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

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Rice is the most important food crop in West Bengal and the staple diet of its people. The state contributes nearly 15% of the total rice produced in India and is often called the 'rice bowl of the east.' Traditionally, farmers practiced mixed farming, where rice was grown along with pulses, oilseeds, and vegetables, helping maintain soil fertility and reduce pest risks. With the Green Revolution, however, farming shifted toward rice monoculture. High-yielding varieties, fertilizers, and irrigation improved food security but created challenges like declining soil fertility, falling groundwater levels, pest attacks, and loss of traditional varieties. This article reviews the history, current practices, economic importance, and challenges of rice monoculture in West Bengal while suggesting sustainable alternatives to protect soil, water, and biodiversity.

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

Introduction

West Bengal is the largest rice producer in India, where the crop is central to culture and economy. Traditionally, farmers practiced crop diversity, cultivating pulses and oilseeds after rice. The Green Revolution of the 1960s encouraged monoculture, driven by high-yielding varieties and policies like MSP and PDS. This shift increased production but led to ecological strain.

Historical Development of Rice Monoculture

Before the 1960s, indigenous rice varieties dominated, requiring low inputs and thriving under local conditions. Crop rotation with pulses and oilseeds improved soil fertility naturally. The Green Revolution introduced high-yielding varieties (HYVs) like IR8 and Swarna, supported by irrigation, fertilizers, and pesticides. Government policies emphasized rice for food security, causing other crops to decline.

Current Practices in Rice Farming

Rice in West Bengal is grown in three main seasons:

- Aus (April–August): Short duration, rain-fed, now declining (~5%).
- Aman (June–December): Main season, rain-fed, covers ~70% of rice area.
- Boro (January–May): Irrigated, high-input, water-intensive (~25%).

While mechanization and chemicals improve yields, costs are high and soil balance is affected.

Economic Significance of Rice

Rice is the backbone of West Bengal's agricultural economy, providing employment and food through the PDS. The state also exports premium aromatic rice like Gobindobhog and Tulaipanji. However, monoculture reduced pulses and oilseeds, increasing dependence on imports and reducing dietary diversity.

Challenges of Rice Monoculture

1. Soil Degradation – Continuous rice cultivation depletes nitrogen, phosphorus, and potassium. Organic matter has declined.
2. Water Scarcity – Boro rice needs 3,000–5,000 liters of water per kg, depleting groundwater.
3. Pests and Diseases – Brown planthopper, stem borer, and sheath blight are common. Pesticide costs are high and resistance develops.
4. Loss of Biodiversity – Thousands of traditional rice varieties have been lost, weakening genetic diversity.
5. Farmer Livelihood Challenges – Rising costs, debts, and climate risks make monoculture risky for small farmers.

Sustainable Alternatives for Rice Systems

- System of Rice Intensification (SRI) – Saves water and seeds, boosts yields.
- Alternate Wetting and Drying (AWD) – Conserves irrigation water.
- Rice-Fish and Rice-Duck Farming – Adds income, controls pests.
- Organic Practices – Green manuring, biofertilizers, and compost restore soil health.
- Reviving Traditional Varieties – Indigenous rice like Tulaipanji and Kalonunia are climate-resilient and marketable.
- Policy Support – Incentives for crop diversification and eco-friendly farming are needed.

Conclusion

Rice monoculture secured food supplies in West Bengal but also caused soil, water, pest, and biodiversity issues. Sustainable rice farming requires combining modern science with traditional practices, supported by government policies, to ensure both food security and environmental health.

Reference

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