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Working in the semi-arid regions of Africa and India, the five-year, multi-institutional ASSAR project (Adaptation at Scale in Semi-Arid Regions, 2014-2018) used 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.

### ASSAR's work on barriers and enablers

Recognising the factors that can influence the progress of adaptation actions is key if adaptation to climate change is to move beyond identifying impacts and potential responses. ASSAR has been examining the conditioning factors surrounding adaptation action in four of the world's semi-arid regions (SARs), with a specific focus on barriers and enablers to the uptake and success of adaptation.

In particular, our integrated work streams have highlighted not just the existence of barriers and enablers, but their interacting effect. None of them operate in isolation, and it is their interaction that shapes the overall constraining or enabling conditions for adaptation action. This document summarises this work.

Adaptation involves the implementation of actions that **reduce the risks posed by climate change**. However, the planning and implementation of adaptation actions are often constrained by barriers – different **factors that make it harder to achieve adaptation outcomes**. Barriers are most commonly categorised as financial, technological, institutional, informational, or socio-cultural (Antwi-Agyei *et al.*, 2015; Biesbroek *et al.*, 2013; Eisenack *et al.*, 2014; Moser and Ekstrom, 2010).

On the other hand, enablers are factors that assist the implementation of adaptation. Enablers can be the factors that are used to overcome barriers, and can require: shifts in thinking, social norms and behaviours; shifts in resource use and land use; as well as adaptive management, and **changes to institutions and their governance**.

To date, however, there has been relatively little focus on the ways in which barriers and enablers intersect, and the associated implications for adaptation processes. Barriers and enablers can emerge, overlap and interact at different scales of time and space to create a complex adaptation challenge (Lehman *et al.*, 2015; Shackleton *et al.*, 2015).

**The aim of this brief is to use examples from our empirical work in the SARs of India, Namibia, Ethiopia and Mali to illustrate how barriers and enablers interact, and to draw out key considerations for planning how to facilitate an enabling environment for adaptation.**



# India

## Adaptation topic: Water use and management

In Indian SARs, [water availability is a critical constraint on livelihoods](#) and, therefore, various adaptation interventions undertaken by the government, NGOs, and farmers themselves focus on soil and water conservation activities. The ASSAR team found that across our three research sites (Maharashtra, Karnataka, and Tamil Nadu), adaptive capacity is primarily being built through infrastructural interventions (Singh et al., in prep) that augment water supply and improve irrigation efficiency. However, there is [relatively less emphasis on addressing institutional and behavioural constraints](#), which undermine sustainable water use incentives. The key factors that can act as barriers or enablers to the uptake and success of these adaptation strategies include the following:



Farm pond in Maharashtra, India  
Photo: Tali Hoffman



Water budgeting board in Maharashtra, India  
Photo: Tali Hoffman

**Local water governance:** Short-term schemes that focus on subsidising water extraction (e.g., state-subsidised borewell drilling to fill farm ponds) tend to undermine sustainable water initiatives. For example, by harvesting rainwater, [farm ponds have been promoted in Maharashtra](#) as being able to provide farmers with protective irrigation during dry spells in the monsoon season. But – with the poor implementation of existing groundwater regulations – these farm ponds are now widely used as storage tanks to hold groundwater that is unsustainably extracted from aquifers. However, local governance can enable sustainable water use and management when it is inclusive, flexible and forward-looking. For example, [in Maharashtra, participatory water budgeting](#) has helped facilitate behavioural change among farmers by building awareness on the limited and shared nature of groundwater.

**Farmer assets and social capital:** Farmer assets – such as landholding size and access to irrigation infrastructure, as well as social capital (information networks, relationships with local agriculture extension officers) – shape capacities to access government schemes and implement them successfully. For example, [in Kolar and Coimbatore](#), the use of drip irrigation is still restricted to large farmers who are typically better connected and can access state subsidies. This has most greatly disadvantaged small and marginal farmers (often from lower castes) since they often do not have borewells or [need to take multiple loans to dig and deepen shallow wells](#).

Governance factors and farmer characteristics (landholdings, social capital, caste) interact and mediate the success of adaptation strategies to use and manage water more efficiently and sustainably. We see that while government subsidies might be inclusive (e.g., subsidising borewell digging, or adopting sprinkler irrigation), they can disadvantage smaller farmers because of how these interventions exacerbate unequal water extraction capacities. This highlights the issue of differential impacts of government programmes meant to build adaptive capacity of the most vulnerable. Thus, well-intentioned government schemes aimed at being an enabler can act as a barrier (e.g., [the borewell subsidy](#)) and interact with other barriers (e.g., caste, small landholdings) to hinder adaptive capacity.

### Where barriers and enablers intersect

Regulatory and policy mechanisms intended to enable adaptation in the water sector need to take account of complex economic, social and cultural barriers that intervene to shape who benefits from water management interventions – especially if they are to avoid the perverse consequence of turning a water-access enabler for some into a water-access barrier for poorer groups.

# Namibia

## Adaptation topic: Climate-resilient farming practices



UNDP: <https://goo.gl/UGRhG8>

The semi-arid, north-central region of Namibia is marginal for agricultural production and is highly **vulnerable to the impacts of climate variability and change**. Evidence from other SARs suggests that Namibian farmers would benefit from adopting climate-resilient agricultural practices that help to conserve water and preserve soil fertility. The Government of Namibia, in partnership with NGOs and development agencies, has devised several response strategies in this regard, including national drought and climate change policies, and a country-wide climate-smart agriculture program. However, ASSAR's research in Namibia's Omusati region indicates that most small-scale and subsistence farmers have been slow to adopt new practices as a result of the following key barriers:

**Information and capacity deficits:** Our research confirmed the long-held understanding that a low level of awareness about climate change at the grassroots level is compounded by a **shortage of technical information on climate science and adaptive farming practices**. Furthermore, the information that is available is often not reliable or relevant at the local scale. These issues stem from **poor collaboration between the producers, disseminators and users of knowledge**, and from there being too few agricultural extension officers to ensure that farmers receive the **information and resources** they need to adapt effectively.

**Incentive to adapt:** Rather than adopting new practices, many marginal groups in north-central Namibia have become **dependent on the government for support**. This is partly because government provides drought relief and pension grants rather than building capacity, or providing the information and resources that enable the uptake of climate-resilient farming techniques. Farmers also lack incentives to destock their herds in drought years due to low market prices, and without government subsidies few farmers are willing to take the risks associated with changing their farming practices.

Though different organisations are attempting to enable the uptake of more climate-resilient practices, their efforts intersect with wider cultural, social and political barriers that tend to compound one another to give rise to still-stronger challenges. For example, conservatism associated with **traditional practices** and **religious beliefs** interweaves with dependency attitudes, risk aversion, and information and capacity deficits to create stronger barriers to the uptake of novel or alternative farming practices. Moreover, shortages in farm labour as a result of rural-urban migration can make some farmers reluctant to implement more labour-intensive interventions such as **water-efficient bunds and planting pits**.

### Where barriers and enablers intersect

Initiatives to promote adaptive farming practices must consider carefully how to make interventions attractive, meaningful, feasible and productive for economically and politically marginalised groups, if they are to counteract powerful compounding barriers and turn them into a potential set of mutually reinforcing enablers.

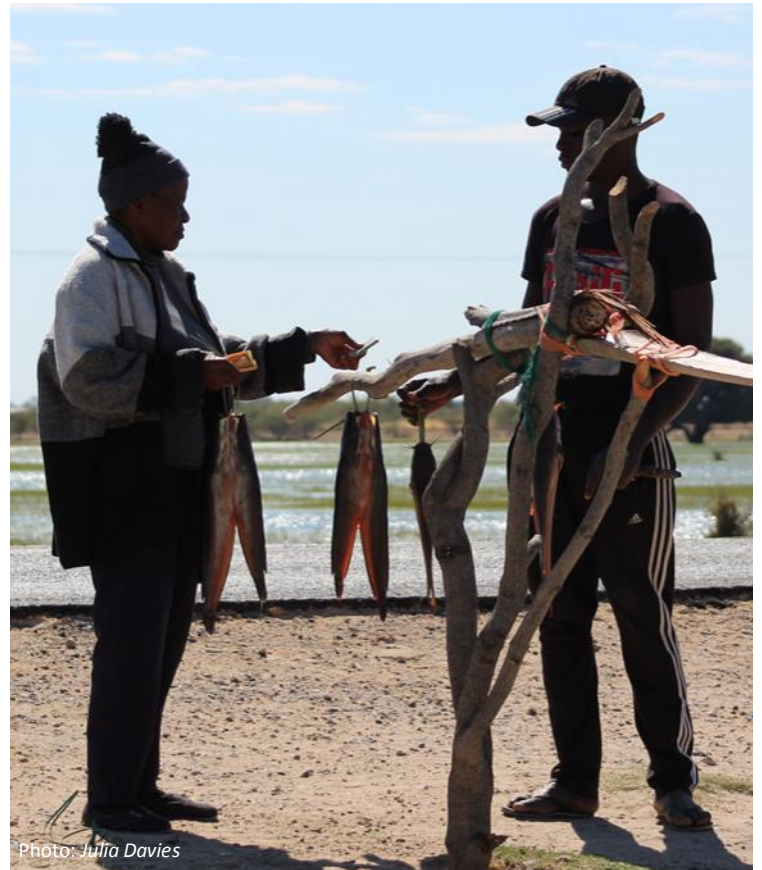


Photo: Julia Davies



# Ethiopia

## Adaptation topic: Targeted eradication of *Prosopis juliflora*

During recent decades much of semi-arid Ethiopia has been experiencing a rapid spread of the drought-resistant alien shrub *Prosopis juliflora*. This invasive plant has had many impacts on rural livelihoods in the rangelands, including a reduction in pasture availability for livestock, and blocking access to water sources. Through [participatory scenario-based research](#) in the Middle Awash Valley, the ASSAR team investigated community perceptions around different adaptive management approaches to the problem in their local area. Given that there is little prospect of completely eradicating the plant, one plausible mechanism is ‘targeted eradication’, which involves clearing *Prosopis* in priority areas only (such as good quality range land, farmland, and along water courses) where intensive land use following clearance can reduce the plant’s recolonisation. Three key factors that can act as barriers or enablers to the uptake and success of this adaptive strategy relate to:



*Prosopis* invasion in Ethiopia  
Photo: Lucia Scodanibbio



Participatory scenario analysis in Alola, Ethiopia  
Photo: Mark Tebboth

**Livelihood dynamics:** People expressed concerns that targeted clearance of *Prosopis* is likely to encourage diversification away from pure pastoralism towards agro-pastoralism and farming, benefiting some households but harming others if enclosure of land hampers livestock movement. However, increased engagement in agriculture may be a key motivator, as well as a key means, to preventing *Prosopis* regrowth.

**External intervention:** It was generally assumed that, to be effective, a targeted clearance programme would require external support. But this also created a wariness about becoming indebted to NGOs or government as people felt this could be used as a means to take power and control of locally-managed resources away from communities and to expand commercial agriculture.

Collectively, these factors are likely to determine the success or otherwise of targeted eradication. Different interests and livelihood aspirations can either promote this eradication or undermine its effectiveness. These intersect with relations of trust – between local/external actors and between social and ethnic groups – tied to issues over resource access, competition, dispossession, and conflict (all of which are rooted in recent experience). For example, for households moving from pure pastoralism into agro-pastoralism, the livelihood-based motivation to support targeted clearance might be a strong enabler, but it is likely to be counteracted by concerns about the underlying interests of external groups promoting this approach.

### Where barriers and enablers intersect

Support for invasive species management approaches within rangeland populations depends on an interacting web of considerations people make surrounding economic interests, resource access, social relations, and experiences of previous interventions. When designing interventions it is crucial to assess how each intervention functions locally and collectively as positive enablers or negative barriers.

# Mali

## Adaptation topic: Access to high-quality seeds

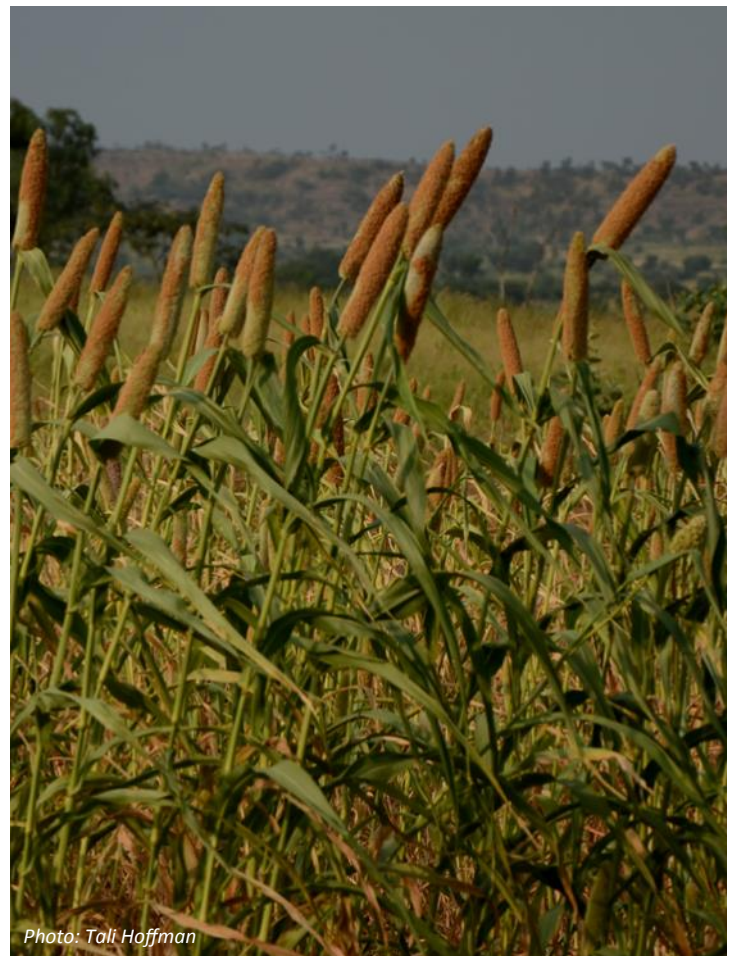


In Mali, amid changing agricultural conditions that are impacting crop yields, the seed regulation aims to ensure farmers' access to high-quality seed and, therefore, to improved agricultural productivity and food security. However, in spite of the seemingly helpful regulation, the majority of farmers continue to rely on seed procured through 'unregulated' traditional seed systems. When investigating how **governance-related factors** influence the success of potential adaptation mechanisms like the seed regulation, the ASSAR Mali team found the following key barriers and enablers:

**Administrative processes:** Farmer associations find the **certification process onerous and expensive**. Although farmers register as seed producers, they often continue to sell their seeds via informal networks with no quality control, undermining the efforts to promote improved varieties.

**Private sector engagement:** To help deal with these challenges, private seed companies have recently emerged and begun partnering with farmer associations; the private companies pay for the seed production and certification costs, and then purchase the resulting seeds from farmers. However, challenges with these arrangements include:

1. The agreement between seed producers and private companies restricts direct sale between seed producers and individual farmers.
2. The private companies sell the certified seeds at a relatively higher price than most smallholder farmers can afford.
3. With seed enterprises playing the intermediary role between seed producers and users, the producers neither have contact with the seed market nor can develop the necessary skills and knowledge to properly market their seeds.



In general, although the seed regulation was enacted to facilitate farmers' access to high-quality seeds, the gap between the seed regulation and the local conditions in which farmers operate hinders the implementation of the regulation, and prevents the majority of farmers from accessing improved seed. Private sector intervention could potentially ease the barrier of poor entry into the system by ordinary farmers, and enable seed regulation to function. However, it may instead serve to reinforce the exclusion of farmers and ultimately to undermine access to better seeds for the farmers that are most vulnerable. Here, once again, we see a counteracting effect between different forms of barriers and enablers, producing a net effect of limited progress.

### Where barriers and enablers intersect

Attempts to enable equitable access to better seeds for farmers are unlikely to succeed unless they recognise the interacting barriers that may be put in place by processes within seed exchange systems. These include those associated with administrative certification procedures and the practices of private intermediaries.



# Implications of intersecting barriers and enablers

Though it is not always explicitly acknowledged, it is self-evident that different factors that act as barriers and enablers to adaptation intersect and interact to shape adaptation outcomes. The web of intersection means that, just as different forms of enablers combine to increase the chances of progress, so multiple interacting barriers can be mutually reinforcing to severely constrain progress. Equally, different factors can, in effect, counteract one another, with some acting to strengthen while others undermine the uptake and success of adaptation actions.

Predicting precisely how this complex web of interaction will work in practice is difficult, of course, but during the design of an intervention it should be possible to identify what are likely to be critical combinations of factors and how they may work together to hinder or support adaptation. This is particularly important if we are to make adaptation work in practice for the poorer and/or least powerful groups in society. In some instances this process may also identify cases in which a deeper (step-change) [transformation of policy and practice](#) may be required in order to take adaptation forward in a sustained, widespread and equitable way.



Local method of communicating climate information in semi-arid Ghana  
Photo: Adelina Mensah





Photo: Chandni Singh

**From ASSAR’s work examining intersecting barriers and enablers, including but not restricted to the examples in this document, we can summarise the following key points:**

- Common intersecting barriers cover factors operating at multiple scales, and include institutional commitment, administrative processes, political interests, community-external relations, information provision, financial assets, social networks, and cultural norms.
- Systemic and interacting barriers to adaptation – such as weak governmental regulation, lack of trust in external organisations, or poor commitment to making information sources accessible – need to be recognised and targeted through longer-term interventions that focus on enabling behavioural change and collaboration among all stakeholders.
- Barriers and enablers are socially differentiated in their effects, working differently for different population groups, as seen especially in the example here from Ethiopia. In some cases there can be a ‘reversal effect’, in that an enabler for some people can act as a barrier for others. We see this in the regulatory mechanisms that promote access to seed and water resources in Mali and India, but – given their costs – do so only for wealthier groups.
- For the poor, the chances to invest in an adaptive action are highly likely to be constrained by risk aversion, especially in the absence of strong enabling mechanisms. The cases in this brief provide evidence of ‘stuckness’, when barriers coincide to keep certain groups marginal from adaptation actions, as exemplified in the case from Namibia.
- But barriers and enablers themselves are not static, and can shift their configurations within the web of interactions. It is also critical to recognise that an enabler in the current period can generate a barrier in the future. There may be enablers that promote specific ‘adaptations’ (such as groundwater extraction), that can themselves constitute barriers to wider forms of adaptation or adaptive capacity-building (such as progress toward more sustainable water management). This brings a temporal dimension to intersecting barriers and enablers, closely allied with the concept of maladaptation.
- We need instead to ensure that the design of adaptation options identifies ‘virtuous circles’. These are positive and mutually reinforcing sequences of intervention that provide ‘routes of escape’ where several enablers combine to facilitate sustainable change, especially for previously marginalised or disadvantaged groups. For example, local-level sustainable groundwater management is being enabled in Maharashtra by a mix of behavioural change, available funding, and local capacity strengthening.
- Participatory processes that attempt to uncover and solve seemingly intractable systemic barriers are one key route for action that aid the transition from hindering conditions to enabling conditions. Within ASSAR we have used [Transformative Scenario Planning](#) and [Vulnerability and Risk Assessment](#) as ways of bringing people together to address intersecting barriers and enablers.





Borewell digging in Maharashtra, India  
Photo: Renie Thomas

## ABOUT ASSAR

ASSAR used insights from multiple-scale, interdisciplinary work to improve the understanding of the barriers, enablers and limits to effective, sustained and widespread climate change adaptation out to the 2030s. Working in seven countries in Africa and South Asia, ASSAR's regional teams researched socio-ecological dynamics relating to livelihood transitions, and the access, use and management of land and water. One of four consortia under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), ASSAR generated new knowledge of climate change hotspots to influence policy and practice and to change the way researchers and practitioners interact.

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