

The background of the cover features a grayscale photograph of a group of people, likely in a meeting or training session, with some individuals wearing white lab coats. Overlaid on this image are several large, overlapping, semi-transparent geometric shapes in shades of red, orange, yellow, and teal. The shapes are primarily diamond and rounded-square forms, creating a layered, abstract design.

ASSAR

ADAPTATION AT SCALE
IN SEMI-ARID REGIONS

2014–2018

FORWARD-LOOKING,
INCLUSIVE GOVERNANCE
ARRANGEMENTS ACROSS
DIFFERENT SCALES ARE
A CRITICAL ENABLER
FOR ADAPTATION

AN ASSAR CROSS-REGIONAL INSIGHT



Marginalised groups in semi-arid regions who live on the frontline of climate impacts will benefit if they are more actively included in climate adaptation governance. However, in these areas, governments struggle to deliver services or engage with local communities due to a range of factors, such as inadequate mainstreaming of climate concerns in development planning, staff capacity deficits at lower levels of governance, and limited technical expertise. We see fragmented decision making across different governance levels. Climate change adaptation responses could learn from widespread implementation of decentralisation, and how it has enabled, and in some cases undermined, the ability to support participation and flexibility across scales. Strengthening governance, and the capacity to engage in decision making across scales, across actors, and between formal and customary governance structures, should be a priority for enabling effective adaptation.

Doing so could enable more equitable participation, promote flexible, hybrid forms of governance, and encourage forward-looking, cross-scalar collaboration and knowledge flows.

ASSAR's focus on adaptation governance

ASSAR concentrated on issues of governance in semi-arid regions, with a focus on what forms of governance will enable effective adaptation. The primary question we addressed was: How do existing governance structures help those most vulnerable to adapt to existing climatic and non-climatic dimensions of risk? Our research focused on the impacts of decentralisation in: the water sector in Namibia, Kenya, and Ethiopia; land tenure and customary law in Mali; and climate risk, vulnerability, and adaptation planning in India.

KEY INSIGHTS

*IN SEMI-ARID REGIONS
THERE IS INSUFFICIENT
UNDERSTANDING OF WHAT
THE MOST APPROPRIATE
GOVERNANCE APPROACHES
ARE FOR ADAPTING TO
CLIMATE RISK*

Adaptation governance is often fragmented; there are disconnects across different levels of governance, and between ecological and administrative scales. Different institutions and actors often have overlapping, competing or antagonistic relationships with regard to adaptation-related responsibilities. Within different institutions there is often a lack of capacity and infrastructure for adaptation across scales, as well as limited planning that is flexible and forward looking, and which accounts for future climatic risks and impacts. As a consequence, marginalised groups often have to manage climate risks without the support they need.

In many cases in semi-arid regions, governance for adaptation is not clearly defined and structured. Adaptation is typically not prioritised, and although it might be called 'climate adaptation', it is more often 'business as usual' development that happens to be impacted by climate variability. Often, the adaptation space is cluttered with institutions working in [disjointed and incoherent ways](#). Seldom do different sectors plan together for how they might manage climate risk. Rather, they each develop and implement their own responses, missing out on opportunities for synergies and collaboration.

Policy and legal frameworks for adaptation planning and implementation are also lacking in some places. For example, in Botswana, there is no guiding policy document for adaptation, although the country has [plans to develop one](#). Other countries where ASSAR worked have adaptation policies in place, or under development. Ethiopia has prepared a National Adaptation Programme of Action (NAPA). Here, adaptation policies and strategies are driven by a number of factors, such as: the country's green economy agenda and international obligations; government's efforts to synchronise regional agendas with the national initiative; and improvement of development indicators, land possession, and settlement of pastoralist populations through the '[villagisation](#)' programme. In Kenya, key adaptation policies and interventions are driven by international obligations and demands, often supported through projects from donor funding, and access to the Global Environmental Facility. At lower governance levels, there are also County Integrated Development Plans, and ward- and county-level adaptation planning committees which are working on identifying key issues and possible adaptation responses. In [India](#), the National Action Plan on Climate Change is the key policy directing action on climate change adaptation and mitigation.

Even when national and local plans exist, there is often a lack of synergy between these plans. For example, in the cities of Bengaluru and Chennai in India, state-level climate plans are often too broad and lack frameworks for implementation of climate action at the city level. Communication and translation of adaptation policies at the local level is often not sufficient. There is also fragmentation of responsibilities for policy implementation, and knowledge mismatch between policy makers and implementation agencies.

Our work in Mali shows how regulations cannot be effective when designed at one scale while ignoring conditions at other scales. For example, [Mali's Cooperative Law as well as its Seed Law](#), both designed at national level to enable farmers' access to agriculture services and improved seeds, have yielded mixed results. Farmers believe the Cooperative Law degrades social cohesion and the mutual support on which they rely when facing climatic and non-climatic risks. Farmers also find the new seed system onerous and unaffordable.

Instead of having a long-term, forward-looking approach, adaptation governance is often understood and characterised as short-term, ad-hoc decision making, aligned to [disaster risk reduction and emergency management](#). Contributing to the challenge, past development pathways and policy decisions can result in [irreversible lock-ins and inherent trade-offs](#) which entrench inequities and lead to maladaptation.

Overall, we see a lack of cohesion in the adaptation space which leads to confusion over who is and who might be responsible for climate change adaptation. The result is that climate adaptation is not strategically framed across sectors and scales. This has implications for sectors and livelihoods, that will be negatively affected when climate impacts are not adequately addressed in a holistic manner.

Recommendations

- Adaptation governance requires planning tools that enable [a shift from short-term, crisis-driven approaches](#) to longer-term, forward-looking approaches.
- A holistic understanding of adaptation, and of the sectors vulnerable to climate change, requires an enhanced awareness of [social, ecological and technical dimensions](#), and strategic linkages across these sectors (horizontal governance). For example, reduced rainfall in an area has an impact on agriculture, water availability, jobs, health and education.
- Strategic linkages between national and sub-national levels (vertical governance) are necessary for the [planning, implementing and monitoring](#) of climate adaptation efforts. These linkages need to be underpinned by requisite technical and financial support that enables multiple actors to engage. In addition, attention should be paid to the processes that support linkages, recognising that these processes take time.
- [Expanding existing governance arrangements](#) to be more inclusive of local communities will ensure that their concerns, desires, and expertise can inform and influence adaptation planning and implementation. This may require new ways of engaging with local communities that address power dynamics and cultural norms, and involve innovative means of participation.



HYBRID GOVERNANCE ARRANGEMENTS ARE EMERGING TO SUPPORT ADAPTATION

Disconnections between national, regional and local governments in semi-arid regions mean that intermediary entities often need to negotiate between local actors and government. With some of these intermediaries linking across different scales and across traditional and bureaucratic practices, hybrid governance arrangements are emerging to support adaptation. However, intermediaries often lack capacity in adaptation-related knowledge and decision making, and need requisite support to perform these roles.

Adaptation governance in semi-arid regions remains largely fragmented. However, some changes brought about by decentralisation have created new spaces and opportunities for intermediaries to become more responsive to the needs of local populations. These intermediaries can take the form of non-governmental organisations (NGOs), community-led groups, research groups, government-initiated groups, and private sector partnerships; and they are starting to bridge the gaps between local populations and government at both local and national levels. These intermediaries are actively driving vertical integration, that supports cross-scalar arrangements and integrated implementation.

In some cases, governments have established these intermediary structures. In Kenya, the National Drought Management Authority established [Ward and County Adaptation Planning Committees](#) and a County Steering Committee chaired by the County Governor to better coordinate actions at county level. Elsewhere, the private sector has become involved, helping to conserve water resources. In India, public-private networks are emerging such as the Karnataka State Water Network, which convenes stakeholders to [coordinate around water management](#). In Ghana, irrigation farmer associations and landlords located near the Black Volta River collaborate with the Water Resources Commission to ensure safe farming practices. In other areas, formal government entities, like the Constituency Development Committee (CDC) in rural north-central Namibia, link directly down to village chiefs at the community level and up to the regional government, in order to identify local priorities. However, the CDC has limited resources for implementation since these resources are allocated at regional level; it also [lacks capacity](#) in adaptation-related knowledge and decision making.

While intermediary structures can help bridge the divide between local needs and government, they are typically nascent and need support in terms of finances and technical skills to function properly. There is also the significant risk that other actors can appropriate these new spaces and opportunities to further their own aims in ways that may not be conducive to effective adaptation governance. Such is the case with the drive to [villagise pastoral communities](#) and encourage more agriculture in Ethiopia.

Recommendations

- Administrative decentralisation can support adaptation governance by bringing decision-making and implementation structures closer to local communities; but [for this to be effective](#), finances, knowledge, and human capital must be made available to support decentralised governance structures. Furthermore, the decentralisation process should focus not only on operational aspects (e.g., administrative and technical inputs), but on socio-cultural and ecological aspects (e.g., local perceptions of risk, resource degradation).

- National support for adaptation is critical but needs to be complemented by cross-sector coordination and bottom-up input, and further development of intermediaries to bridge scales.
- Issues of coordination, responsibility, capacity, and accountability need to be better understood to strengthen decision making across scales, and [to understand how each level of governance enables or constrains climate adaptation](#).
- Approaches to support vertical integration should recognise that substantial resources will be needed to actively ensure that multiple stakeholders at multiple levels of state and society are part of conceptualising and implementing adaptation responses. This requires [a richer understanding of the relationships between state and community actors](#), and alignment with the growing focus on collaborative governance and co-production for climate change adaptation.
- Formal government structures need to embrace rather than resist intermediary bodies, so that effective hybrid governance systems can emerge.



WORKING WITH CUSTOMARY INSTITUTIONS CAN HELP FOSTER COLLABORATIVE ADAPTATION RESPONSES THAT ARE COGNISANT OF LOCAL CONTEXTS

In semi-arid regions, traditional and customary institutions can play an important role in natural resource management and adaptation responses. In some cases, formalising or supporting these institutions has led to improved management of water, pasture land and forests. It has also led to the emergence of hybrid structures where traditional institutions collaborate with formal government agencies on land stewardship and resource management. However, conflicts between customary and formalised government arrangements remain, especially when the definition of mandates, authority, and roles and responsibilities is unclear. Ways of integrating traditional and customary institutions with government institutions need more attention. Integration holds opportunities for adaptation that recognises local needs and structures while acknowledging the role of government.

Customary and traditional institutions play an important role in many of the ASSAR study sites. They help to manage grazing land, water and other natural resources according to traditional methods. In Kenya and Ethiopia, *Dedha* committees manage pasture land according to customary land management principles. They use a zoning system that partitions grazing land into wet season, dry season, and drought areas. Kenya has recognised *Dedha* committees at the local level in policies, such as the Customary Natural Resources Bill of Isiolo, which is currently in development. Recognising and strengthening the roles of these committees has enabled them to work together with formalised water committees and Water Resource Users Associations for water management. Doing so, the *Dedha* committees help to support the government's decentralised water governance approach.



In Kenya too, the conservancy model of resource management and adaptation, previously promoted by NGOs and now also by Isiolo county government, uses traditional institutions, like the council of elders, to run some activities. Some institutions are engaged in conserving natural resources while others perform administrative roles, such as facilitating pasture sharing.

The recognition and, in some cases, formalisation of traditional institutions – along with policies that enable customary management of natural resources – has helped support local and sub-national level governance of adaptation, empowering these institutions. For example, in Mali's villages, such as N'Goutjina, a local convention based on traditional natural-resource-management principles enables community-led management of timber. A local committee levies fines on people caught harvesting wood outside of set times, which deters overcutting. However, there remains conflict over enforcement. The district officer working for the forest service in that area considers the fines for violators to be illegal. "Only the state has the power to impose fines on a contravener to the rules," he said. Similarly, in Mali's Cinsina ward, the devolution of decision making over natural resources to local authorities, as part of the decentralisation policy, has made locally-agreed bylaws the major tools for management of pastoral resources. But the enforcement of these bylaws does not always sit well with individual interests.

One provision mandates that the stay of transhumant pastoralists in local pastoral areas cannot exceed five days. But some local people hosting these transhumant pastoralists want them to stay longer to benefit from the organic manure the animals leave behind in the fields. They also take advantage of the milk production and the business opportunities during the pastoralists' stay, such as buying or selling oxen at a good price for the next rainy season.

Although these bottom-up approaches are important, they are designed from within a particular local context and so are unlikely to achieve management goals for a much larger scale without broader organisational structure, and support from higher levels of government.

While the recognition, and in some cases formalisation, of traditional structures assists in adaptation governance, challenges remain. In some cases, these groups report being inadequately supported. In Namibia, for example, traditional authorities are formally recognised by government but feel the budget they receive is insufficient to carry out their duties effectively. Representation of diverse voices in traditional structures is also challenging. In some cases, women and other minority groups remain under-represented. Sometimes, traditional authorities and other local level institutions are dominated by specific groups. In India's Maharashtra state, even though there are women *sarpanches* (village heads), in many cases the decision-making power still rests with men.

Recommendations

- Appreciating hybrid modes of governance is important and has not received enough attention. Northern approaches tend to focus on government, but southern realities show the importance of traditional governance. Adaptation needs to appreciate this reality and find ways to leverage it.
- Effort is needed to ensure that there is better representation of marginalised groups within hybrid modes of governance that incorporate traditional and customary institutions.

BUILDING CAPACITY OF LOCAL ACTORS TO ENGAGE IN LOCAL AND CROSS-SCALAR ADAPTATION GOVERNANCE IS CRITICAL, BUT MUST START FROM APPRECIATING EXISTING CAPACITY AND ASPIRATIONS

People living in semi-arid regions hold a lot of local knowledge about adaptation challenges, and in many cases are responding to change. Future shifts in temperature and rainfall patterns as a result of climate change will put extra pressure on these communities, increasing their need for support. Although work is happening around climate change policy and the establishment of national priorities, this work is not yet feeding into or sufficiently supporting on-the-ground needs. At the local level, there is a lack of financial and technical support for communities to innovate for adaptation. Local capacity needs to be strengthened to adapt to long-term change and support engagement in multi-level governance processes and flexible planning. This capacity strengthening needs to build on existing skills and local knowledge while recognising that new skills are needed. Maximum benefit will be derived if the capacity support links to wellbeing and aspirations, and is context specific.

Key to the success of community-based adaptation responses is the ability to innovate in the face of local climate change challenges. However, evidence points to a number of socio-technical lock-ins that hinder communities' ability to innovate. For example, in India, the focus on subsidies for borewell digging has led to an individualisation of resources, and undermined efforts to incentivise restoration of Kolar's old system of

community water tanks which doubled up as water-harvesting structures. In Ghana, there are projects that provide technologies to help farmers scale up operations that communities consider ineffective or inadequate, and yet these projects persist. For example, the Ghana Social Opportunities Project (GSOP) provided small surface dams (or 'dugouts') that do not adequately store enough water to last through the dry season, as well as boreholes that require expensive or uncommon spare parts for maintenance that communities are unable to afford. Land tenure rights can also act as obstacles to adaptation. In Ghana's semi-arid north, the lack of land tenure rights has negatively impacted on farmers' socio-economic characteristics, which limits their adaptive capacity, particularly for female crop farmers.

Without the necessary technical, social, financial and legal support, communities struggle to properly manage resources. In Namibia's Onesi Constituency, Water Point Committees run and maintain water points in villages voluntarily. They do not, however, have sufficient technical and managerial skills to do this well, and also lack funds for maintenance. This has created a situation where many community water points (standpipes) have closed down, and poor people cannot afford to get water from private taps. When taps shut down poorer households rely on hand-dug wells to draw free water during the dry season, which can have negative health impacts.

Recommendations

- Cross-scalar approaches to governance for adaptation need to improve ways of integrating the concerns and realities of communities on the ground.
- Increasingly, national decentralisation has expected local communities to be more responsible for the governance of resources, such as water. In many cases these communities do not have the requisite financial, technical and capacity skills. This needs to be urgently addressed so that communities are better equipped to perform their expected responsibilities.
- Capacity support should be context-specific and should value local knowledge.
- More attention needs to be paid to monitoring and evaluating the current and potential capacity needed for communities to best manage natural resources and the climate risks they face.
- Adaptation governance requires a shift that fosters innovation and learning at the community level and across scales.

ADAPTATION NEEDS TO PRIORITISE VULNERABLE GROUPS AND CONTESTED VIEWS, WHICH REQUIRES MORE ATTENTION TO HOW DIVERSE NEEDS AND VOICES GET HEARD

In the adaptation space, certain views dominate decision-making processes and the identification of adaptation priorities. For most potential adaptation responses, trade-offs exist. Frequently, these are insufficiently explored from the perspective of diverse groups, and dominant groups tend to have the final say. More attention needs to be paid to how to shift away from dominant views, to support processes and implementation that can include the priorities of the most vulnerable, who are often least able to support their own adaptation sufficiently. This is likely to require additional support from NGOs and intermediaries that can liaise between vulnerable groups, government actors and, at times, the private sector.

With increased decentralisation of governance in semi-arid regions, there have been moves to incorporate community concerns by institutionalising bottom-up processes. However, in the absence of feedback mechanisms and two-way flows of information, communities are unsure of how their priorities have been addressed.

In some places, there is little space for communities to input on governance decisions that affect their ability to adapt, as is the case in [Namibia's Onesi Constituency](#). Instead, the priorities of local leaders often determine the extent of inclusion of the poor and marginalised people, such as ethnic minorities, who are seldom explicitly considered and integrated into water management and village decision-making processes. Elsewhere, these needs are being better considered. For example in India's rural semi-arid Maharashtra state, local level village plans [were found](#) to reflect priority needs of communities even though the satisfaction levels of the community members differed across the villages based on the quality of execution on the ground.

There are several mechanisms in place to try to address issues of inclusion of marginalised groups, such as women. Generally, though women are represented, they are [not](#)

[represented well enough](#). In some cases, [illiteracy and lack of knowledge about roles and responsibilities](#), hinders their active participation in governance. Additionally, the representation of other marginalised groups, such as youth, [remains tokenistic](#). We also see the development of formal institutional arrangements to support participation that are not adequately used, such as in Namibia, where villages are supposed to have Village Development Committees that feed into Constituency Development Committees (CDC). But these are often [not able to feed into the CDC sufficiently](#). Where they do work well, there is an enabling and engaged village chief.

To make space for the views of marginalised groups, which may conflict with dominant views, it is important to build, or maintain, platforms that [actively encourage vulnerable groups to input their views](#) on adaptation issues that affect their lives. These spaces need to feel safe, and illustrate how these views are taken up in practice. ASSAR has experimented with various tools for increasing participation, including [Participatory Scenario Analysis \(PSA\)](#), [Vulnerability and Risk Assessments \(VRA\)](#), and [Transformative Scenario Planning \(TSP\)](#). These processes have brought together actors from across scales, which has allowed different perspectives to surface, and potential ways forward to be explored. For example, in 2015, ASSAR undertook a [VRA](#) in Botswana's Bobirwa sub-district, a climate-change hotspot in the Limpopo River Basin. The process brought together representatives of central and local government, farmer groups, women traders, and representatives from youth and NGOs, among others. Participants assessed the vulnerability of different social groups, like small-scale livestock keepers, and women vegetable sellers, to different risks. The VRA paid close attention to issues affecting the elderly, and the gendered dimensions of vulnerability. In 2018, ASSAR subsequently [trained district-level officers in the VRA approach](#) to assist government with informing district-level planning processes.

Recommendations

- Adaptation efforts need to support underrepresented groups to allow them to participate in ways that have impact. More recognition is needed of contested views that acknowledge different perspectives. A more integrated approach to adaptation cannot succeed without actively incorporating [traditionally-marginalised constituents](#), like women and youth, in decision-making processes.
- Formal platforms for the inclusion of different voices in adaptation decisions that have been developed but are not functioning adequately, should be revisited and strengthened.

- Local development initiatives that build leaders within communities are an important way to develop agency and increase engagement across scales. Processes that are aimed at [strengthening local capacities](#) and engaging local actors through [scenario planning](#) or seeking [responses to reduce vulnerability in a participatory way](#) - while being [cognisant of power dynamics](#) - are a good step in this direction.

AUTHORS

Gina Ziervogel* (gina.ziervogel@uct.ac.za),

University of Cape Town

Poshendra Satyal (p.satyal@uea.ac.uk),

University of East Anglia

Chandni Singh (csingh@iihs.ac.in),

Indian Institute for Human Settlements

Brendon Bosworth (brendon.bosworth@mailbox.org),

University of Cape Town

Tali Hoffman (tali.s.hoffman@gmail.com),

University of Cape Town

Lucia Scodanibbio (scolucia@gmail.com),

University of Cape Town



ADDITIONAL RESOURCES

Abass, R. 2018. *Formal and informal institutions in climate change adaptation: the case of Lawra and Nandom districts in the upper west region*. Master's thesis. University of Ghana. [Link](#). [Link](#) to poster.

Abass, R., Mensah, A. and Fosu-Mensah, B. 2018. The role of formal and informal institutions in smallholder agricultural adaptation: The case of Lawra and Nandom Districts, Ghana. *West African Journal on Applied Ecology*, 26: 56-72. [Link](#) to article.

Akugre, F. A. 2017. *Implications of land tenure rights on farmers' adaptive capacity to climate variability and change in semi-arid North-Western Ghana: The case of crop farmers in the Lawra district*. Master's thesis. University of Ghana. [Link](#).

ASSAR. 2016. *Barriers and enablers of climate change adaptation in semi-arid Ghana*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

ASSAR. 2018. *Do conservancies enhance the adaptive capacity of communities? Perspectives from ASSAR's work in Kenya*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

ASSAR. 2018. *Do women farmers have a fair share of land for food security and sustainable adaptation?* [Infographic]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

ASSAR. 2018. *Multiscale governance: The paradox of top-down policy design*. [Infographic]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#) to English infographic. [Link](#) to French infographic.

ASSAR. 2018. *Sometimes our interventions can lead to unintended consequences: A well does not always lead to wellbeing*. [Infographic]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

ASSAR. 2019. *Does villagisation enhance the adaptive capacity of pastoralist communities? Perspectives from ASSAR's work in Ethiopia*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

Ballo, M. In prep. *Effet des changements climatiques et des pratiques agricoles sur la gestion durable des bas-fonds dans le Mali Sud: Cas de Sorobasso et Koumbri dans le Cercle de Koutiala, Bamadouyou Bagotière dans le Cercle de Sikasso*. PhD thesis. Institut Universitaire de Développement Territorial de Bamako (IUDT).

- Basu, R. and Bazaz, A. 2016. *Assessing climate change risks and contextual vulnerability in urban areas of semi-arid India: The case of Bangalore*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Bendapudi, R., Yadav, A., Chemburkar, S., D'Souza, M. and Thomas, R. 2019. *Adaptation or maladaptation: Case of farm ponds converted into storage tanks in Maharashtra: Implications for groundwater governance*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#). [Link](#) to poster.
- Berthe, D. 2017. *Analyse de la dynamique des modes d'accès au foncier agricole dans les communes rurales de koloningue et de m'pessoba, Cercle de Koutiala au Mali*. Master's thesis. Institut supérieur de formation à la recherche appliquée (ISFRA). [Link](#).
- Bosworth, B., Hegga, S. and Ziervogel, G. 2018. *When participation is not enough: Lessons from decentralised water governance in Namibia*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- CARIAA. 2018. *Climate adaptation policy*. [Information brief]. Collaborative Adaptation Research in Africa and Asia (CARIAA). [Link](#).
- Cisse, O. 2017. *Analyse de l'évolution des pratiques de pêche dans la commune rurale de Zangasso, cercle de Koutiala au Mali*. Master's thesis. Institut supérieur de formation à la recherche appliquée (ISFRA). [Link](#).
- D'Souza, M. and Misquitta, K. 2018. *From me to we... from mine to ours! A story of how motivation changes people's perceptions and drives community action*. [Story of Change]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Davies, J. 2017. *Barriers and enablers to climate change adaptation in north-central Namibia*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Davies, J., Spear, D., Omari, K., Morchain, D., Urquhart, P. and Zaremba, J. 2017. *Background paper on Botswana's draft Drought Management Strategy*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Davies, J., Spear, D., Ziervogel, G., Hegga, S., Angula, M., Kunamwene, I. and Togarepi, C. 2019. Avenues of understanding: mapping the intersecting barriers to adaptation in Namibia. *Climate and Development*. DOI: [10.1080/17565529.2019.1613952](#). [Link](#) to poster. [Link](#) to brief.
- Degefu, M. A., Assen, M. and Satyal, P. In prep. Villagisation and water resource in the Middle Awash Valley, Ethiopia: Implications for climate change adaptation.
- Few, R., Bendapudi, R., Mensah, A. and Spear, D. 2016. *Transformation in adaptation: Learning from ASSAR's regional diagnostic studies*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Few, R. 2017. *Drought does not work alone*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Few, R., Morchain, D., Spear, D., Mensah, A. and Bendapudi, R. 2017. Transformation, adaptation and development: Relating concepts to practice. *Palgrave Communications*, 3: 17092. DOI: [10.1057/palcomms.2017.92](#). [Link](#) to summary.
- Few, R., Satyal P., Assen M., Camfield L., Leavy J. and McGahey D. 2018. *The development-adaptation spectrum in dryland East Africa: mapping risks, responses and critical questions for social research*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Few, R., Satyal, P. and Tebboth, M. G. L. In prep. Using a justice/ capabilities framing to understand people's vulnerability and adaptive capacity in the drylands of East Africa.
- Few, R., Singh, C., Spear, D., Davies, J., Tebboth, M. G. L., Sidibe, A., Mensah, A. and Thompson-Hall, M. 2018. *When adaptation barriers and enablers intersect: Key considerations for adaptation planning drawn from ASSAR's findings*. [Information brief]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Few, R. and Tebboth, M. G. L. 2018. Recognising the dynamics that surround drought impacts. *Journal of Arid Environments*, 157: 113-115. DOI: [10.1016/j.jaridenv.2018.06.001](#). [Link](#) to summary. [Link](#) to information brief.
- Gajjar, S. P., Singh, C. and Deshpande, T. 2018. Tracing back to move ahead: A review of development pathways that constrain adaptation features. *Climate and Development*. DOI: [10.1080/17565529.2018.1442793](#). [Link](#) to summary.
- Hegde, G., Sasidharan, S. and Bazaz, A. In prep. Traditional knowledge systems and the role of knowledge brokers, in India. [Link](#) to poster.
- Hegga, S., Siyambango, N., Angula, M., Spear, D., Masundire, H., Molefe, C. and Morchain, D. 2015. *Stakeholder and influence network mapping exercise with the government, development and research actors in Namibia*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).

- Hegga, S., Ziervogel, G., Angula, M., Spear, D., Nyamwanza, A., Ndeunyema, E., Kunamwene, I., Togarepi, C. and Morchain, D. 2016. *Vulnerability and risk assessment in Omusati Region in Namibia: Fostering people-centred adaptation to climate change*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Hegga, S., Kunamwene, I. and Ziervogel, G. 2018. *Capacity of local actors to participate in decentralised water governance: Insights from northern central Namibia*. [Presentation]. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Hegga, S., Kunamwene, I. and Ziervogel, G. In prep. Local participation in decentralised water governance: Insights from north-central Namibia. [Link](#) to presentation.
- Hegga, S. and Kunamwene, I. In prep. Mapping actor influence in climate adaptation practices: The case of north-central Namibia. [Link](#) to poster.
- Kaur, H., Bazaz, A. and Srinivas, A. In prep. Understanding access to knowledge systems and rural perspectives from Karnataka.
- Kunamwene, I. In prep. *Wellbeing as a way of looking at vulnerability and response to drought in Onesi, Namibia*. PhD thesis. University of Cape Town.
- Masundire, H., Morchain, D., Raditloaneng, N., Hegga, S., Ziervogel, G., Molefe, C., Angula, M. and Omari, K. 2016. *Vulnerability and risk assessment in Botswana's Bobirwa sub-district: Fostering people-centred adaptation to climate change*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Michael, K., Deshpande, T. and Ziervogel, G. 2018. Examining vulnerability in a dynamic urban setting: The case of Bangalore's interstate migrant waste pickers. *Climate and Development*. DOI: [10.1080/17565529.2018.1531745](#). [Link](#) to summary. [Link](#) to information brief.
- Michael, K., Deshpande, T. and Bhaskara, K. In prep. The political economy of climate change and vulnerability in a neo-liberal city: A case of Bengaluru's informal settlements. [Link](#) to summary.
- Misquitta, K. and Thatte, K. 2018. *Whose appropriate technology? Understanding the adoption of micro-irrigation in the face of climate and policy uncertainty*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Morchain, D. 2018. Rethinking the framing of climate change adaptation: Knowledge, power, and politics. In: S. Klepp and L. Chavez-Rodriguez (eds.) *A Critical Approach to Climate Change Adaptation*. London, UK: Routledge, pp. 77-96. [Link](#) to book. [Link](#) to chapter.
- Morchain, D., Ziervogel, G., Spear, D., Masundire, H., Angula, M., Davies, J., Hegga, S. and Molefe C. 2019. Building transformative capacity in southern Africa: surfacing knowledge through participatory Vulnerability and Risk Assessments. *Action Research*, 17(1): 19-41. DOI: [10.1177/1476750319829205](#). [Link](#) to summary.
- Ofoegbu, C., New, M. G. and Kibet, S. 2018. The effect of inter-organisational collaboration networks on climate knowledge flows and communication to pastoralists in Kenya. *Sustainability*, 10(11): 4180. DOI: [10.3390/su10114180](#).
- Ofoegbu, C., New, M., Nyamwanza, A. M. and Spear, D. 2018. Understanding the current state of collaboration in the production and dissemination of adaptation knowledge in Namibia. *Environment, Development and Sustainability*. DOI: [10.1007/s10668-018-0231-y](#).
- Ofoegbu, C. and New, M. In prep. The effect of inter-organisational collaboration networks on climate knowledge flows and communication to rural farmers in Ghana.
- Omari, K. In prep. *Drought management in Botswana*. PhD thesis. University of Cape Town.
- Pillai, S. and Bendapudi, R. 2019. *Inclusion of local aspirations in village development plans in Maharashtra*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Revi, A., Bazaz, A., Krishnaswamy, J., Bendapudi, R., D'Souza, M. and Pahwa Gajjar, S. 2015. *Vulnerability and adaptation to climate change in semi-arid areas in India*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Sami, N. 2017. Multi-level climate change planning: Scale, capacity and the ability for local action. In: S. Moloney, H. Fuenfgeld and M. Granberg (eds.) *Local Action on Climate Change*. London, UK: Routledge, pp. 92-110. [Link](#) to book. [Link](#) to chapter.
- Sami, N. 2018. Localising environmental governance in India: Mapping urban institutional structures. In A. Luque-Ayala, H. A. Bulkeley and S. Marvin (eds.) *Rethinking Urban Transitions: Politics in the Low Carbon City*. London, UK: Routledge. [Link](#) to book. [Link](#) to chapter.

- Sanogo, T. 2017. *Changements climatiques et gouvernance des ressources pastorales dans la commune rurale de Sincina Cercle de Koutiala, Mali*. Master's thesis. Institut supérieur de formation à la recherche appliquée (ISFRA). [Link](#).
- Satyral, P., Budds, J., Few, R., Bahir, A., Kibet, S. In prep. Adaptation to climate change in the context of decentralisation: Exploring multi-level governance of water-related issues in semi-arid areas of East Africa. [Link](#) to presentation.
- Shooya, O. 2017. *Barriers and enablers to water access and community wellbeing in the Onesi constituency of Namibia: The case of Okalonga B and Onandjandja villages*. Master's thesis. University of Cape Town. [Link](#).
- Sidibé, A., Totin, E., Thompson-Hall, M., Traoré, O. T., Traoré, P. C. S. and Olabisi, L. S. 2018. Multi-scale governance in agriculture systems: Interplay between national and local institutions around the production dimension of food security in Mali. *NJAS - Wageningen Journal of Life Sciences*, 84: 94-102. DOI: [10.1016/j.njas.2017.09.001](#). [Link](#) to summary. [Link](#) to English information brief. [Link](#) to French information brief.
- Singh, C., Basu, R. and Srinivas, A. 2016. *Livelihood vulnerability and adaptation in Kolar District, Karnataka, India: Mapping risks and responses*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Singh, C., Gajjar, S. P. and Deshpande, T. 2016. *Policies, projects and people: Exploring the adaptation-development spectrum in India*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Singh, C., Rahman, A., Srinivas, A. and Bazaz, A. 2018. Risks and responses in rural India: Implications for local climate change adaptation action. *Climate Risk Management*, 21: 52-68. DOI: [10.1016/j.crm.2018.06.001](#). [Link](#) to summary. [Link](#) to information brief.
- Singh, C., Solomon, D., Bendapudi, R., Kuchimanchi, B., Iyer, S. and Bazaz, A. 2019. What shapes vulnerability and risk management in semi-arid India? Moving towards an agenda of sustainable adaptation. *Environmental Development*. DOI: [10.1016/j.envdev.2019.04.007](#). [Link](#) to summary.
- Spear, D., Haimbili, E., Angula, M., Baudoin, M., Hegga, S., Zaroug, M. and Okeyo, A. 2015. *Vulnerability and adaptation to climate change in the semi-arid regions of southern Africa*. CARIAA-ASSAR Working Paper. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Sulemana, A. 2017. *Management and use of non-timber forest products (NTFPs) as climate change adaptation strategy in Lawra district, Ghana*. Master's thesis. University of Ghana. [Link](#).
- Tebboth, M. G. L. and Few, R. 2018. *Considering the future of Prosopis: Participatory Scenario Analysis in Afar, Ethiopia*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Tebboth, M. G. L. and Few, R. 2018. *Considering the future of the rangelands: Participatory Scenario Analysis in Isiolo, Kenya*. Adaptation at Scale in Semi-Arid Regions (ASSAR). [Link](#).
- Tebboth, M. G. L., Few, R., Assen, M. and Degefu, M. In prep. Valuing *Prosopis juliflora*? Analysing ecosystem service narratives to understand environmental management dilemmas
- Totin, E., Segnon, A. C., Schut, M., Affognon, H., Zougmore, R. B., Rosenstock, T., and Thornton, P. K. 2018. Institutional perspectives of climate-smart agriculture: A systematic literature review. *Sustainability*, 10(6): 1990. DOI: [10.3390/su10061990](#). [Link](#) to summary.
- Totin, E., Sidibe, A. and Thompson-Hall, M. In prep. Governance of resources: Is there space for implementing the land policy under complex customary tenure practices? [Link](#) to presentation.
- Traore, O. T. 2016. *Gouvernance et vulnérabilité des groupes sociaux: Analyse de la situation institutionnelle autour du coton dans le Cercle de Koutiala*. Master's thesis. Institut Universitaire de Développement Territorial de Bamako (IUDT). [Link](#).
- Wasonga, O., Kibet, S., Tebboth, M. G. L., Few, R. In prep. Do wildlife conservancies enhance the adaptive capacity of local communities? Perspectives from northern Kenya.
- Ziervogel, G., Satyal, P., Basu, R., Mensah, A. and Singh, C. In prep. Vertical integration for climate change adaptation in the water sector: Lessons from decentralisation in Africa and India.
- Zulfawo, T. A. 2016. *Exploring the competing uses of water in the context of climate variability and change in the Lawra district*. Master's thesis. University of Ghana. [Link](#).

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