Water resources, agriculture, and drought

Understanding the context of drought in Marathwada

EVA Policy Brief No. 1

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Inside

Changes in the frequency and intensity of extreme events such as droughts will impact the ecosystem and also farming communities dependent on natural resources for their livelihoods. The occurrence of droughts is primarily dependent on biophysical factors, but the vulnerability of ecosystems to droughts is also influenced by the practices that communities adopt. A key question is how to achieve sustainable water and resource management in the context of climate change, water scarcity, and drought?

The drought of 2012–13 clearly affected water and agricultural resources in the Marathwada region. It has demonstrated the need to improve drought preparedness through improved knowledge, drought management plans, and a science-policy interface around vulnerability to droughts and related risks.

More proactive strategies on water and agriculture are needed that will promote sustainable resource use and address local differences and adaptation needs.

Water resources and agriculture

Increased pressure on dryland ecosystem: Conversion of pastures into agricultural land and market-driven shift from traditional crops to high water consumptive crops such as cotton has increased pressure on dryland ecosystems. As farmers in the Marathwada region use shallow groundwater as a primary source of irrigation, growing of water intensive crop may lead to overexploitation in the face of climate change and droughts.

Water for drinking and agriculture: While there is disparity in water availability for irrigation within communities in the region, availability of drinking water is assured by the government. Water tankers are thus, 'a part of the ecosystem' providing water, especially during dry months. The drought of 2012–13 was noted as a 'drinking water drought', and tanker schemes were intensified.

Watershed development and groundwater management: Due to complex hydrogeology with mainly shallow aquifers, localized variations occur. Most of the wells were strongly affected during the 2012–13 drought and shallow wells went dry. Several watershed structures, such as check-dams, were reported as non-functional due to lack of maintenance, which can add to the vulnerability of the system. Scarce data, especially at local scale, is a constraint for hydrological mapping, planning, and impact monitoring.

Analysis of impacts and vulnerabilities

The policy implications are derived from an analysis of primary and secondary data collected during a two-year research and capacity-building project in Jalna District, Marathwada

Methodology

- Analysis of secondary data (groundwater, land use, cropping patterns)
- GIS-analysis of NDVI and participatory drought mapping
- Well survey, participatory methods, and household survey in nine villages
- Consultations with relevant departments

Drought of 2012–13

The drought of 2012–13 is considered the worst in the region since the drought of 1972. Meteorologically, it is seen to be less severe for Maharashtra than the 1972 drought. Yet, spatial variances occurred. Jalna District was among the most severely affected in terms of rainfall deficit, receiving only 25–50 per cent of its normal rainfall during the monsoon. Total rainfall for Jalna was similar for the two droughts, but with different monthly distribution; e.g. 105.5 mm rainfall in June 1972 vs 43.3 mm in 2012. The low June rainfall was a particularly bad onset of the season as it is an important month in terms of cropping decisions.

Localized hydrology and agriculture impacts occurred; farmers connected variances in crop losses and well performance in particular to differences in soil quality and local hydrogeology.

Key policy implications

Increase conceptual awareness: Success of climate change adaptation would depend on multi-level stakeholders' understanding of the causes of vulnerability and the implications of water- and agriculture-related management practices that are adopted.

Improved monitoring: Denser networks of monitoring stations at the local scale are required for better understanding of drought status, scale, and impacts. Engagement of local communities in operation and maintenance of monitoring systems can help in improving resource and drought management. It can also help farmers in planning and decision making.

Watershed planning: Planning of decentralized watershed infrastructure should resonate with the complex hydrogeology of the region in order to ensure equitable benefits for local communities and sustainable ecosystems. Maintenance of structures should be prioritized.

Soil management and irrigation: Continuous focus on soil management and farming techniques to conserve water, soil, and nutrients is needed. Support and training for water budgeting and use of drip and sprinkler irrigation technologies for efficient use of scarce water resources should be provided.

Research on agriculture and livelihood diversification: Adapting to climate change requires adjustment in existing livelihood strategies beyond 'business as usual' strategies. There might be a need to diversify types of crops grown and livelihood activities for sustainable development. Research and innovation in this area should be supported.

Strengthen policy and institutional framework: Climate change is not limited to any one sector alone. There is a need to facilitate multi-sector and integrated approaches to managing climate change and variability across all sectors.

Extreme risks, Vulnerabilities and community-based Adaptation (EVA)

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The EVA Policy Brief series presents key policy insights from field-based research conducted in Jalna district before, during, and after the extreme drought of 2012–13.

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