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Rice Monoculture in West Bengal: Historical Development, Current Scenario, and Pathways for Sustainability

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Abstract

Rice is the most important food crop of West Bengal and also the main food for its people. The state contributes nearly 15% of the total rice produced in India and has earned the name "the rice bowl of the east." In the past, farmers in West Bengal followed mixed farming, where rice was grown along with pulses, oilseeds, and vegetables. This helped keep the soil fertile and reduced the risk of pests. However, after the Green Revolution, farmers started depending only on rice cultivation. They shifted to high-yielding varieties and chemical fertilizers. Slowly, rice monoculture became common across districts. While this change helped to increase food production and ensured food security for the growing population, it also brought new problems. Soil fertility declined, groundwater levels went down, and pest and disease attacks became frequent. Farmers also lost many of the traditional rice varieties that were rich in taste and quality. This article explains the history of rice monoculture in West Bengal, its present condition, its importance to the economy, and the challenges it creates. It also suggests sustainable methods to continue rice farming in a way that protects soil, water, and biodiversity.

Keywords

Rice Monoculture, West Bengal, Soil Fertility, Water Scarcity, Sustainable Agriculture, Green Revolution

Introduction

West Bengal is the largest producer of rice in India. Rice is grown in almost every district of the state and is the main food for the majority of its people. From daily meals to festivals, rice holds cultural as well as economic importance.

Traditionally, farming in West Bengal was diverse. Farmers cultivated rice during the rainy season, followed by pulses, oilseeds, or vegetables. This diversity kept the soil healthy and reduced pest attacks. But after the Green Revolution in the 1960s, farmers began to grow only rice in large areas.

Government policies such as the Minimum Support Price (MSP) and procurement for the Public Distribution System (PDS) encouraged them further. This trend led to monoculture, where the same crop is grown repeatedly on the same land.

Historical Development of Rice Monoculture

Before the 1960s, farmers mostly grew indigenous rice varieties that were suited to local soils and weather. These varieties were less demanding and survived even with low inputs. Farmers also followed crop rotation, where rice was grown with pulses and oilseeds. This improved soil fertility naturally.

The Green Revolution brought a major change. New high-yielding varieties like IR8, Swarna, and later hybrid rice gave more output but needed irrigation, fertilizers, and pesticides. Government schemes and markets supported rice cultivation because it was essential for food security. Slowly, farmers reduced other crops and concentrated mainly on rice. Over time, rice monoculture became the dominant system in West Bengal.

Current Practices in Rice Farming

Rice is cultivated in West Bengal in three main seasons.

Table 1: Rice Seasons in West Bengal

Season	Months	Characteristics	Share of Area
Aus	April – August	Short duration, rain-fed, declining area	~5%
Aman	June – December	Main season, rain-fed, largest share	~70%
Boro	January – May	Irrigated, high input, water-intensive	~25%

Aman is the most important season, covering nearly two-thirds of the rice area. Boro rice has increased in recent years due to irrigation but it requires huge amounts of groundwater. Aus rice is slowly disappearing because farmers find it less profitable.

Most farmers depend on chemical fertilizers and pesticides. Modern machines are also used for transplanting and harvesting. While these practices give good yields, they have also increased costs and reduced the natural balance of the soil.

Economic Significance of Rice

Rice is the backbone of the agricultural economy of West Bengal. It provides employment to millions of small and marginal farmers. The state supplies rice to the Public Distribution System (PDS), which ensures food for poor households. West Bengal also exports aromatic rice like Gobindobhog and Tulaipanji.

However, focusing only on rice has reduced the cultivation of other crops. As a result, the state depends on imports from other regions for pulses and oilseeds. This has reduced dietary diversity and income options for farmers.

Challenges of Rice Monoculture

1. Soil Degradation

Growing rice again and again removes important nutrients such as nitrogen, phosphorus, and potassium from the soil. Farmers use chemical fertilizers, but these cannot replace the natural balance fully. The organic matter of soil has reduced in many districts.

2. Water Scarcity

Rice, especially Boro rice, requires a huge quantity of water. On average, it needs 3,000–5,000 liters of water to produce one kilogram of rice. This has led to falling groundwater levels in districts like Nadia, Hooghly, and Murshidabad.

Table 2: Water Requirement of Rice (Boro Season)

Item	Amount
Water needed per kg rice	3,000 – 5,000 litres
Groundwater depletion rate	0.5 – 1 metre/year in some districts

3. Pests and Diseases

Monoculture creates a favorable condition for pests and diseases. Brown planthopper, stem borer, and sheath blight are common in West Bengal rice fields. Farmers spend heavily on pesticides, but pests often develop resistance.

4. Loss of Biodiversity

West Bengal once had thousands of traditional rice varieties, including aromatic and drought-tolerant types. Many of these are now lost because farmers have shifted to HYVs. This has reduced the genetic strength of rice to face climate change.

5. Farmer Livelihood Challenges

The cost of cultivation has increased due to fertilizers, pesticides, and irrigation. Small farmers often fall into debt. Climate change, with irregular rainfall and floods, makes them more vulnerable when they depend only on rice.

Sustainable Alternatives for Rice Systems

- **System of Rice Intensification (SRI):** Uses less water and seeds but increases yield.
- **Alternate Wetting and Drying (AWD):** Saves irrigation water while maintaining productivity.
- **Rice-Fish and Rice-Duck Farming:** Integrates fish or ducks in paddy fields, which helps control pests and adds extra income.
- **Organic Practices:** Use of farmyard manure, green manuring, and biofertilizers can improve soil health.
- **Reviving Traditional Varieties:** Indigenous rice like Tulaipanji and Kalonunia are not only climate-resilient but also have high market demand.
- **Government Support:** Policies should promote pulses and oilseeds in rotation with rice and give incentives for eco-friendly practices.

Conclusion

Rice monoculture in West Bengal helped the state achieve food security but it also created serious ecological and economic challenges. Soil degradation, groundwater depletion, pest attacks, and biodiversity loss are major concerns. Farmers are under stress due to rising costs and climate risks.

The future lies not in giving up rice but in making rice cultivation sustainable. This can be achieved by adopting water-saving methods, organic practices, and crop diversification within the rice system. Support from government, research institutions, and farmer communities will be essential. By combining modern science with traditional wisdom, West Bengal can secure both food security and environmental health for the future.

References

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