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# REBALANCING INDIA'S RICE ECONOMY

## Water, Exports and Sustainability

## 1. Latest Developments

India's position as the world's largest rice exporter has renewed the focus on the water, energy and environmental costs of rice production. This highlights the need to shift agricultural policy from export volumes towards sustainable value creation.

## 2. India's Position in the Global Rice Market

India has remained the world's largest rice exporter since 2012, accounting for approximately 30–35% of global rice exports in recent years. The country produced an estimated 154.02 million tonnes of rice in 2025–26.

Rice exports increased from 17.73 million tonnes in 2020–21 to 21.57 million tonnes in 2025–26, while export earnings rose from $8.82 billion to $11.54 billion.

The major rice-producing States include Uttar Pradesh, Telangana, West Bengal, Punjab, Chhattisgarh, Odisha, Madhya Pradesh, Bihar, Andhra Pradesh and Tamil Nadu.

India's rice exports comprise two major categories:

- Basmati rice: In 2025–26, India exported 6.52 million tonnes, valued at Rs. 50,138 crore ($5.67 billion).
- Non-Basmati rice: Exports reached 15.04 million tonnes, valued at Rs. 51,892 crore ($5.86 billion).

Although non-Basmati rice accounted for more than twice the export volume of Basmati rice, its aggregate export value was only marginally higher. This highlights the potential for improving export earnings through quality, branding and value addition rather than relying primarily on higher volumes.

## 3. The Hidden Resource Cost of Rice Exports

A major concern surrounding India's rice economy is the water embedded in agricultural production and exports. This is referred to as virtual water trade, which represents the water used to produce goods that are subsequently traded internationally.

Two categories of water are particularly important:

- Green water: Rainwater stored in soil and used by crops. Rice cultivation dependent on rainfall generally places relatively little pressure on local freshwater resources.
- Blue water: Water drawn from rivers, reservoirs and groundwater aquifers for irrigation. Excessive dependence on these sources can deplete already scarce water resources.

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The pressure is particularly acute in Punjab, Haryana and western Uttar Pradesh. Groundwater-fed rice cultivation in parts of West Bengal, Bihar, Odisha, Chhattisgarh, Telangana, Andhra Pradesh, Tamil Nadu and Karnataka also contributes to water stress.

Therefore, the sustainability of rice exports cannot be measured only through export earnings and volumes. The amount of scarce blue water used to produce every tonne of exported rice is equally important.

## 4. Rice Cultivation and Climate Change

Rice production also contributes to greenhouse gas emissions, particularly through two major sources:

- Methane emissions: Flooded paddy fields create anaerobic conditions that encourage methane-producing microorganisms, making rice cultivation a significant source of agricultural methane emissions.
- Nitrous oxide emissions: Excessive or inappropriate application of nitrogen-based fertilisers can increase nitrous oxide emissions. Other intensive conventional farming practices also contribute to greenhouse gas emissions.

Several agricultural practices can improve resource efficiency and reduce emissions:

- Alternate Wetting and Drying (AWD): A water-management technique that periodically allows paddy fields to dry rather than keeping them continuously flooded.
- Direct-Seeded Rice (DSR): Rice seeds are directly sown in fields instead of being raised in nurseries and transplanted.
- Integrated Nutrient Management: Combines organic and inorganic nutrient sources to improve fertiliser efficiency and soil health.

However, the effectiveness of these interventions varies across agro-climatic and soil conditions. Their environmental benefits and possible trade-offs between different greenhouse gases require context-specific assessment.

## 5. Moving from Volume to Value

India's rice policy needs a differentiated production and export strategy based on regional water availability, agro-climatic conditions and groundwater status.

The key priorities include:

- Crop diversification: In highly water-stressed regions, farmers should be encouraged to shift towards less water-intensive crops, supported by appropriate incentives.
- Improved irrigation efficiency: Better water-management practices and efficient irrigation systems can reduce pressure on groundwater and other freshwater resources.
- Quality and branding: Export competitiveness should increasingly depend on product quality, branding, processing, traceability and geographical indications (GIs), rather than simply increasing physical export volumes.

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- Sustainable agricultural practices: Wider adoption of AWD, DSR and integrated nutrient management can improve water-use efficiency and reduce the environmental footprint of rice cultivation.

The objective is not necessarily to export less rice, but to produce and export higher-value rice with lower water and environmental costs.

## 6. Measuring Sustainability Through a Water–Carbon–Value Framework

A more comprehensive assessment of rice exports requires indicators that capture their economic and environmental performance.

The proposed water–carbon–value framework includes:

- Export value per tonne of rice.
- Export value per cubic metre of blue water consumed.
- Groundwater used per tonne of rice produced.
- Irrigation water productivity.
- Greenhouse gas emissions per kilogramme of rice.
- Farmer income generated per unit of water.
- Groundwater trends across major rice-producing districts.

These indicators can help policymakers assess whether improvements in export earnings are being achieved alongside better resource efficiency and environmental sustainability.

Source: The Hindu (TH)

