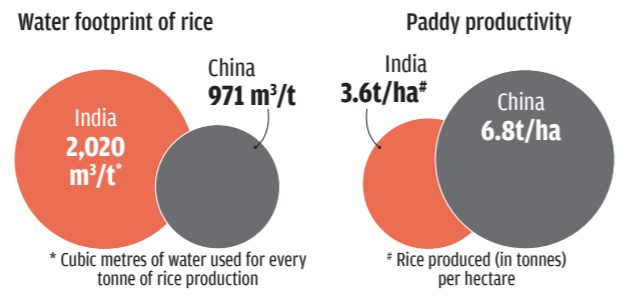


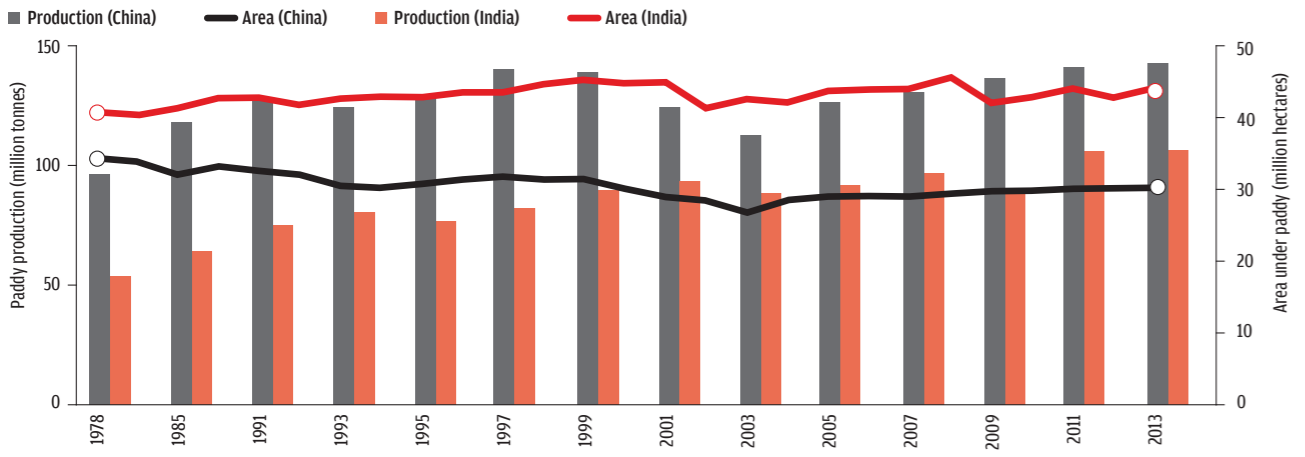
Future tense

India will need to feed a projected 394 million more people by 2050. What are the agricultural challenges and how can they be addressed

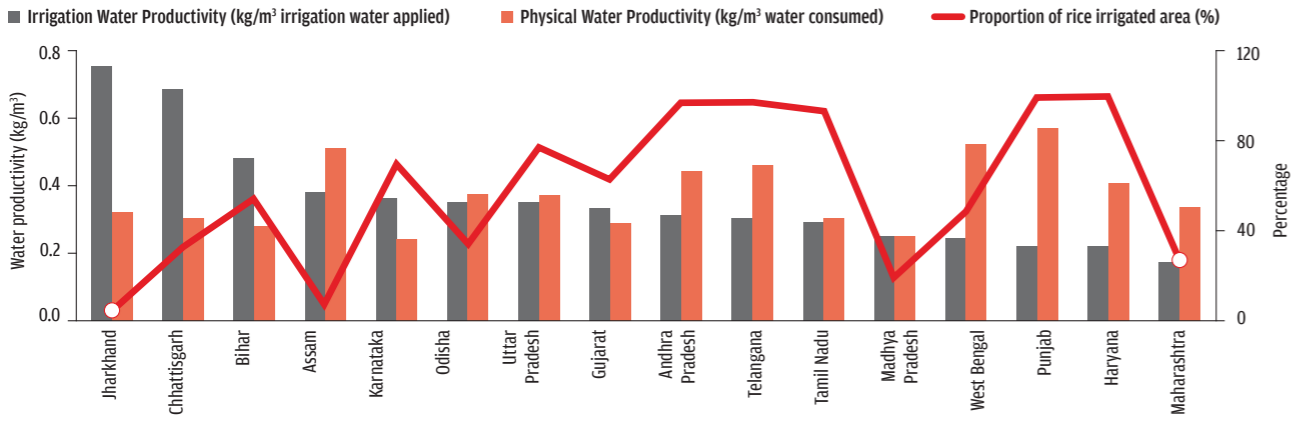
Water guzzler | India's rice productivity is less than half of China, yet the country's water footprint is 208 per cent higher



Productivity issues | Between 1978 and 2013, China maintained its productivity levels, while bringing down area under paddy cultivation as irrigation was assured to almost all paddy fields. India, on the other hand, increased productivity by adding more area under paddy cultivation, only 60 per cent of which has assured irrigation cover



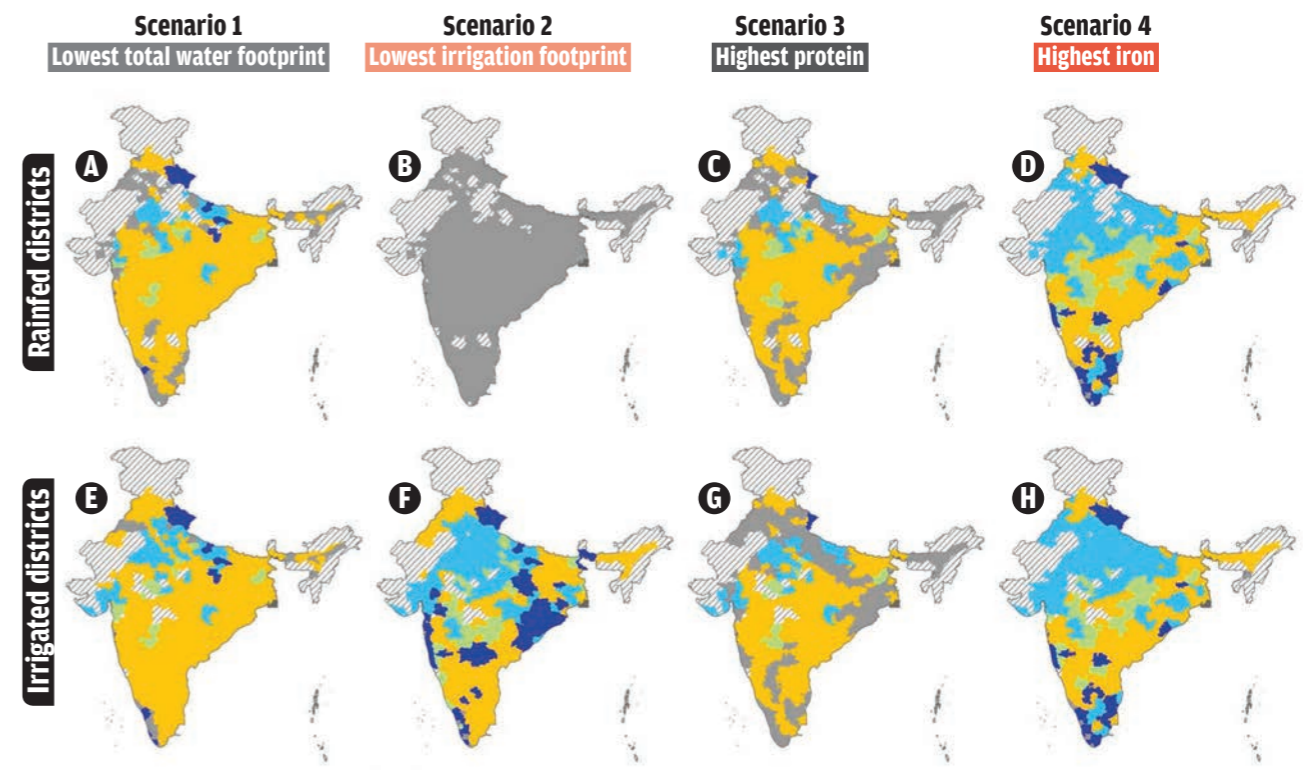
Grown in wrong states | Being water-intensive, paddy should ideally be grown in Jharkhand, Chhattisgarh and Bihar that give high yield through irrigation due to favourable climate. But owing to government policies, it is mostly grown in dry states like Punjab and Haryana, leading to fast depletion of groundwater resources



Moving beyond paddy | India can improve water use and nutrient supply by replacing rice with alternative cereals such as maize, finger millet, pearl millet, or sorghum, which can reduce irrigation water demand by 33 per cent and provide more nutrition—protein, iron, and zinc. This is crucial as the current rice cropping system has contributed to chronic water stress in many parts of India and the situation is likely to worsen due to weakening monsoon rains due to climate change.

There are four projected scenarios on how rice-harvested districts can be replaced with alternative kharif crops. In scenario 1 (A and E), rainfall dependency can be reduced by close to 21 per cent while iron levels can go up by 43 per cent. In scenario 2 (B and F), irrigation dependency can go down by close to 33 per cent. In scenario 3 (C and G), protein levels can be increased by 12.3 per cent. In the final scenario (D and H), iron levels can be increased by close to 50 per cent

REPLACING CROPS:
 ■ Maize ■ Pearl millet ■ Sorghum ■ Finger millet ■ Rice (no replacement) ■ No rice cultivation



% change from current levels	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Rainfall dependency	-20.6	-8.3	-11.7	-22.8
Irrigation dependency	-31.5	-32.6	-16.2	-31.2
Protein production	8.7	0.8	12.3	4.5
Iron production	43.1	26.8	30.3	48.4
Zinc production	27.8	12.7	23.1	23.3

Prepared by DTE/CSE Data Centre
 Infographics: Raj Kumar Singh; Analysis: Kiran Pandey and Rajit Sengupta
 Data sources: Water Productivity Mapping of Major Indian Crops report by NABARD and ICRIER, and "Alternative cereals can improve water use and nutrient supply in India" published in Science Advances in July 2018
 For more such infographics visit: www.downtoearth.org.in/infographics