ASSAR
Adaption at Scale in Semi-Arid Regions

IDENTIFYING HOTSPOTS IN LAND USE LAND COVER CHANGE AND THE DRIVERS IN A SEMI-ARID REGION OF INDIA

RESEARCH BRIEF

The use of advanced satellite imagery and data from India's semi-arid Mula Pravara region has enabled researchers to identify the major areas of land use land cover change over the last three decades, and the driving forces behind these changes.

KEY FINDINGS

Over the last 25 years (1991-2016), agricultural land area increased by approximately 98% due to the conversion of uncultivable and fallow lands to agriculture. In more recent years (2011-2016), urban expansion into agricultural lands occurred close to the urban fringe areas (with an increase in built up areas by 195%).

There has been a shift from food crops to commercial plantations (pomegranate), as observed from the steep increase in the amount of land under plantations, by 1601% from year 2001 to 2016.

Hotspots of both positive and negative changes were identified. Negative changes include: i) change in forest canopy – from dense to open, ii) change in agricultural land – from agriculture to built-up areas, and from agriculture to horticulture plantations (pomegranate). Positive changes include: i) change in agricultural land – open scrub to agriculture, fallow land to agriculture, barren land to agriculture, and barren land to open scrub.

Institutional factors that improved access to water resources were the major drivers of change in hotspots, especially in the context of agriculture.

Technological (access to groundwater) and economic factors were the other supporting elements that contributed to the change.

WHAT WAS DONE, AND WHAT WAS NOVEL?

The study examined the land use land cover (LULC) changes in Mula-Pravara region of Godavari river basin in India over the periods of 1991-2001, 2001-11 and 2011-16, using geospatial techniques and methods.

The continuous observations from advanced very high-resolution radiometer (AVHRR) satellite data for the years 1982–2015 were used to identify the 'hotspots' of LULC changes.

Multi-temporal Landsat satellite imagery was used to produce finer scale land use maps and to explain the changes in the identified hotspots.

The results acquired from the remote sensing analysis were studied in the context of the government policy changes, schemes introduced, and outcomes measured by other studies to identify the various factors involved in the LULC changes.

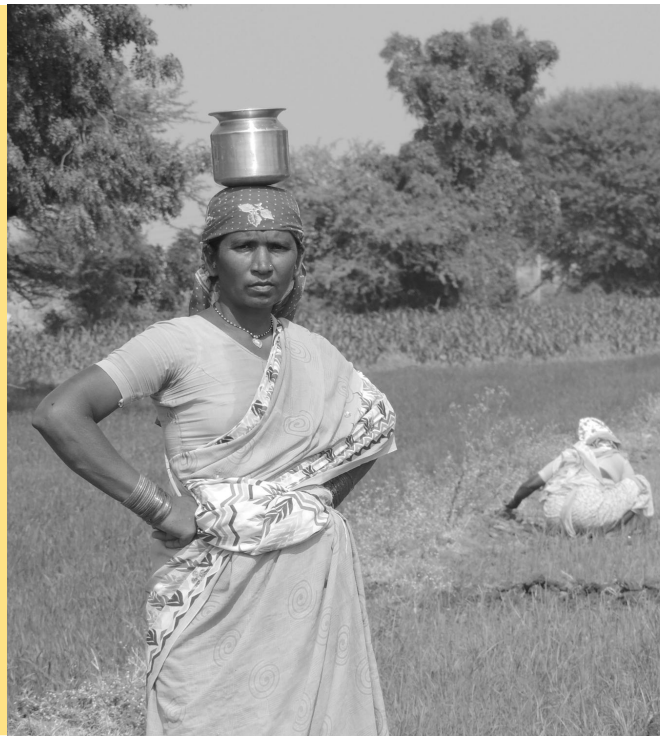
KEY IMPLICATIONS FOR POLICY, PRACTICE & RESEARCH

Groundwater plays a major role in the agricultural growth in the region but the local geology consisting of hard rock basalt severely limits groundwater availability and recharge potential. Therefore, overdependence on groundwater could have serious implications for sustained agriculture in the region.

It is important to prioritise groundwater management by implementing the recently enacted Maharashtra Groundwater (Development and Management) Act of 2009 to regulate groundwater, which is a first step towards addressing the governance issues surrounding groundwater use.

Access to markets and government incentives have provided opportunities for farmers to cultivate high-input and high-profit commercial crops, which also increased farmers' exposure to both market and climate risks. Upgrading agro-advisory systems and information technology infrastructure to make market, climate, and crop management information accessible to farmers will play an important role in mitigating risks.

Further research to generate information on the spatial distribution and acreage of cultivars in the area would be useful in developing location specific advisories as well as enhancing the water resource management in this region.



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