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## India's rice export ban revives the conversation about the crop's vast ecological footprint

**India's grain export moratorium will hurt the Global South as prices rocket. But as India exports rice, it also exports its increasingly scarce water supply. Massive methane emissions, land-use change and human health concerns also mar production of India's most lucrative crop.**



By [Richi Verma](#)

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International rice buyers went into a frenzy after India announced a sudden ban on the export of non-basmati white rice late July, after a period of heavy rains devastated rice paddies.

The sudden ban sent ripples across the global food chain, spurring panic buying among the Indian diaspora in the United States, Canada, Dubai and Australia and prices to climb in its main export markets, Asia and Sub-Saharan Africa. The ban has dented the credibility of India's claim to be the natural leader of the Global South, since rising rice prices will hurt poor communities, particularly India's neighbours, Bangladesh and Nepal, the hardest.



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According to officials, the export ban was put in place to keep domestic retail prices – which have increased by 11.5 per cent over the last year – in check. Some believe the decision was made with one eye on elections next year.

“Apart from being politically motivated, the export ban has been imposed just in case India has a weak monsoon next month and El Niño plays spoilsport. These factors could hurt rice productivity,” said Anand Sharma, director of weather forecasting, disaster management and environmental awareness at the India

Meteorological Department.

India is the world's largest exporter of rice, selling over 22 million tonnes of the crop last year – some 40 per cent of the global supply.

### Exporting rice, exporting water

India's rice export ban has revived the conversation about the huge environmental health costs of cultivating the crop. Experts have long warned of the consequences of the intense focus on rice production over other crops such as pulses and millets.

“India's huge rice industry is a consequence of the Green Revolution that transformed agricultural practices through technological and research innovation,” said Dr Nandula Raghuram, a professor of biotechnology and a specialist in rice research at the Centre for Sustainable Nitrogen and Nutrient Management at the Guru Gobind Singh Indraprastha University in New Delhi.

Raghuram was referring to a period of agricultural modernisation that began in the 1960s, when high-yielding variety seeds, pesticides and fertilisers were introduced to boost production. In 1951, India produced 20.58 million tonnes of grain from 30.81 million hectares. [Now, the country produces](#) 112.9 million tonnes from 43.79 million ha.

“A shift to higher cultivation of rice and wheat has come at the cost of other essential crops like pulses, oilseeds and millets. This is very unsustainable for a country like India, where a large part of the population is protein-deficient, and/or diabetic,” he said.

Millet, pulses and other crops that are rotated to keep the soil healthy have been replaced rice monoculture paddies, as farmers have been persuaded to switch to rice by attractive government subsidies and the lure of export traders.

But as India exports rice, it is also shipping its domestic water supply. India has 18 per cent of the world's population but only 4 per cent of water resources. Water scarcity is [a problem in many cities](#) and rural areas.

“Rice typically doesn't require much water to grow, making it a unique crop. But since adding water to rice crops aids weed management and increases the uptake of nutrients for a higher yield, Indian farmers have been liberally adding water,” said Ramanjaneyulu CV, a scientist at the Centre for Sustainable Agriculture, Indian Agricultural Research Institute, Hyderabad.

Around the time of independence in the 1940s and 1950s, at least 50 per cent of rice crops were intensely irrigated. Now almost all rice crops are farmed using ponding conditions.

“Our estimate is that 60 lakhs [million] litres of water are consumed per acre [0.4 hectares] of rice paddy. This is equivalent to over a hundred households' worth of domestic water consumption a year,” he said.

The volume of water used to grow rice cannot be replenished by rainfall alone. So farmers pump groundwater to irrigate their paddies. Up to 5,000 litres is sucked out of the ground for every kilogram of rice produced.

“Most of this is for exports rather than meeting domestic needs,” said Ramanjaneyulu.

“Last year at least 47 billion litres of water was used, billions spent on dams, groundwater drained, and millions of tonnes of fertiliser used to increase rice supply to sell overseas. While other countries have started reducing the areas used for rice production and diversifying their agricultural output, India has seen growing rice as cash crop for export,” he added.

The India Meteorological Department has predicted “break” monsoon conditions in early August, which could mean that rains shift to the foothills of the Himalayas and the rest of the country experiences dry conditions, including in the major rice-producing states. Reduced rainfall will force farmers to tap further into the groundwater supply, said Sharma.

An underreported story of the climate impact of rice production is the release of methane, which occurs when rice is grown in stagnant water and organic matters starts to decompose. Paddy fields account for nearly one-fifth of man-made methane emissions globally and are India’s second biggest methane source after livestock.

Methane has more than 20 times the global warming potential of carbon dioxide, meaning that how rice is grown in India has a significant effect on the country’s decarbonisation ambitions. India has set a 2070 net-zero target, which is more likely to be achieved if the country shifts to more sustainable agricultural methods.

Heavily subsidised fertilisers manufactured with imported naphtha, a flammable liquid hydrocarbon mixture, are another large emissions source associated with rice production, along with high power consumption from the use of tube wells.

### **Greater grains and climate change**

While uneven rainfall distribution has affected rice production, drought-proofing through assured irrigation and re-evaluating cropping patterns are solutions India can adopt to mitigate the impacts of rice production shortfalls.

“No drought lasts more than two weeks and stored water through harvesting, canals, groundwater and irrigation have not been focused on enough,” said Sharma.

Switching from ponding to drier methods of cultivation would reduce the methane footprint. In addition, cropping patterns need to change to allow for a greater diversity of produce.

In semi-arid areas, farmers should rotate what they grow and cultivate millets or pulses,

which are less thirsty crops. These alternatives are also nitrogen fixing, which allows farmers to cut back on nitrogenous fertiliser that can be used to grow other crops, such as cereals, vegetables, fruits or flowers.

Another solution is to shift to different rice strains, which require less water and fertiliser, although they are costlier.

“In Telangana in the south of India, for example, the area for rice production has increased by 250 per cent in the last decade because rice crops have a guaranteed market,” said Ramanjaneyulu. “In Punjab, rice production comes at a huge cost of groundwater resources and their entire produce is exported.”

“India needs alternate solutions like dry rice production, dry paddy production and regulations for water usage. Allowing export of only sustainably produced rice which will help farmers as well,” he said.

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