilization of resources and reduce wastage. These technologies have led to enhanced profitability for commercial-scale farmers and

agribusinesses, triggering investment in agritech startups and research. However, the upfront cost of embracing new technologies is a hindrance to smallholder farmers, and it can increase the economic gap between industrialized and developing agricultural economies.

Farm automation and robotics have transformed traditional labor patterns. While these technologies increase efficiency and reduce the use of manual labor, they also generate anxieties of job loss [2]. Mechanization of farm operations such as harvesting and packaging has significantly reduced the need for seasonal and low-skilled labor, resulting in a shift towards a more technologically oriented workforce. Hence, there is a growing demand for training and education programs that equip agricultural farmers with technical and digital skills required to operate and sustain modern farming equipment.

Socially, agrotechnology has been crucial in the improvement of food security and nutrition concerns worldwide. Advances in biotechnology, such as genetically modified crops and climatic-tolerant seed species, allow farmers to adapt to changing climatic trends and environmental stresses [3]. The technologies ensure a reliable food supply, particularly for regions prone to droughts, floods, and land degradation. Additionally, vertical farming and hydroponics ensure sustainable ways for urban agriculture, reducing dependence on traditional arable land and cutting down the expense of food transport.

There are some problems with the introduction of new technologies in agriculture. Let's look at some of them and try to give solutions:

- ✓ New technology is too costly for small farmers. In this case, subsidy and preferential loans can allow small farmers to buy technology.
- ✓ New technologies take the place of humans. As a result of this, an increase in unemployment can be observed. New training programs for the use of technology prepare workers for new employment.
- ✓ Overuse of chemicals harms soil and biodiversity. Sustainable practices can reduce environmental damage.

✓ Rural areas need better internet and digital literacy. It is necessary to develop new state programs to improve these cases

Uzbekistan is striving to integrate agrotechnology completely into agriculture to improve efficiency and sustainability. The government supports digital farming, mechanization, and biotechnology to improve productivity and reduce environmental impact. Intelligent irrigation systems, such as drip irrigation, are being promoted to address water scarcity, which is necessary given the country's arid geography. Agro-industrial clusters are being formed to rationalize production and export of farm produce, and international cooperation is responsible for transferring cutting-edge technologies. Nevertheless, challenges persist, such as high prices that render new machinery unaffordable for small farmers, low levels of digital literacy among rural communities, poor water management, and infrastructure deficiencies like internet access and electricity supply in rural villages. Overuse of fertilizers and pesticides also poses environmental risks, affecting soil health and biodiversity [4]. To counter these, the government is stepping up financial support, investing in training programs to equip farmers with modern skills, and promoting sustainable agriculture.

Uzbekistan, being a rural country with a large rural population, considers agriculture a main pillar of its economy. The government has been attempting to modernize the agriculture sector during recent years by adopting agrotechnologies. They consist of drip irrigation systems, greenhouse farming, agro-drones, and hybrid seeds. The use of these technologies is a central activity in food security, export development, and rural incomes.

The adoption of agrotechnology in Uzbekistan has helped to achieve large yields increases and water use efficiency, particularly in cotton and grains. In a country where water resources are not highly available, drip and sprinkler irrigation systems have been paramount. The methods reduce water loss and optimize land use. Modern agricultural equipment and computer monitoring have replaced laborers and enhanced efficiency, with farmers able to achieve higher yields at lower costs. Greenhouse complexes established in areas like Tashkent, Samarkand, and

Fergana have also facilitated year-round production and expanded the country's agricultural export potential. Moreover, agrotechnology draws in foreign investments and stimulates the growth of agribusiness, which adds to GDP and generates jobs in rural areas.

Socially, agrotechnology has transformed rural society. Mechanized farming has eased the physical burden for farmers and reduced the need for seasonal child labor, allowing for educational continuity. Agricultural innovation centers and vocational training programs have been established to educate farmers, specifically youth, on how to utilize new technologies. This has enhanced consciousness and interest among youth to pursue a profession in agriculture. Yet there are challenges. Not everyone can afford new machinery, and lack of access to finance and the internet can hinder smallholders' complete use of agrotechnology. There is also a regional digital divide, which the government is attempting to alleviate through subsidies, loans, and collaboration with international agencies.

The social impacts of agrotechnology in Uzbekistan are also significant. Traditional farming in most regions has long been backbreaking and laborious, especially for women and elderly farmers. Mechanization and automation reduce this burden, creating improved, healthier, and more dignified working conditions. Farmers get to work less on drudgery and work more on farm management, planning, and research courtesy of the new technology.

The other significant benefit is women's and youths' empowerment. Due to increased technology in agriculture, the youths are venturing into new opportunities in agritech startups, data analysis, piloting drones, and agri-marketing. Entrepreneurship and vocational training among rural youths are increasingly being promoted by government initiatives and donor-funded programs. Agriculture schools and institutes in regions such as Andijan, Karshi, and Tashkent are now incorporating digital agriculture, smart irrigation, and greenhouse control in their curriculum [5].

Agrotechnology also facilitates greater food nutrition and access. More varieties of crops are being grown throughout the year using greenhouses and

controlled environments, so more fresh fruits and vegetables are readily available throughout much of the country. It has positive effects on public health, especially in rural or even previously underdeveloped areas.

But unequal access and the digital divide remain perpetual issues. Many small farmers, particularly those who operate in the mountains or remote areas, lack the funds or technical knowledge to acquire high-level technologies [6]. Unless they are given special assistance, such farmers will continue to lag behind. Equitable policies guaranteeing even access to internet, finance, farm schooling, and advisory services are a must in order to fill the gap.

Social acceptance and adaptability are also crucial. Some old farmers may be recalcitrant in terms of modifying procedures due to unfamiliarity or fear of failure. Therefore, agricultural extension services - i.e., demonstration farms, mobile advisory units, and farmer-to-farmer learning - are necessary so that know-how can be spread and confidence generated.

**Conclusion.** In conclusion, agrotechnology plays a decisive role in increasing agricultural productivity, ensuring food security and ensuring sustainable development. Despite significant progress in Uzbekistan, problems such as high costs, digital illiteracy and environmental risk remain barriers to widespread adoption. Continuing investment in technology, education and infrastructure is essential to maximize the economic and social benefits of agrotechnology.

### **REFERENCES:**

1. International Journal of Agricultural Science and Technology. (2023). *Challenges and Innovations in Agrotechnology Adoption*.
2. Uzbekistan Agrotechnology Research Institute. (2023). *Annual Review on Agro-Industrial Modernization*.
3. Ministry of Agriculture of the Republic of Uzbekistan. (2023). *Annual Report on the Development of Agrotechnology in Uzbekistan*. Tashkent.
4. Shavkatbek, Egamberdiyev, and Toshtemirova Muxlisa. "THE NEED FOR FOREIGN COUNTRIES TO STUDY EXPERIMENTS IN THE DEVELOPMENT

OF AN INNOVATIVE ECONOMY." *Лучшие интеллектуальные исследования* 37.4 (2025): 219-223.

5. Shavkatbek, Egamberdiyev, and Adhamjonov Nuriddin. "TRANSPORT VOSITALARINI ISHLAB CHIQARISHDAGI YANGI TEXNOLOGIYALAR VA ULARNING IQTISODIY OQIBATLARI." *Лучшие интеллектуальные исследования* 37.4 (2025): 235-239.

6. Jasurbek, G'ulomov, and Egamberdiyev Shavkatbek. "INNOVATION AND COMPETITIVENESS IN LIGHT INDUSTRY." *Modern education and development* 19.4 (2025): 3-7.