

Rethinking India's Rice Production and Export Strategy

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India's Rice Production and Export Strategy Latest News

- India has been the world's **largest rice exporter** since 2011-12. In 2024-25, India exported about 21.69 million tonnes, far higher than Thailand (7.86 million tonnes) and Vietnam (8.06 million tonnes).
- India also became the **largest rice producer** in the world in 2024-25, with an estimated 150 million tonnes of output, surpassing China's 145.28 million tonnes.
- However, the key challenge ahead is maintaining this leadership while ensuring environmental sustainability and financial viability.

Environmental Costs of Paddy Cultivation

- Paddy is an extremely **water-intensive crop**. A single irrigation covering one acre to a depth of 2.5 cm requires about 1,01,171 litres of water.
- To control weeds, paddy fields are usually kept submerged under about 5 cm of water for long periods.
- Depending on crop duration and planting time, paddy requires 20 to more than 30 irrigations.

- Under the conventional system of transplanting with continuous flooding, about 25 irrigations at 5 cm depth can consume roughly 5 million litres of water per acre.

Water Footprint of Rice Production

- With an average yield of 2.5 tonnes of paddy per acre, producing one kilogram of paddy requires about 2,000 litres of water.
- After milling (which gives about two-thirds recovery), one kilogram of rice requires nearly 3,000 litres of water.
- This means that every kilogram of rice exported by India effectively represents the export of about **3,000 litres of water**, raising concerns about the environmental sustainability of large-scale rice exports.

Financial Sustainability of Rice Exports

- India exports both **basmati and non-basmati rice**, but their export values differ significantly.
- In 2023–24 and 2024–25, basmati exports were about 5–6 million tonnes, less than half of non-basmati exports (11–14 million tonnes).
- However, the export value of both categories was almost similar. Basmati exports earned about \$5.8–5.9 billion, while non-basmati exports generated \$4.5–6.5 billion.
- The average unit value of basmati rice was ₹82.9–92.3 per kg, compared with ₹34–39.2 per kg for non-basmati rice, showing that basmati brings higher revenue per kilogram.

Water Efficiency in Basmati Cultivation

- Basmati rice also requires less irrigation water compared with many non-basmati varieties.
- Non-basmati paddy is usually transplanted in June, during peak summer, which requires frequent irrigation.
- In contrast, basmati varieties are transplanted in July with the onset of monsoon, reducing the need for irrigation.

Climatic Advantage for Aroma

- Basmati crops flower and develop grains in October, when temperatures fall to 30–31°C.
- These cooler conditions help the formation of **2-acetyl-1-pyrroline**, the compound responsible for basmati's distinctive aroma.
- If transplanted earlier in June, grain filling happens in September when temperatures remain high, which reduces aroma quality.

Shift Towards High-Value Rice Exports

- Because basmati generates higher export earnings and uses less water, it offers better economic and environmental returns.
- Experts suggest increasing exports of basmati and other high-value aromatic rice varieties.
- These include GI-protected varieties such as Kalanamak and Adamchini (Uttar Pradesh), Katarni (Bihar), Gobindobhog (West Bengal), Badshah Bhog (Chhattisgarh), Koraput Kalajeera (Odisha), Wayanad Jeerakasala

and Gandhakasala (Kerala), and Seeraga Samba (Tamil Nadu).

- The broader goal is to shift from exporting bulk commodity rice to exporting high-value, less water-intensive rice varieties.

Towards a Non-Basmati Phaseout Strategy

- India's basmati exports have increased sharply from 0.6–0.7 million tonnes in the early 2000s to 5–6 million tonnes in recent years.
- Export earnings have also risen from \$400–450 million to about \$5.8–5.9 billion.
- This growth is largely due to high-yielding basmati varieties developed by scientists at the Indian Agricultural Research Institute (IARI).

High-Yield Modern Basmati Varieties

- **Pusa Basmati-1509** yields about 2.5 tonnes of paddy per acre and matures in 115–120 days, compared with 1 tonne yield and 155–160 days maturity for traditional basmati varieties.
- India's basmati GI region covers about 6.2 million hectares across Punjab, Haryana, western Uttar Pradesh, Uttarakhand, Jammu and Himachal Pradesh.
- However, actual basmati cultivation is only about 2.1 million hectares. Expanding basmati to the entire GI area could increase production, exports, and sustainability in rice farming.

Policy Measures for Transition

- Experts suggest gradually reducing non-basmati rice cultivation in water-stressed regions like Punjab and Haryana.
- The government could instead procure non-basmati paddy from eastern states such as Uttar Pradesh, Bihar, West Bengal and Assam, where groundwater stress is lower.
- The government can set a floor price for basmati paddy in mandis to protect farmers from price crashes.

Advances in Rice Breeding Strategies

- IARI scientists introduced genes from wild rice and landraces into popular varieties such as Pusa Basmati-1509, 1121 and 1401 using marker-assisted selection.
- This led to disease-resistant varieties Pusa Basmati-1847, 1885 and 1886, which resist bacterial leaf blight and rice blast.
- Genetic resistance reduces the need for antibiotics and fungicides. Lower chemical use helps maintain basmati's premium quality in global markets.

Tackling Other Crop Threats

- Researchers are now identifying genes for resistance against diseases (bakanae, false smut, brown spot) and pests (stem borer, leaf folder, plant hoppers).
- The focus is also on traits like drought, heat and salinity tolerance.

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