Solution:

High-yielding, climate-resilient and nutritious rice varieties

Submitter: (International Rice Research Institute - IRRI)

Solution Overview

What is it, and what problem does it solve? Brief 2–3 sentence description.

High-yielding, climate-resilient rice varieties have been developed through the IRRI–NARES partnership to combat drought, salinity, and flood risks (e.g., GSR varieties). They also include Direct Seeded Rice (DSR)-suitable, low-input types, ideal for regions facing labor shortages, water stress, and poor soil fertility. Additionally, varieties with a demonstrated low Glycemic Index (GI) and high zinc content contribute to nutritional security while maintaining competitive yields. Developed using advanced breeding tools, including IRRI-derived germplasm like Sub1 and biofortified lines, these varieties support sustainable agriculture by enhancing yield stability, reducing input needs, and improving nutrition.

Key Features & Benefits

Main components and why it is useful? Bullet points summarizing methods, tools, and value added.

Key features and benefits

- High yield potential: improved genetics for increased grain production per hectare.
- Climate resilience:
  - Drought tolerance: sustains yields during water shortages (e.g. Sahbhagi Dhan, Swarna Shreya, DRR Dhan 42, DRR Dhan 44, DRR Dhan 50, CR Dhan 80, CR Dhan 802 and DRR Dhan 64).
  - Flood tolerance (e.g., Swarna-Sub 1, Samba-Sub1, Binadhan 11, IR64 sub1, CR Dhan 801, CR Dhan 802): survives submergence for extended periods (two-three weeks).
  - Heat tolerance withstands higher temperatures during critical growth stages (eg. DRR Dhan 47 and DRR Dhan 52).
  - Salinity tolerance: suitable for coastal or degraded saline soils (eg. CSR 36, CSR 46 CSR 60 & CSR 76).
- Early maturity: shorter growing cycle; allows for multiple crops per year.
- Pest and disease resistance: built-in resistance reduces need for chemical inputs.
- Biofortification: enhanced levels of micronutrients with competitive yield (e.g., Zico Rice MS, Protezin)
- Adaptability: grows well in diverse agro-ecological zones.

Value added to the seed system and farmers

- Boosts demand for quality seeds, encouraging local production, distribution, and profitability, while also promoting public-private partnerships and attracting private sector investment in seed multiplication and marketing.
- Improves seed quality standards: drives innovation and certification systems for better seed quality assurance.
- Climate-resilient and high-yielding varieties reduce production risks, lower input costs, and enhance farmer income through improved productivity.
- Better nutrition: biofortified rice contributes to household health and dietary diversity.
- Increased cropping intensity: early-maturing varieties allow multiple harvests per year.

Where It Works and Where It Can Work

Existing and potential target regions, agroecologies, or farming systems. Include examples if available.

These varieties are widely adapted to diverse agroecologies across India, Nepal, and Bangladesh. These include drought-prone uplands and rainfed lowlands of eastern India (Assam, Odisha, Eastern Uttar Pradesh), flood-affected plains of Nepal and Bangladesh, and saline coastal zones of Sundarbans and coastal Odisha. The low input responsive rice varieties (GSR) are suitable and scalable for medium lands in eastern India.

Evidence & Impact

What results has it shown? Stats, pilot outcomes, or testimonials.

These climate resilient rice varieties have created a widespread impact across South Asia. Drought- and submergence-tolerant varieties have demonstrated a yield advantage of 0.4 to 0.7 tons/ha compared to conventional, widely cultivated varieties.

In India, Nepal, and Bangladesh, flood- and drought-tolerant varieties such as Swarna-Sub1, Binadhan 11, Samba Sub1, DRR Dhan 42, DRR Dhan 44, and PR 126 are being scaled up through national networks. In Nepal, varieties like Hardinath 5, Hardinath 6, Ganga Sagar 1, Ganga Sagar 2, and Sukhadhan 5 are helping farmers achieve better yields and resilience against climatic stress. In Bangladesh, submergence-tolerant varieties such as BRRI Dhan 51, BRRI Dhan 52, and Binadhan 11, along with drought-tolerant varieties like Binadhan 67 and Binadhan 71, are supporting farmers in improving yields under challenging conditions.

Additionally, nutrition-rich rice varieties—particularly those biofortified with zinc—are scale-ready and increasingly adopted in India and Bangladesh.

Scalability & Adoption Support

Why it can be scaled and what's needed to adopt it?

Low-cost, adaptable, partner-ready, etc.

These varieties are well-suited to local ecologies, stress-tolerant, and aligned with market demand. Their adoption requires no additional cost to farmers. KVKs and agriculture departments can support the dissemination of these varieties through their extension networks. Additionally, state seed corporations, private seed companies, and farmer collectives can be encouraged to participate in their seed production and marketing.

Partners & Contact Info

Who's involved and how to connect? List of key contact and partners + email / phone.

Partners: State seed corporations (Odisha, UP, Bihar, Chhattisgarh, Assam, Maharashtra). and Private Seed Agencies

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