Tata-Cornell Institute

POLICY BRIEF

Number 14

Identifying India's Agricultural Hotspots

High-performing districts have robust irrigation, high fertilizer levels and efficient access to agricultural extension

Study Overview

In a study supported by the Tata-Cornell Institute for Agriculture and Nutrition (TCI), researchers examined the spatial distribution of seasonal yields for paddy, wheat and millets in India from 2010 to 2019. Hotspots are defined as districts with seasonal crop yields ranked higher than the 80th percentile, or that achieved significant yield increases compared to the national average. Coldspot districts saw significant declines in yield.

Background

In recent decades, India has made significant progress in reducing hunger. However, about 210 million Indians remain undernourished, and many suffer from micronutrient deficiencies. In order to make diverse, nutritious foods accessible and affordable to its growing population, increasing India's agricultural production is paramount. Aside from the nutritional benefits, increased production also benefits farmers through increased incomes.

RESULTS

Researchers identified 536 hotspots and 122 coldspots. Paddy hotspots were clustered in Punjab, Haryana and Uttar Pradesh in the north; Telangana, Andhra Pradesh, Tamil Nadu and Karnataka in the south; and West Bengal in the east. Wheat hotspots were clustered in Punjab, Haryana and Uttar Pradesh in the north, and Madhya Pradesh, Rajasthan and Gujarat in central India. Hotspots for millets were clustered in Haryana, Uttar Pradesh, Rajasthan and Madhya Pradesh in the north; Andhra Pradesh, Karnataka and Tamil Nadu in the south; and Gujarat in the west. The average yield gaps between hotspots and coldspots for paddy, wheat and millets were 2, 2.4 and 1 tonne per hectare, respectively.

To discern possible reasons behind the hotspots' success, the researchers analyzed the impact of input use on yield levels. They found that hotspots are associated with higher irrigation, higher fertilizer usage and increased use of digital extension services. A 1% increase in irrigation corresponded with a 7 kilogram per hectare increase in yield, while a 1% rise in crop specific extension queries was tied to a 6 kilogram per hectare increase. A 1 kilogram per hectare increase in fertilizer was associated with a 0.5 kilogram per hectare rise in yield.

POLICY RECOMMENDATIONS

- In coldspot districts, invest in irrigation infrastructure, increase fertilizer use, and promote the usage of digital extension services.

Pramanik, C., Agricultural Hotspots in India: Evidence from Paddy, Wheat and Millets, *Agricultural and Resource Economics Review*, May 2026.

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