KEY FINDINGS FROM ASSAR'S REGIONAL DIAGNOSTIC STUDY & INITIAL RESEARCH: Sangamner Sub-Region, Maharashtra

INFORMATION BRIEF

ASSAR
Adaptation at Scale in Semi-Arid Regions

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www.ASSARadapt.org

The five-year (2014-2018) Adaptation at Scale in Semi-Arid Regions (ASSAR) project uses insights from multi-scale, interdisciplinary work to inform and transform climate adaptation policy and practice in ways that promote the long-term wellbeing of the most vulnerable and those with the least agency.

During the first phase of our ASSAR work – the Regional Diagnostic Study (RDS) – we identified three semi-arid sub-regions in three states of India, in which to do our work. These are: **Bangalore in Karnataka**, **Sangamner in Maharashtra**, and **Moyar Bhavani in Tamil Nadu**.

Working with stakeholders in these different contexts we developed several key questions which were contextualised within the larger national and regional development processes. These questions serve as the foundation for the next phase of our work, the Regional Research Phase (RRP), where – in close collaboration with our stakeholders – we aim to identify equitable and transformative adaptation pathways for the medium-term future (2015-2030).

In this brief, we identify and characterise the key vulnerabilities in **Sangamner**.

KEY INSIGHTS

- Groundwater is the primary source of water for both the agricultural and drinking needs of the area. However, the widespread, regional overexploitation of groundwater, compromises its access and availability, and makes its management and governance crucial.
- There has been a regional shift in cropping patterns from food crops to cash crops. There has also been an increase in crossbred milch cattle and buffalos, and a decline in indigenous breeds. These shifts are high-profit, high-risk strategies and could increase vulnerabilities, particularly in the case of poor and marginal farmers.
- In Maharashtra, government, private and civil society actors have been taking steps to use information technology to provide weather, crop and market-related services to farmers. By providing farmers with timely, reliable, and useful information, these services have the potential to reduce farmer vulnerability to both climatic and non-climatic risks.

THE SANGAMNER CONTEXT

The Sangamner sub-region lies within the Ahmednagar district, Maharashtra. This district falls mainly in the hot semi-arid agro-ecological sub-zone of the Deccan Plateau, and – being situated in the rain shadow area of the Western Ghats – often experiences drought. The average annual rainfall here is 565mm, although 94% of that rain falls over 5 months of the year, between June and October.

Although roughly 80% of the population in the Ahmednagar district lives in rural areas (census data 2001), in recent decades the urban population has grown substantially. The increase in the use of land for non-agricultural purposes (e.g., buildings, roads, railways, canals) reflects this shift. By creating demand for rural products, increasing employment opportunities, and enabling remittances from migrants, urbanisation can play a positive role in reducing rural poverty.

Indeed, the Ahmednagar district has benefited from its proximity to the urban centres of Mumbai, Pune, and Nashik. However, urbanisation also puts additional pressure on local land and water resources, and in recent years conflicts have emerged regionally, particularly over the allocation of water for urban, industrial, and agricultural use[1].

The households in the Sangamner sub-region are made up of a combination of large farmers, small farmers, marginal farmers and landless homeowners. The majority of people belong to the marginal and small farmer categories which are considered the most vulnerable to climatic and non-climatic risks due to limited resource access, and poor social capital. The over-exploitation of local land and water resources further exacerbates the situation.

Climate Change Context

The drought-proneness of Maharashtra is a critical factor that adversely affects farming productivity and leads to low cropping yields. About a quarter of India's drought-prone districts are in Maharashtra, with 73% of the state classified as semi-arid[2]. In the Sangamner sub-region there has been a modest increase in the annual average rainfall since the early 1990s, although there is high variability in the contribution of sparse rain and moderate rain events to overall rainfall[3]. Projections indicate that there will be an increase in extreme rainfall as well as a reduction in the number of rainy days in the region. This is a matter of concern for local agriculture[4] and could affect the wellbeing and food security of communities.

Exploitation of Water Resources

Problems

Recent increases in the indiscriminate use of groundwater for irrigation have led to a significant rise in groundwater draft, leading to over-exploitation in many blocks in the Ahmednagar district, including Sangamner. Between 2004 and 2011, the groundwater draft in the Ahmednagar district rose from 74% to 82% of net annual groundwater availability[5]. The corresponding figure for Sangamner stood at 96.5% in 2011[6].

This over-exploitation is driving water scarcity, pushing up agriculture input costs, and locking people into an energy-intensive pathway that is unsustainable in the long run[7].

Given the widespread water scarcity in rural areas of the district and across the state, many villages now rely on water tankers to meet their drinking and sanitation needs. In September 2015, more than 22% of villages in the Ahmednagar district required drinking water provided via tankers. Using micro-irrigation methods, rather than flood irrigation methods, would improve water-use efficiency and greatly enhance water productivity

n addition, to reduce groundwater over-exploitation the state government of Maharashtra is trying to regulate groundwater use through the Maharashtra Groundwater Development and Management Act of 2009 (which was first put in practice in 2014).

Potential Solutions

The Act lays out a framework for participatory groundwater management by:

- requiring well owners to register their tube wells;
- requiring drilling contractors to obtain permission prior to drilling tube wells;
- prohibiting the drilling of new deep-wells and restricting water withdrawals from existing deep-wells;
- imposing levies for groundwater extraction;
- managing demands through participatory community crop planning;
- and protecting the sources of groundwater that are used for drinking purposes.

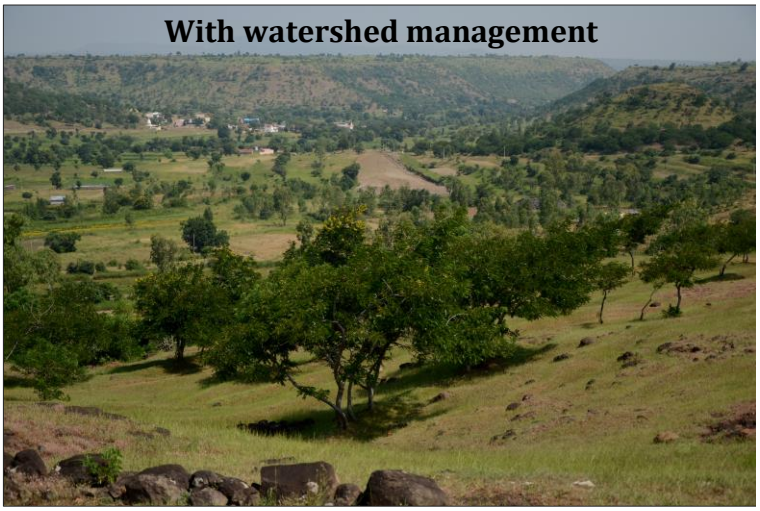
While this Act offers a comprehensive framework for groundwater management, the institutional infrastructure and implementation pathway for the Act has yet to be put in place. For this purpose the State Groundwater Authority and the Groundwater Survey and Development Agency has initiated a consultative process inviting comments and inputs from local communities and civil society. For the Act to be effective some of the issues that need addressing include poor awareness among communities about the provisions of the Act; the lack of appropriate institutions; and the corresponding minimal capacity to monitor and manage groundwater resources at the local level.

Agriculture

In rain-fed systems of the semi-arid tropics, the constant risk of drought increases livelihood vulnerabilities and decreases human security. Thus, drought management is one of the key strategies for agricultural development in these regions. Maharashtra has taken the lead in experimenting with various participatory watershed management approaches, used for drought-proofing and the provision of water for drinking and irrigation.

Watershed development has greatly benefited agriculture in the Ahmednagar district and has led to:

- increases in the net sown area;
- increases in the gross cropped area;
- increased yields;
- increases in the area under irrigation;
- and increases in groundwater levels.



Crop production

The primary crops grown historically in the Ahmednagar district have been food crops such as pearl millet and sorghum. While these remain the major crops (in terms of area covered), cropping patterns now include increasing cover of soybean, cotton and maize. The potential sensitivity of these new crops to changes in rainfall and temperature patterns could leave the small and marginal farmers with an even lower income and at risk of food insecurity.

Livestock production

In the Ahmednagar district there has been an increase in the use of cross-bred cattle and buffaloes and a steady decline in indigenous cattle breeds. Although the productivity of cross-bred animals is higher than indigenous breeds, so too are their input costs and disease risks. A similar decline in the number of small ruminant livestock (sheep and goats) at the district level and block level in Sangamner may be linked to drought[8]. The goats are mainly reared by the poor small and marginal farmers and offer a complementary source of income to supplement their household needs during lean times. Future decreases of small ruminant livestock numbers could therefore be an indication of future vulnerabilities of these farming communities. The emergence of large-scale industrial production units and a decline in the grazing resource base pose additional important concerns for sustainable livestock production.

Knowledge Systems

Information and Communication Technology (ICT) is given priority through central government schemes such as the "National e-Governance Plan in Agriculture (NeGP-A)"[9]. There are also many private ICT initiatives active in Maharashtra's agriculture sector such as e-Choupal, Reuters Market Light (RML), i-Shakti (Hindustan Level Limited), Mahindra Kisan, and many others. Most of these focus on market information, general weather and crop advisories.

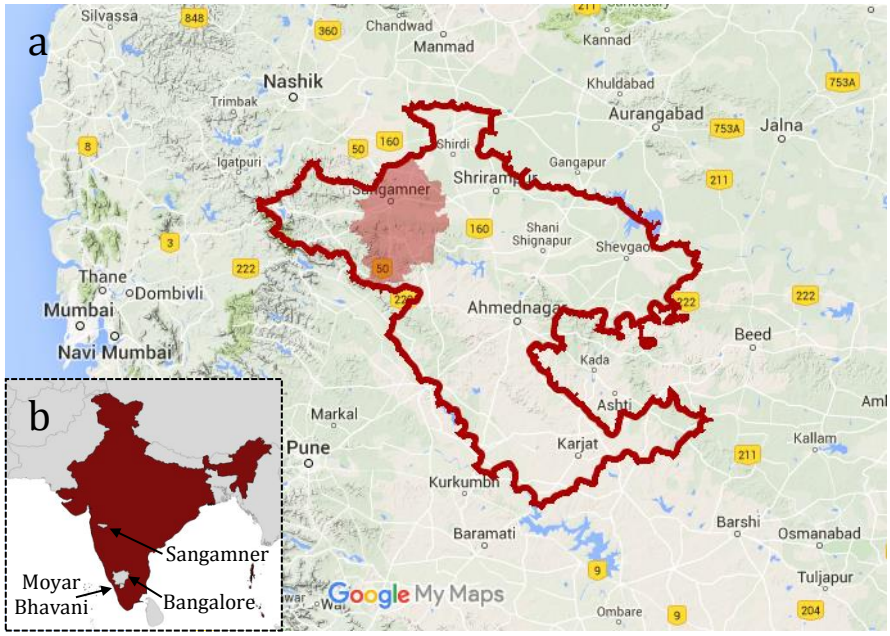
In the cluster of villages in Sangamner, the Watershed Organization Trust (WOTR) provides knowledge-embedded services to farmers. These are crop and locale-specific advisories based on weather information from meteorological stations positioned in the villages. Multiple channels of dissemination, such as mobile text messages and weekly posters displayed in public places, are employed to ensure that this information is accessible to all farmers – regardless of caste and gender. Such agro-met advisories contribute to reducing farmers risks by enhancing their preparedness and enabling them to take pre-emptive measures in the event of prolonged dry spells, and the increased prevalence of pests and diseases. The advisories also encourage general good management practices to increase crop yields. In Sangamner, farmers who received this package of services were able to achieve yield increases of 20-30% and cost reductions of 10-20%, with vegetables registering the highest gains[10].

Local Governance

Rural governance in India is based on the Panchayati Raj system. Gram panchayats are village-level self-governance bodies. The 73rd and 74th Amendments to the Constitution passed in 1992/3 provided constitutional status to the Panchayat Raj Institutions and urban local bodies. However, even though this decentralisation process of governance has been initiated, most often the planning takes place in a top-down manner, with the role of local bodies, civil society and communities limited to implementation with little room for innovation or self-determination.

WOTR's AIMS

WOTR's work focuses on identifying the vulnerabilities of different categories of communities to climate and non-climate risks in the Sangamner sub-region. We already engage with stakeholders at the community level to collectively deliberate and develop plans for efficient and equitable water management. Because groundwater depletion has become a major concern for agriculture and drinking water availability, we will also map the subsurface groundwater conditions of the most vulnerable areas and delineate potential areas of water stress. We will then examine the externalities that arise due to the over-exploitation of groundwater (inequitable access and depletion) and the barriers for efficient groundwater management and governance. We will also consider the consequences of this system on poverty and inequality, and the impacts of climate change and these socio-economic issues on marginalised and vulnerable groups.



(a) The Ahmednagar district (solid red line) and the Sangamner sub-region (shaded red area) that forms the focus of this brief; (b) the three Indian sub-regions that form the focus of our broader work (in grey).

We already use ICT to provide agro-met advisories to farmers, and we plan to explore farmer perceptions of these advisories to make them more effective, sustainable, and widely accessible. Finally, because high summer temperatures cause morbidity among the rural communities and also mortality in some extreme cases, we aim to understand which categories of the rural communities are most susceptible to heat stress and the factors contributing to vulnerability to heat stress. The findings would help to bring this issue to the attention of policymakers and practitioners.

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ASSAR is a five-year, multi-country research project, which aims to deepen the understanding of the barriers and enablers for effective, medium-term adaptation within the dynamic and socially differentiated semi-arid regions of Africa and Asia. ASSAR will generate new knowledge about how adaptation processes – especially those linked to governance systems, policies and adaptation responses – can be modified or improved upon to achieve more widespread, equitable and sustained adaptation. We are particularly interested in understanding people's vulnerability and, in doing so, exploring the dynamic structural and relational aspects linking vulnerability to social difference, governance and ecosystem services.

For more information visit www.assaradapt.org or karan.misquitta@wotr.org.in

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