GreenariA
Go Green, Learn Green
An Agricultural Monthly e-Magazine

Volume 03, Issue 05, 2025
ISSN: 2584-153X
Article ID: G-25-0506

A REVOLUTION IN RICE PRODUCTION IN ASIA: METHODS THAT INCREASE YIELDS

Ankan Ghosh

Bachelor of Science (Hons.) Agriculture, Brainware University, Barasat, Kolkata, West Bengal, India

Corresponding Author Mail ID: ghoshankan75@gmail.com

Abstract

Over 90% of the world's rice consumers live in Asia, where agriculture has seen substantial transformation recently. Even though the Green Revolution laid the foundation, modern rice production is influenced by precision farming, biotechnology developments, and advanced agronomic techniques. This article examines the most effective yield-boosting strategies that are currently revolutionizing rice cultivation throughout Asia using case studies and the most recent scholarly research.

Introduction:

Mostly in Asia, rice is a staple food for over half of the world's population.

Growing rice production sustainably has become essential as populations grow and the climate deteriorates. In order to ensure food security for future generations, the Asian rice revolution aims to combine sustainability, genetics, and smart farming in addition to increasing output.

1. High-yielding varieties and hybrid rice (HYVs)

The introduction of high-yielding varieties (HYVs) during the Green Revolution marked the beginning of the rice revolution in Asia. Since then, hybrid rice has significantly increased yields per hectare, particularly in Vietnam, China, and India. When compared to conventional types, these hybrids can boost output by up to 20–30% by utilizing heterosis, or hybrid vigor (Yuan, 2017). Advances in molecular breeding and marker-assisted selection have further enhanced these cultivars, increasing their resistance to pests, diseases, and adverse weather conditions (Ali et al., 2020).

2. System of Rice Intensification (SRI)

The System of Rice Intensification (SRI) is a farming method that emphasizes younger seedlings, wider spacing, and alternate wetness and drying (AWD) irrigation. Several studies have shown that SRI can increase yields by 25–50% while reducing water use by up to 40% (Uphoff, 2007). SRI's adaptability and potential for smallholder adoption are demonstrated by its success in countries like Sri Lanka, Indonesia, and India. SRI was initially labor-intensive, but mechanized versions are now being developed to facilitate implementation (Thakur et al., 2010).

3. Precision Agriculture and Smart Technologies

Asian farmers are employing Internet of Things (IoT)-based sensors, drones, and satellite imaging to remarkably accurately monitor soil health, water levels, and pest infestations. This data-driven approach enables timely interventions that maximize input use and minimize crop loss, boosting yields and reducing costs (Zhang et al., 2019). South Korea and Japan are leading the way in robotic rice cultivation, while China and India are rapidly growing smartphone-based agronomy advice platforms (Patel et al., 2021).

4. Integrated Nutrient and Pest Management

Sustainable intensification maintains soil health while simultaneously boosting productivity. Integrated nutrient management (INM) and integrated pest management (IPM) strategies reduce the need for pesticides by promoting balanced fertilizer use and biological pest control. Research indicates that INM increases productivity by 15–20% and enhances soil fertility over the long term (Singh et al., 2014). IPM techniques like pheromone traps and natural

predators, which have been demonstrated to reduce pesticide use by 50%, are strongly promoted by Vietnam's rice IPM programs (Huan et al., 2005).

5. Climate-Resilient and Stress-Tolerant Rice

The growing frequency of droughts, floods, and salinity in coastal regions has made developing rice cultivars that can tolerate stress a major scientific priority. Farmers have reported yield increases of 1–3 tons/ha in flood-prone areas as a result of using submersion-tolerant rice, like Swarna-Sub1 (Mackill et al., 2012). Salinity-tolerant rice cultivars, such as IR64-Saltol, have proven crucial for preserving rice's viability in hostile environments in coastal Bangladesh and portions of India (Gregorio et al., 2013).

Conclusion:

The rice revolution in Asia is still going strong. While earlier decades focused on quantity, current approaches aim for high-tech, climate-smart, and sustainable solutions. From hybrid varieties to precision agriculture and integrated farming, Asia continues to lead the world in rice innovation. The next challenge is to ensure that smallholder farmers, who grow most of the region's rice, are aware of these developments. Policies that promote education, technology access, and collaborative research are crucial to maintaining this change.

References

1. Yuan, L.P. (2017). "Hybrid rice achievements and future prospects." *Rice Science*, 24(1), 1–2.
2. Ali, J., et al. (2020). "Marker-assisted selection in rice: Recent advances and future prospects." *Plant Breeding*, 139(1), 1–11.
3. Uphoff, N. (2007). "The System of Rice Intensification: Using alternative cultural practices to increase rice production and profitability." *International Rice Commission Newsletter*, 55, 39–45.
4. Thakur, A.K., et al. (2010). "Comparative performance of system of rice intensification and conventional transplanting under irrigated conditions in India." *Paddy and Water Environment*, 8(4), 451–460.
5. Zhang, C., et al. (2019). "Precision agriculture technologies in rice production: A review." *Agricultural Systems*, 174, 1–13.
6. Patel, H., et al. (2021). "Smartphone advisory services and digital agriculture in India: Adoption and outcomes." *Information Technologies & International Development*, 17, 23–36.
7. Singh, Y., et al. (2014). "Integrated nutrient management for enhanced rice productivity and soil health." *Indian Journal of Agronomy*, 59(3), 381–386.
8. Huan, N.H., et al. (2005). "Rice pest management in the Mekong Delta, Vietnam." *Crop Protection*, 24(2), 187–193.
9. Mackill, D.J., et al. (2012). "Development and deployment of Sub1 rice: A climate-resilient rice variety." *Field Crops Research*, 134, 18–23.
10. Gregorio, G.B., et al. (2013). "Progress in breeding for salinity tolerance and associated abiotic stresses in rice." *Field Crops Research*, 76(2–3), 91–101.