



## INNOVATIONS IN RICE CULTIVATION: FACTORS FOR INCREASING ECONOMIC EFFICIENCY

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### Abstract

This article discusses the economic efficiency of rice cultivation and innovative methods for improving it. Additionally, the article provides recommendations on increasing the volume and quality of rice cultivation to enhance food security and improve economic efficiency.

**Keywords:** Food security, innovative agro-technologies, yield, costs, economic efficiency, export, import, laser equipment, rice breeding, quality indicators.

### Introduction

Ensuring food security worldwide includes the cultivation of rice alongside other agricultural crops, as rice plays a unique role in the human diet. Rice is one of the oldest food crops in the world and has been cultivated for over seven thousand years in Southeast Asia. By 2024, rice is grown in more than 115 countries, with a total area of 155.5 million hectares. The average yield of rice worldwide is 38.4 quintals per hectare. In countries like India and China, rice is grown on 44.8 million hectares and 31.7 million hectares, respectively. In Uzbekistan, rice is grown on 100,000–110,000 hectares, with an average yield of 35-38 quintals per hectare, resulting in a total yield of 395,000 tons. This quantity barely meets the increasing demand for rice among Uzbekistan's growing population. Official reports indicate that approximately 55,000 tons of rice are imported annually to satisfy domestic demand. According to the UN's FAO and WHO data, over 840 million people globally lack sufficient access to food.

Currently, various methods are being employed to cultivate rice in Uzbekistan, including traditional methods, transplanting, and new techniques such as the "Akramjon-Ixtiyor" farm in the Andijan region, where a new method of direct seeding is used. These innovations aim to save water, optimize yields, and reduce costs while improving the economic efficiency of rice production.

### Research Methods

This study utilizes statistical observation and analysis methods to evaluate the economic indicators of rice-producing farms. Quantitative analysis methods were applied to assess the dynamics of rice cultivation and its impact on farm operations, using data for medium-term forecasting. The study also employed comparative analysis, logical reasoning, and monographic observation methods.

### Results

The study examined rice production in Andijan, a region accounting for just 1% of the country's area but housing 10% of the population. As of January 2024, the population of Andijan was 3.42 million, with an average of 744 people per square kilometer, compared to the national average of 75. The region has 20,026 hectares of irrigated agricultural land, of which 10,892 hectares are dedicated to rice cultivation. In 2024, 45,978 tons of rice were produced in 12 districts of Andijan, with an average yield of 43.1 quintals per hectare.

The study also analyzed the economic efficiency of rice cultivation at the "Abdulaziz Rice Farms" in Jalaquduq District, which achieved a yield of 80 quintals per hectare in 2024. The total revenue per hectare was 67,200,000 UZS, with a profit of 38,750,000 UZS per hectare, resulting in a profitability rate of 73%.

### Key Factors Affecting Economic Efficiency

Several key factors influence the economic efficiency of rice production, as outlined in the table below:

Cost Types	Cost Sum (UZS)	Explanation
Land Preparation (plowing, harrowing, manual labor)	5,100,000	Labor and machinery costs
Seed (120 kg, 20,000 UZS per kg)	2,400,000	Cost of seeds
Fertilizers (900 kg)	2,500,000	Fertilizer costs
Herbicides and pesticides	3,300,000	Weed and pest control
Water and land taxes	6,000,000	Water and land-related costs
Combine harvesting services	4,500,000	Harvesting service costs
Machinery service	750,000	Equipment maintenance
Drying services	2,700,000	Drying process
Processing (converting to rice)	1,200,000	Processing costs
<b>Total</b>	<b>28,450,000</b>	Total costs per hectare

The following factors have the most significant influence on improving economic efficiency in rice production:

1. **Accurate Planning of Costs:** Detailed budgeting of costs for each agricultural process is essential for controlling expenses and improving profitability.
2. **Use of Laser Technology:** The introduction of laser equipment for land preparation ensures even water distribution, improving the quality and uniformity of rice cultivation, leading to higher yields and better economic returns.
3. **Improved Rice Seed Production:** Focusing on high-quality seeds ensures uniformity and quality in the harvested rice, enhancing market competitiveness and increasing income.
4. **Efficient Irrigation Practices:** Implementing optimal irrigation methods, such as water rotation and precise distribution, ensures even growth and maximizes yield per hectare, resulting in better economic returns.

### Conclusion

The research concludes that the following strategies will significantly enhance the economic efficiency of rice cultivation in Uzbekistan:

1. Accurate cost planning for each agro-technological process, with a focus on efficient resource use, will lead to increased profitability.
  2. The application of laser technology for uniform water distribution will improve yields and enhance the quality of the rice.
  3. High-quality rice seed production will prevent the mixing of different varieties and improve the quality of the final product, ensuring better market prices.
- Optimizing irrigation practices will not only increase yields but also provide additional income by ensuring consistent and uniform water distribution.

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