



Spatial Analysis: Visualizing Shifts in Indian Agriculture

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India's narrative of the Green Revolution is familiar to agricultural development practitioners. High-yield varieties of wheat and rice introduced in the 1960s, along with access to modern inputs, such as fertilizer and irrigation, doubled cereal production (Hazell 2009). A country that was plagued by famine in the first half of the 1900s became self-sufficient in calorie production by the end of the century.

Using almost half a century of data on area and production of major crops at the district level from ICRISAT's VDSA database (<http://vdsa.icrisat.ac.in>), the TCI has mapped this evolution in farming (Figure 1).

A three-year average of data from 1967–1969 shows the status of agriculture in the late 1960s, which is juxtaposed against an average of data from 2007–2009 (late 2000s). Comparing the landscape across time illuminates changing agricultural patterns in India, perhaps enabling more targeted interventions to address the shortcomings of the last fifty years.

Statistics—the number of people in poverty, the percentage of households suffering from malnutrition, the tonnage of rice lost to drought—can highlight need, but their spatial distribution can be far more illuminating. Mapping this data indicates where need is greatest, which regions suffer more than others, and exceptions that buck the trend their neighbors exhibit. Insights into the spatial patterns of food production can inspire research, advocacy and policymaking for more targeted interventions against malnutrition in the parts of India that need them most.

Example of mapping to show (not tell) the story: The evolving relative importance of nutritious crops

Cropping patterns have changed significantly over the last half century in India. The rural landscape in the mid-1900s supported mostly subsistence agriculture, as farmers cultivated coarse cereals, rice, and pulses with limited inputs.

Intensive investment in rice and wheat during the Green Revolution focused production of these crops on areas endowed with certain resources and infrastructure, primarily across the plains of northern India. By the late 2000s, cereal production was clearly concentrated in the north, but continued to be a focus for much of the rest of the country.

Considering changes in nutritious crops, northern India's shifting cultivation patterns are evident in the decline of pulses in the region. Pulses seem to have moved southward, as the country-wide area under pulses has remained nearly constant—decreasing just 650,000 hectares, or 3%, from the 1960s to the 2000s.

Rising incomes and changing diets in India over the last few decades have increased demand for fresh produce, dairy, and meat (Pingali 2012). Consequently, production of fruits and vegetables has expanded (albeit slowly) in southern and eastern regions.

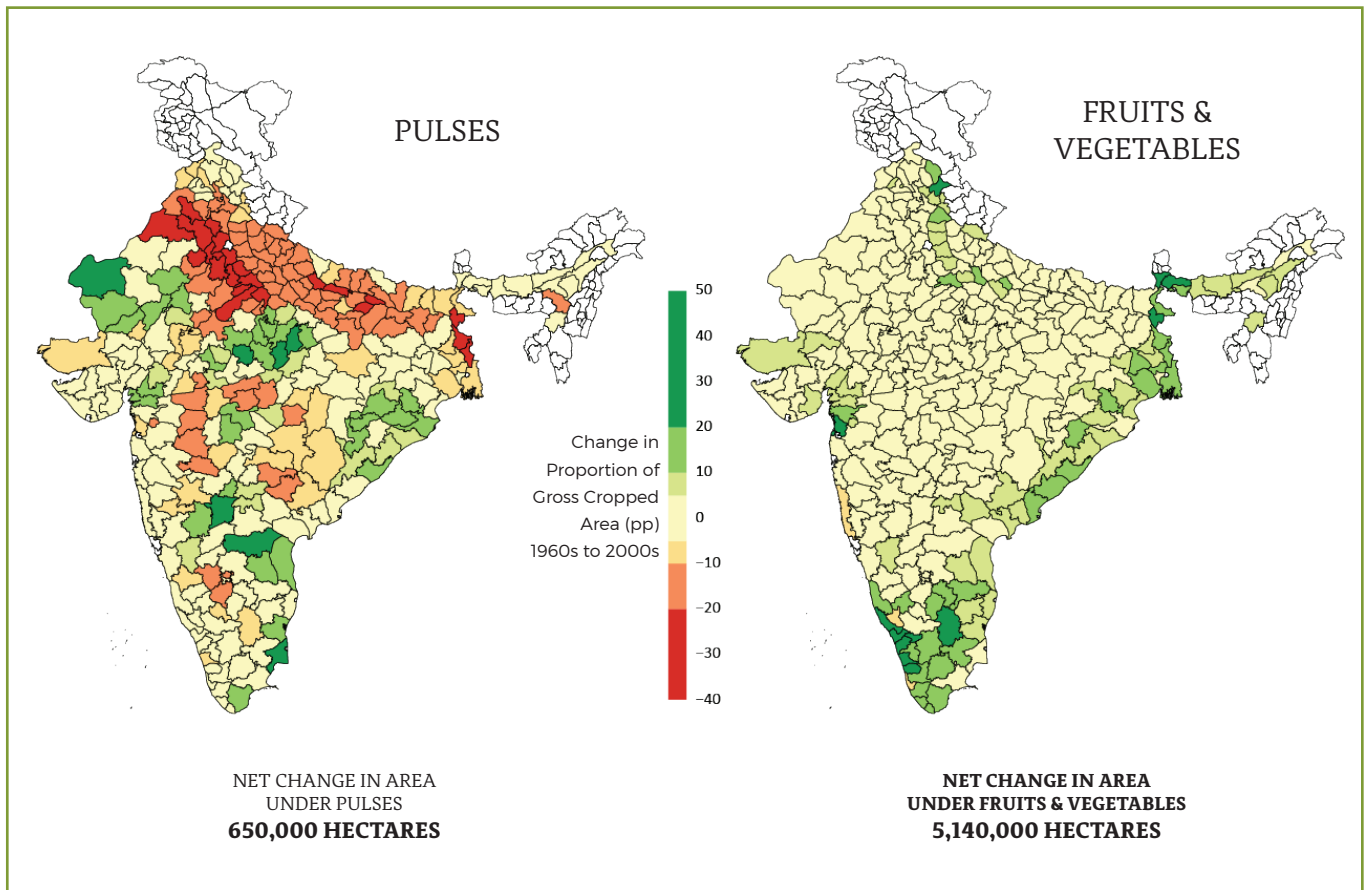


Figure 1. Changing agricultural landscapes in India: Dominant cropping systems over the last 40 years. Source: Government of India - Agricultural Statistics; (from ICRISAT's VDSA database) 1970 district boundaries.

Hazell, P. B. R. 2009. "The Asian Green Revolution." IFPRI Discussion Paper 00911, International Food Policy Research Institute, Washington, DC.

Pingali, P. L. 2012. "Green Revolution: Impacts, Limits, and the Path Ahead." Proceedings of the National Academy of Sciences USA 109 (31): 12302-12308.

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*Additional maps and spatial trends in Indian agriculture are available at:
<https://tarina.tci.cornell.edu/wp-content/uploads/2017/03/TCi-Maps.pdf>*

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