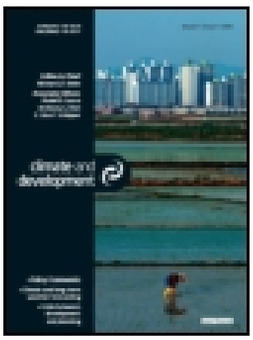

Climate and Development

ISSN: 1756-5529 (Print) 1756-5537 (Online) Journal homepage: https://www.tandfonline.com/loi/tcld20

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To cite this article: Julia Elaine Davies, Dian Spear, Gina Ziervogel, Salma Hegga, Margaret Ndapewa Angula, Irene Kunamwene & Cecil Togarepi (2019): Avenues of understanding: mapping the intersecting barriers to adaptation in Namibia, Climate and Development, DOI: 10.1080/17565529.2019.1613952

To link to this article: https://doi.org/10.1080/17565529.2019.1613952

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CLIMATE AND DEVELOPMENT
https://doi.org/10.1080/17565529.2019.1613952

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Avenues of understanding: mapping the intersecting barriers to adaptation in Namibia

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ABSTRACT

The existing literature on barriers to adaptation focuses predominantly on the broad, generic factors, such as financial, technological or institutional factors, as examples that might constrain adaptation. Not enough is known, however, about how barriers converge in localities, what drives them and how they interact to affect adaptation processes and outcomes. This paper considers the barriers to adaptation in Namibia through the lens of the 'adaptation activity space' – a framework that positions the adapting system in relation to its environment. In doing so, it questions not only what types of barriers are encountered, but what their underlying drivers are and how the relationships among them influence adaptation on the ground. Two intersecting 'avenues' within Namibia's adaptation activity space are explored, namely: (1) the policy-practice partition and (2) the adaptive capacity challenge. Each of these avenues tells a story about the complex nature of barriers and points to the need for greater integration between government spheres, across temporal scales and among actor groups. Such integration is necessary for addressing the barriers to adaptation and for paving the way to a more effective and sustainable adaptation activity space in Namibia.

ARTICLE HISTORY
Received 9 November 2018
Accepted 25 April 2019

KEYWORDS
Climate change; adaptation; intersecting barriers; adaptation activity space; Namibia

Introduction

Namibia, a middle-income developing country in south west Africa, has encountered several challenges in its efforts to adapt to climate variability and build the resilience of its systems and people to the impacts of climate change (Spear et al., 2018; Spear & Chappel, 2018; Zeidler, Kandjinga, David, Turpie, & Malema, 2012). Namibian communities have historically demonstrated a strong capacity for living in harsh climatic conditions and for adapting autonomously to unexpected or extreme events such as drought and flood (Spear et al., 2018). In the contemporary context of growing development pressures and increasingly frequent and extreme climate change impacts, as well as a commitment to international climate change agreements, the Namibian government has now adopted a more formalized approach to adaptation (Ministry of Environment and Tourism, 2011, 2013). Adaptation to climate change is seen as reducing the risks from climate impacts and may require changes in systems, actors or underlying biophysical or socio-economic contexts (Eisenack et al., 2014; IPCC, 2014).

Despite a relatively enabling national policy environment, adaptation efforts at the grassroots level in Namibia have been fundamentally incremental and reactive, often comprising an array of short-term coping mechanisms and technological 'fixes.' These responses largely fail to contribute to more systemic shifts in, for example, the approaches or paradigms underlying adaptation initiatives – a form of adaptation that is typically referred to as 'transformation' (Solecki, Dorsch, & Pelling, 2015). Rather than just responding to or managing climate risks, transformation requires deliberate, targeted and ongoing actions that purposefully seek to bring about major changes in contexts where there is significant vulnerability and wherein existing resources or mechanisms are no longer sufficient to deal with climate impacts or other stresses (Few, Morchain, Spear, Mensah, & Bendapudi, 2017; Kates, Travis, & Wilbanks, 2012).

Whilst there may be conceptual differences between forms of adaptation, coping strategies, incremental adjustments and transformation, they are actually interrelated processes that, if implemented appropriately, can build system resilience in both space and time (Chhetri, Stuhlmacher, & Ishtiaque, 2019). Unfortunately, navigating this complex adaptation space is challenging and often leads to what Chelleri, Waters, Olazabal, and Minucci (2015) term 'resilience tradeoffs', whereby immediate, proximate issues are dealt with at the expense of those which might yield benefits across broader spatial and temporal scales (for more on resilience tradeoffs see, for example, Bedsworth & Hanak, 2010; Chelleri, Minucci, & Skrimizea, 2016; Eakin, Tompkins, Nelson, & Anderies, 2009). In the Namibian context, the complex adaptation

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challenges and tradeoffs that are being faced are not well understood, as although there is a growing body of literature on barriers to adaptation, few empirical studies have considered barriers in the context of Namibia specifically. Moreover, much of the existing work on barriers more broadly has focused on classifying these factors into macro-generic categories and identifying frameworks for overcoming or removing them (Biesbroek, Klostermann, Termeer, & Kabat, 2013; Eisenack et al., 2014). For instance, Moser and Ekstrom (2010), who appropriately describe barriers as 'simply impediments that can stop, delay, or divert the adaptation process' (p. 22027), offer a typology of different barriers that commonly arise at discrete phases of this process (i.e. at either the 'planning,' 'managing' and 'understanding' phases). In a later paper, Ekstrom and Moser (2014) categorize adaptation barriers into institutional, attitudinal, financial and political types. Similarly, Antwi-Agyei, Dougill, and Stringer (2014) find that adaptation efforts in sub-Saharan Africa tend to be restricted by financial, socio-cultural, institutional, technological and information-deficit barriers.

At least as a starting point, categories can indeed be a useful heuristic for guiding research on barriers. However, this approach also tends to give rise to simplistic narratives and generic solutions, rather than accounting for local-level dynamics and contextual differences, including more subtle variations in values, customs, attitudes and aspirations (Adger, 2016; Adger, Barnett, Brown, Marshall, & O'Brien, 2012; Davies, Spear, Chappel, Joshi, & Togarepi, 2018; Leck & Roberts, 2015; O'Brien, 2009). Without a deeper understanding of barriers and how they interact, any intervention aimed at eliminating them is likely to be superficial (Biesbroek et al., 2015; Biesbroek, Termeer, Klostermann, & Kabat, 2014). Given this, there is a demand for more empirical work that considers what causes barriers to emerge, how these issues play out on the ground in different contexts, and in what ways they interact to disrupt seemingly linear adaptation processes or reinforce negative feedback mechanisms (Biesbroek et al., 2015; Lehmann, Brenck, Gebhardt, Schaller, & Süßbauer, 2015). Inspired by Pelling, O'Brien, and Matyas's (2015) concept of an 'adaptation activity space,' this paper seeks to bring focus to the spaghetti junction of intersecting barriers arising in the Namibian adaptation context. Understanding the dynamics of intersecting barriers within this adaptation activity space can help decision makers to grasp where, and in what form, adaptation interventions could be introduced. This understanding can help enable experimentation with novel or transformative solutions that target the underlying issues or areas of concern.

The following section discusses the conceptual framework used in this study, namely, the 'adaptation activity space' within which barriers arise and intersect, and wherein more effective adaptation initiatives could be realized. Following a presentation of the methods, the barriers identified in this study are positioned in relation to the Namibian adaptation context (Table 1). Subsequently, these findings are explored in more detail by mapping out two intersecting 'avenues' within Namibia's adaptation activity space, namely: (1) the policy-practice partition; and (2) the adaptive capacity challenge. Each of these avenues tells a story about the complex nature of barriers and illustrates how these factors can coalesce to give rise to cumulative challenges, reinforce negative feedback mechanisms that maintain the status quo or undermine otherwise virtuous adaptation interventions. The exemplars point to the importance of improved communication and collaboration between different spheres of governance (from local to national government levels, across government sectors and in partnership with non-state organizations); better alignment of adaptation interventions across temporal scales (by seeking short-term 'wins' that match with and contribute to longer-term strategic visions); and a more pragmatic way of bringing together different actor groups (and their diverse interests, values, identities and knowledge systems). Such an integrated approach can help adaptation practitioners in complex development contexts address the barriers to adaptation in a way that is more meaningful to, and useful for, the intended beneficiaries. In turn, this would pave the way to a more effective and sustainable adaptation activity space in Namibia.

Conceptual framework: intersecting barriers within the 'adaptation activity space'

This paper draws on the theoretical idea of the 'adaptation activity space,' a framework put forward by Pelling et al. (2015) that depicts the complex, social-ecological system in which adaptation takes place. Pelling et al. (2015), who draw on the earlier work of Harvey (2010), conceive this space as being comprised of seven co-evolving 'sites.' These include: (i) the biotic and abiotic elements and processes of the natural environment; (ii) regulatory (formal) and cultural (informal) institutions; (iii) the values and identity of individuals, as well as their peer-to-peer interactions and relationships with the broader environment; (iv) technology, both in material and organizational forms (e.g.: infrastructure and community-based organizations); (v) production and labour processes related to sustaining livelihoods; (vi) discourse (both popular and policy); and (vii) the habitual practices and routines that form the normative behaviour of actors.

The boundaries of Pelling et al.'s (2015) seven sites are permeable. They may overlap, there is a continuous exchange of information and power among them and the expression of one site's context or experience may influence the characteristics or actions of others. For instance, the routine behaviour of an actor may be drawn from social relations or from his or her individual values, which themselves may lie most closely in material assets, environmental stewardship or kinship, for example (e.g.: Gifford, Kormos, & McIntyre, 2011; Turner, Fünfgeld, & Robertson, 2016). Similarly, livelihoods might be regulated by institutions or by access to technology, while collective identities, behaviours and relations with nature may be shaped by contemporary discourses or by cultural norms and expectations (e.g.Adger et al., 2012; Von Hase, 2013).

Pelling et al. (2015) devised their framework with the view of provoking more transformative agendas for adaptation in both research and practice. Whilst we do not discount this objective in any way, we argue that the adaptation activity space is an equally useful concept for analysing barriers to adaptation, as it is within this space that barriers can arise, accumulate and intersect. As such, we use the theoretical ideas of Pelling et al.'s (2015) framework as inspiration for our own, which envisions the interactions and exchanges between the different

Table 1. Barriers to adaptation in Namibia's adaptation activity space.

Overview of Namibian context		Examples of adaptation responses	Barriers to adaptation identified in this study
Environment (biotic and abiotic)	Namibia has an arid to semi-arid climate, with natural water scarcity, poor soil fertility and hot, dry conditions year-round. The country is home to sub-humid woodlands, true desert and savanna biomes. The harsh environment supports a range of terrestrial and marine wildlife (Mendelsohn, Jarvis, & Robert, 2002). Drought is a common occurrence and the northern region of the country is also subject to frequent flooding during the high rainfall season, when water collects in ephemeral watercourses known as *lishana*.	Drought policy and drought relief programme Awareness campaigns for water saving Drip irrigation and earth dams Emergency flood response Seed policy (provision of hybrid seeds and certification to meet quality standards) Green Scheme Policy (established to maximise irrigation opportunities for food production) Namibia Agriculture Policy (for increased and sustained agriculture production and productivity) Debushing advisory service	Communities lack the capacity, knowledge and resources needed to adapt effectively to droughts and floods. Government lacks the resources needed to deal effectively with problems such as bush encroachment and the eradication of invasive species. This limits the productivity of agricultural lands and negatively impacts the availability of water resources.
Institutions (regulatory and cultural)	Namibia's National Climate Change Policy (NCCP, 2011) is complemented by other relevant policies, including those for water management and disaster risk reduction. The Ministry of Environment and Tourism (MET) is responsible for the implementation of the NCCP as well as the 2013 National Climate Change Strategy and Action Plan. The climate change agenda is supported by the Desert Research Foundation of Namibia (DRFN) and the Environmental Investment Fund (EIF). Most of the adaptation work that takes place in Namibia is donor-driven. In parallel to a democratic government system is a traditional chieftainship system.	The EIF was accredited as the National Implementing Entity (NIE) for the Green Climate Fund in 2016 The DRFN was accredited as the NIE for the Adaptation Fund in 2015 Debushing Advisory Service Community Water Point Associations introduced as a means to decentralize water governance	Adaptation is centralized at the national scale while the local-level mandate for adaptation is unclear. A lack of coordination, poor vertical and horizontal integration and insufficient sharing of information has led to policy misalignment and inter-ministerial power struggles. Whilst traditional authorities are formally recognized by government, they are not adequately empowered. There is also a lack of long-term planning and upscaling of donor-funded projects, which are usually in the form of short-term pilot interventions. This, coupled with high staff turnover in government, means that sustaining adaptation projects is difficult.
Technology (material and organizational)	Namibia has limited financial and technological resources, one consequence of which is a lack of investment in education and skills development. There is poor transport and communications infrastructure in the rural north of the country, and access to basic services like sanitation, healthcare, electricity and potable water is insufficient. Community leaders, such as traditional authorities, local councillors and village chiefs, are generally trusted and well-respected within communities.	Government subsidizes inputs like seeds, fertilizer and tractors through the Dryland Crop Production Programme Newly formed agro-marketing and trade agency Establishment of rural markets (e.g.: Otamanzi multi-purpose community centre where produce / products can be sold or traded) 'Learning and Information Sharing for Agriculture' (LISA) – SMS service for farmers Support groups for people affected and infected by HIV/AIDS	Major infrastructural deficits include a lack of: roads and bridges; hospitals (in Onesi Constituency); stormwater drainage systems (in informal settlements); grain storage facilities; tractors; water pumps and government vehicles. There is also insufficient access to technologies such as drought resistant seeds and rainwater harvesting tanks, and limited access to climate change data and adaptation options. Most rural farming communities not aware of initiatives that are meant to assist them with information. Many of these barriers are linked to financial resource and capacity deficits.
Discourse (popular and policy)	Much of the national policy discourse in Namibia is pro-poor and development-driven. Government agendas thus tend to prioritize issues such as poverty and inequality over environmental concerns. There is a significant focus on upscaling agricultural production, while strengthening and coordinating Disaster Risk Management is a strategic priority. At the community level there is a strong sentiment that government is responsible for improving the lives of local people.	Government provides grants for vulnerable children and orphans, pensioners and people with disabilities. School feeding programme Drought relief programme	Adaptation is not adequately mainstreamed into development planning and there is a lack of specific adaptation interventions. Climate change is positioned as an environmental rather than cross-cutting issue. Rural communities remain marginalized and many households are food insecure. Vulnerable communities tend not to take any action until climate-related impacts are experienced – and even then, people tend to wait on government for help. Many farmers are risk-averse and reluctant to try new farming practices. Above-average rainfall in recent years has made some people sceptical of climate change. Government's response to climate-related disasters are largely reactive rather than proactive.
Livelihoods (production and labour processes)	The principal livelihood activity in northern Namibia is rain-fed, small-scale and subsistence cropping and livestock farming. Other natural resources such as wood, fish, medicinal plants and raw material for crafts are also important. Some people earn an income from off-farm labour or from trade, basketry or beer-making. Others own small businesses such as 'cuca shops' or car washes.	Green Scheme Projects, e.g.: Etunda irrigation scheme Omahenene Project (breed drought-resilient varieties of pearl millet and sorghum) Community-based tourism initiatives, e.g.: conservancies and a wildlife loan scheme Community forestry projects (sustainable forest management)	An economic dependence on natural resources, coupled with a lack of access to alternative employment opportunities, makes communities vulnerable to climate change. While most people have experienced droughts and floods and are aware of seasonal changes in weather and climate, there is limited understanding of climate change itself. There is a lack of

(*Continued*)

Table 1. Continued.

Overview of Namibian context		Examples of adaptation responses	Barriers to adaptation identified in this study
	Many rural dwellers depend on in-kind sources of food and income, such as donations of millet from wealthier farmers or cash remittances that are sent from their relatives working in urban areas. State pension grants are also a key form of income for the elderly, whilst extremely vulnerable groups rely on social grants from the government (Spear et al., 2018; Spear & Chappel, 2018).	Community-based freshwater aquaculture facilities Training of farmers through agricultural extension programme Community gardening projects Construction of earth dams	infrastructure to support rural livelihoods, for example access to markets to sell farm produce. Whilst drought relief helps to meet the immediate needs of vulnerable communities it can lead to a dependence on government hand-outs which, in the long-term, reduces people's capacity to adapt autonomously.
Individuals (values and identity)	Farming is at the core of the Oshiwambo and Ndongona cultures. People find their identity in farming and are strongly attached to this way of life. Mahangu (pearl millet) has strong cultural significance and the ownership of cattle is linked closely to the male identity, as well as being valued as a measure of wealth, prestige and social status. Many people also have strong religious beliefs and their values are thus tied to the principles of Christianity. Traditional values remain prevalent in Namibian society, particularly in rural areas of the north where there is a dominant Oshiwambo culture (Davies et al., 2018).	Government subsidies for sale of livestock in drought years Agricultural extension officers advise farmer's on using improved crop varieties and livestock breeds Provision of loans from Agribank for farming inputs, including drought-resistant seeds and fertilizers	There is a strong belief among some communities that God will provide and that only God knows the future. This can be a barrier to the use of meteorological climate information. Strong cultural attachments to farming with pearl millet (mahangu) and livestock without diversifying limits farmer's ability to adapt to climate variability and change. Older, more traditional farmers are often unwilling to sell off their livestock in times of drought despite severe food and water deficits.
Behaviour (practices and routines)	Traditionally, women are responsible for household chores, child rearing, caring for crops and collecting non-timber forest products, and approximately 55% of households in the Omusati Region are female-headed. Men are usually responsible for rearing livestock and patriarchy influences decision-making, agency and control over resources at the household level.	SCORE project: Scaling up community resilience to climate variability and climate change in Northern Namibia, with special focus on women and children Government provides rippers for elderly farmers and female-headed households Establishment of women's cooperatives (collect marula nuts)	There is an increasing pattern of migration to towns and cities among males and the youth, which is leading to labour shortages in rural areas. Women and the elderly, who are already among the most vulnerable groups, are increasingly being left to tend livestock and crop fields, as well as maintain the household.

sites in the adaptation activity space as the 'avenues' that connect them (Figure 1). Mapping out these avenues can unearth where existing cul-de-sacs or road blocks are serving as barriers to adaptation.

Figure 1 is a first attempt at denoting how barriers might play out within the adaptation activity space. Although only one avenue of intersecting barriers is represented in the figure, in reality there are multiple of these, each of which is part of a larger system of secondary and tertiary roads, along which one might 'travel' through the adaptation activity space. While some routes can be taken with relative ease, at some point adaptation practitioners and decisions makers are likely to encounter barriers, which are symbolized in Figure 1 by the blue arrows. Many of these barriers are cross-cutting, some flow bi-directionally and others are curved as opposed to linear, which implies that these challenges cannot always be addressed in a straightforward manner. Moreover, barriers can, at times, accumulate or reinforce one another, giving rise to still stronger challenges, as represented by the thickly-lined blue shapes illustrated in Figure 1.

The adaptation activity space depicted in Figure 1 is intended to be descriptive rather than normative, and thus should not be viewed as an exact representation of the way in which barriers play out in a social-ecological system. Indeed, this space will, in reality, reflect the specific adaptation context, which may be more or less complex than that which is shown. However, the framework is a useful conceptual tool for understanding the dynamics within the adaptation activity space and for highlighting the intersections between and among barriers. Hence, mapping out this space could help adaptation practitioners and decision makers to grasp where and in what form adaptation interventions could be introduced; whilst the identification of patterns over time might help them to anticipate potential barriers or envision possible scenarios of interaction, plan adaptively and avoid situations of 'stuckness' in future.

Methods

This study was conducted as part of the Adaptation at Scale in Semi-Arid Regions (ASSAR) research project (2014–2018), which aimed to deepen the understanding of climate vulnerability and adaptation in semi-arid regions of Africa and Asia where millions of people are highly vulnerable to climate-related risks and impacts (IPCC, 2014). In 2014 and 2015, the ASSAR Southern Africa Team met with a range of different stakeholders across Namibia. These included both state and non-state actors from the national (in Windhoek) to the local level (in the north-central Omusati region).

The engagements which took place in 2014 were in the form of introductory meetings with eight key stakeholders, identified as those who were already working in the climate change space or who held a more strategic position in government. These meetings were intentionally arranged with experts from government and support institutions (as opposed to communities) in order to help the project team gain a basic, higher-level understanding of the adaptation sphere in Namibia in terms of what initiatives existed, what the challenges had

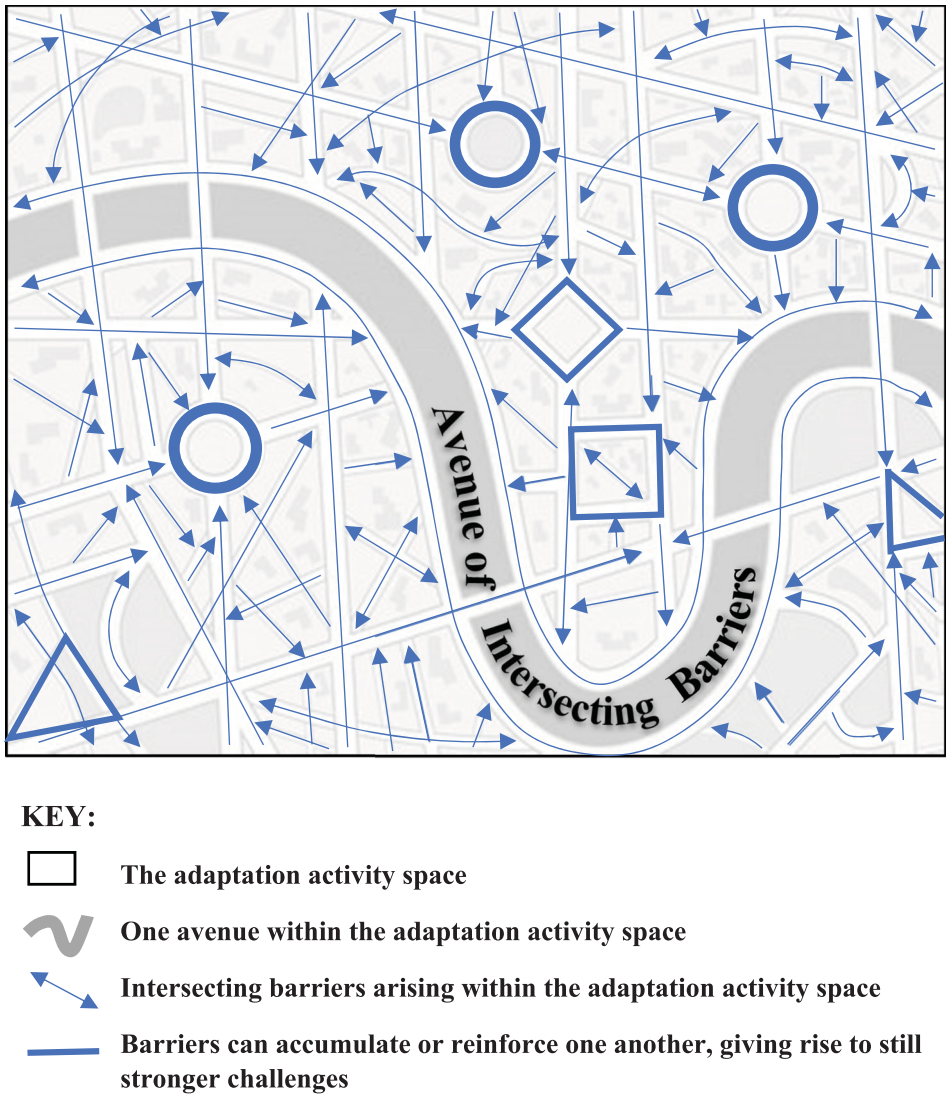

Figure 1. Conceptual framework showing one avenue of intersecting barriers within the adaptation activity space. Source: Author's own, inspired by Pelling et al. (2015).

been to date and what were perceived to be the key areas for research. Given the broad, exploratory nature of these meetings, they were held in a small 'focus group' setting, which allowed stakeholders to brainstorm around adaptation issues and opportunities in Namibia. The method of focus groups is often used by researchers trying to understand a new field or topic and was thus deemed appropriate in this context (Longhurst, 2016).

Based on these findings, in-depth interviews 18 key informants were conducted in February of the following year (2015). Interviewees were identified based on the recommendations made by stakeholders in the 2014 meetings, as well as by snowball sampling (see Suri, 2011). While the 2014 meetings were discursive and open-ended, the 2015 interviews were semi-structured in nature and sought to explore the topic of adaptation planning and practice and barriers and enablers of adaptation in detail. In addition to eliciting more specific and targeted responses, semi-structured interviews are useful for gaining perspective on an issue from individuals who may have different knowledge and experience, without the distraction or influence of other stakeholders (Schensul & LeCompte, 2012).

Both the introductory meetings and key informant interviews were recorded and transcribed by the interviewers. The data was then coded using the qualitative data analysis programme, NVivo. The coding process sought to identify barriers to adaptation, as well as current enablers or potential opportunities for adaptation, as identified by the interviewees.

What barriers are found in Namibia's adaptation activity space?

Table 1 uses the seven sites identified in Pelling et al.'s (2015) framework as an entry point for mapping out the adaptation activity space in Namibia. Drawing on peer-reviewed and grey literature, as well as the knowledge held by some authors of this paper who are Namibian nationals and / or who work in adaptation-related fields in Namibia; the table provides an overview of the broader Namibian context (column 1) and highlights existing adaptation responses (column 2). Based on the findings of this study, it then highlights the barriers that have been identified in Namibia (column 3). Each column is positioned in relation to the environmental, institutional, technological, discourse, livelihood, individual and behavioural

'sites' that influence the adaptation activity space, and which inform the types of barriers encountered therein.

Two avenues for understanding the intersecting barriers to adaptation in Namibia

This section describes two major 'avenues' of intersecting barriers in Namibia, namely: (1) the policy-practice partition; and (2) the adaptive capacity challenge. These exemplars emphasize the need for a more integrated approach to adaptation in Namibia, in which communication, collaboration, partnership and participation pave the way to a more effective and sustainable adaptation activity space.

The policy-practice partition

A significant share of the stakeholders that participated in this study expressed some discontent about the nature of policy and planning processes in Namibia and the implementation of adaptation on the ground. Essentially, it was felt that '… *everybody talks the talk but very few walk the walk*' (member of an NGO). In other words, whilst sound policies are in place and actors generally have the intention to deliver on these, there is what Dupuis and Knoepfel (2013) call an 'implementation deficit,' whereby policies contribute only symbolically to problem solving. As described by an employee of a state-owned enterprise, '*the political will is there but the implementation is maybe what is lacking.*' The failure of policy to translate into effective adaptation on the ground is what we refer to as the 'policy-practice partition.' This avenue, along with the multiple intersecting barriers that occur in the surrounding adaptation activity space, is mapped out in Figure 2.

The challenges that Namibia has encountered with regards to the implementation of adaptation policy are not unique to this country, and indeed have been identified in other case studies from the Global South. In east Africa, for example, Ampaire et al. (2017) and Ampaire et al. (2016) found that a disengagement between national, district and community levels has been one of the critical factors limiting progress in adaptation efforts and in the implementation of climate change actions more generally. Ryan (2015) focuses on the importance of having the appropriate government capacity in order to implement policies, such as legal, funding or organizational resources. Similarly, many of the intersecting barriers surrounding the policy-practice partition in Namibia can be traced back to the institutional arrangements for climate change governance. Considered a critical barrier in this regard is the highly centralized governance structure, whereby the core mandate for implementing the national climate change policy and strategy sits in one department at the national level – the Ministry of Environment and Tourism (MET). The problem with this centralized approach is that sub-national governments, as a result, have little power when it comes to decision-making and the mobilization of resources for adaptation interventions, a challenge that is exacerbated by an absence of sufficiently detailed frameworks to guide those in operational positions. This is a critical challenge elsewhere, too. For example, Hughes, Gnatz, Borquez, Romero-Lankao, and Rosas-Huerta (2013) found, in Mexico City and Santiago (Chile), that the capacity of institutional actors to implement climate policy was constrained by high levels of centralization at the federal level and fragmented local institutional and political structures. On the other hand, Roberts (2008) uses the case of Durban, South Africa to highlight the value of embedding the climate change function at the local government level. She shows how such a

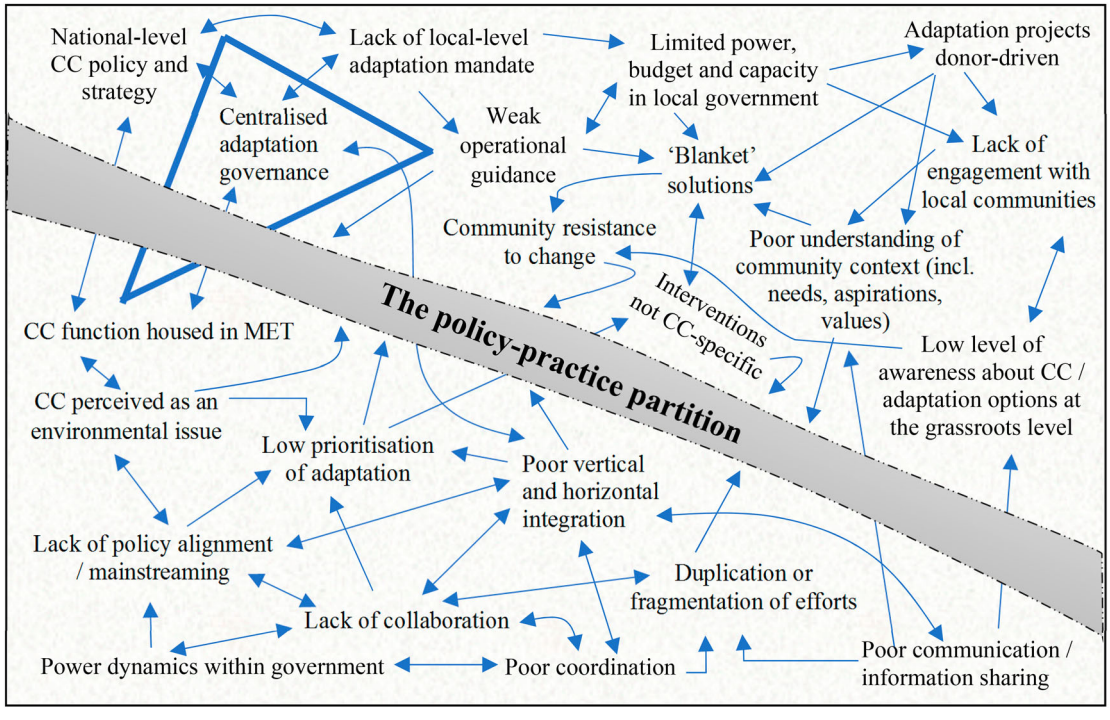

Figure 2. The policy-practice partition (CC = climate change; MET = Ministry of Environment and Tourism). Source: Author's own.

decentralized approach can enable local-level decision makers to build knowledge and capacity around climate change impacts and adaptation options (also see Roberts, 2010; Roberts & O'Donoghue, 2012).

This study found that housing climate change within Namibia's MET was also problematic in that this arrangement positions adaptation as an environmental issue, rather than one that is cross-cutting in nature. As such, adaptation tends to be viewed as less of a priority relative to social and economic concerns, a challenge that is often characteristic of developing countries where multiple stressors can place great pressure on government capacity and resources (Davies & Ziervogel, 2017; Shackleton, Ziervogel, Sallu, Gill, & Tschakert, 2015; Ziervogel & Taylor, 2008). Strong arguments have therefore been made for mainstreaming adaptation into development more broadly (IPCC, 2014; Lebel et al., 2012). Several case studies, for example from the Pacific region (Gero, Meheux, & Dominey-Howes, 2011; Nalau et al., 2016), also draw connections between climate change adaptation and disaster risk reduction and show how (in the case of Australia) adaptation can be effectively governed by integrating it into disaster risk management and subsequently spreading responsibility for these joint mandates across government departments and agencies. Figure 3 highlights how the institutional, technological and discourse-related barriers found in Namibia contribute to the policy-practice partition.

The centralization of adaptation without adequate integration among government departments and across governance scales (from the national and regional to local levels) led to adaptation interventions being poorly coordinated in Namibia. As such, planning occurs in a fragmented manner, one consequence of which is that adaptation objectives are incompatible with the focus of overarching and sectoral policies, including Namibia's National Development Plan. There were examples of poor vertical and horizontal integration, coupled with insufficient communication between government departments, that has resulted in adaptation interventions being duplicated. At times this may cause conflict due to inter-ministerial power struggles and the politicization of non-political (e.g.: technical) issues. As expressed by a regional-level government stakeholder, '*power* [causes this lack of coordination] … *Nothing else. Everyone is saying 'I am the boss,' or 'I'm running my institution here*." Indeed, Nightingale (2017) notes how politics and power are often innate in climate change adaptation efforts, and argues that investments in institutional reshuffling or the implementation of technical adaptation interventions will continue to face barriers if these more fundamental issues remain unaddressed.

The findings of this study suggest that a lack of coordination within government intersects with adjacent barriers, such as information, resource and technical capacity deficits, to create stronger barriers to adaptation on the ground. For example, Namibia now has a Country Climate Smart Agriculture Programme (Ministry of Environment and Tourism, 2015), elements of which are already embedded in the Ministry of Agriculture, Water and Forestry's agricultural extension programme. Yet, there is little evidence of farmers adopting climate-smart practices such as conservation tillage and water saving techniques, or switching to drought-resistant crops and livestock breeds. Although the reasons for the slow adoption of novel farming practices are complex (e.g.: see Davies et al., 2018; Spear & Chappel, 2018); the problem can be attributed largely to the fact that the policy framework for climate-smart agriculture is not matched with the support or resources needed on the ground. As explained by a regional level non-government stakeholder, '*they* [farmers] *would love to adapt but they do not know the strategy, or they do not have the means. Everybody wants to improve his or her quality of life, but the resources might not be there.*'

A lack of coordination within government was found to be mirrored by the poor collaboration between government and local communities, this study found. As described by one regional-level government official, '*most climate change activities are concentrated at the national level rather than what is happening within the community … they* [government] *need to talk to the people on the ground … most of the talks about climate change are taking place in Windhoek*.' Without adequate and ongoing institutional and financial support from centralized government ministries, the capacity and effectiveness of local-level operations is restricted. Where work is taking

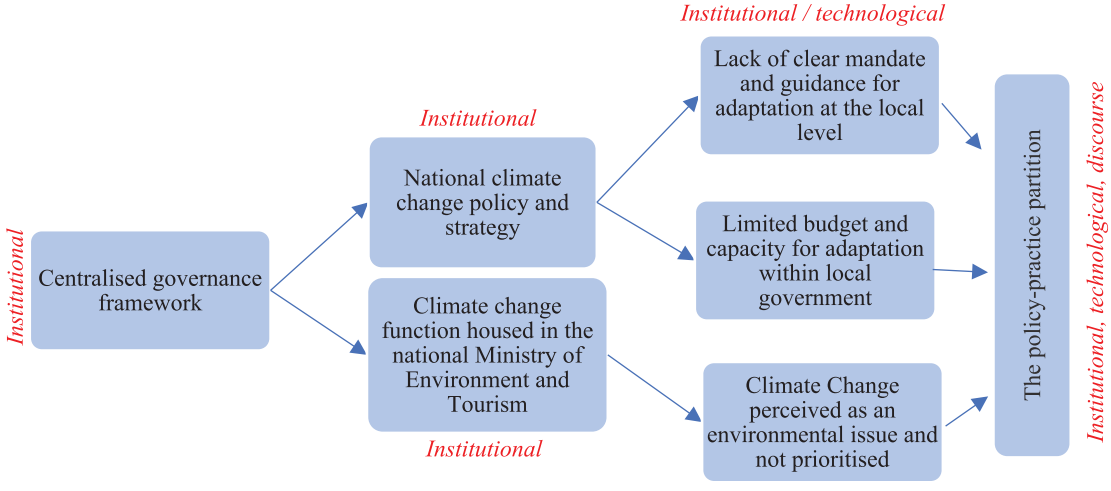

Figure 3. Example of how institutional, technological and discourse-related barriers can contribute to the policy-practice partition. Source: Author's own

place, it is usually related to development more broadly, rather than offering solutions that are targeted specifically at climate change adaptation: '*there are a lot of interventions that are being implemented, but they do not bring any changes which really, meaningfully address climate change,*' explained a researcher from the University of Namibia. Similarly, adaptation interventions that are rolled out are often done so in a top-down, 'one-size-fits-all' manner without a proper understanding of the local context. An employee of an international development agency based in Namibia finds fault with such 'blanket' solutions, explaining that what often happens is that

> somebody has already conceived of a project idea, not because it really fits with our context or it could make a true difference on the ground, but maybe it might be something that's popular globally [or] regionally. Some have said, 'ya you guys must try this.' You know, almost like a flavour of the month kind of thing.

It is for this reason that Westskog, Hovelsrud, and Sundqvist (2017) argue for the importance of understanding diverse local contexts and making these matter at the national planning scale, and similarly why Roberts (2008) emphasizes the need to ensure that adaptation agendas are 'rooted in local realities' (p. 521).

The challenge of doing this in Namibia can be attributed, in part, to the fact that much of the adaptation work happening in the country is donor-driven and overseen by external NGOs or development agencies, whose mandate is to respond to the terms of reference laid out by project funders rather than to the specific needs or aspirations of the beneficiaries. Moreover, because they are not always embedded at the local level, external project coordinators might inadvertently disregard the appropriate channels for community engagement. For instance, '*community members* [in Onesi Constituency] *now respect, or they value the participation of the councillor'* a local government official explained. '*As long as the councillor is not there, they don't want to take part. And that hampers the implementation of adaptation.'* This is problematic, as when communities are not adequately involved in decision making or are not properly informed about adaptation projects, then there is likely to be resistance to change and a low level of buy-in at the grassroots level. This is particularly true within Namibian communities who uphold strong values and customs related to the Oshiwambo culture, in which crop and livestock farming is at the core of their cultural identities (also see Davies et al., 2018), and for whom traditional agro-ecological knowledge has been used to inform dryland farming practices for generations (e.g. see Newsham & Thomas, 2011). A local-level government stakeholder gave the following example:

> *Last year, there was some beans from the U.S.* [United States of America] *that* [were] *distributed to the community. But you see now,* [those] *beans were too small, the seed is too small. Then people started to complain … Like the sorghum also, they distributed sorghum seeds to the community and then that stem is too short … You see the culture in Oshiwambo, they like the tall one.*

Given these context-specific nuances, and because there is insufficient co-ordination and collaboration between donors / NGOs and local governments or boundary organizations, adaptation projects in Namibia are often limited in their effect. They also tend to stay at the pilot phase, as once the NGO leaves, there is a lack of continuity and support for realizing longer-term and broader-scale impacts: '*… there is a lack of funds* [for adaptation] *due to a withdrawal of donor support … it takes a long time to claim funds from the government,'* a local official explained.

Despite the intersecting barriers associated with the policy-practice partition, which arise from institutional, technological, individual and discourse-related 'sites' (see Pelling et al., 2015), there do seem to be champions who are dedicated to responding to climate change in Namibia. As told by a national government official, '*we have people who are willing, I mean passionate people in the field. There are really people who are committed to this process in Namibia.'* Other studies (e.g.: Burch, 2010; Davies & Ziervogel, 2017; Pasquini, Ziervogel, Cowling, & Shearing, 2014; Roberts, 2010), have found that such people often play a key role in steering the adaptation agenda on the ground, and adaptation champions in Namibia should therefore be enabled with the capacity, finances and political support needed to do so. Moreover, if those working in the adaptation space in Namibia could incorporate the knowledge, values and needs of communities into planning processes, as opposed to merely informing them about predefined projects or programmes, it is likely there would be more ownership and relevance of local adaptation responses (Leck & Roberts, 2015; Morchain et al., 2019).

The adaptive capacity challenge

Since 1997, Namibia has endeavoured to follow a decentralized governance framework, the objective being to enable greater grassroots participation in governance processes, and to enhance the effectiveness of basic service delivery through the devolution of responsibilities, powers and resources from national to sub-national levels (Republic of Namibia, 1997). Some government ministries, including those of health, education and government housing, have managed to follow a decentralized approach with some aptitude. Other ministries, however, have been slower to adopt this model, which in some instances has made it more difficult for subnational departments to achieve their mandates. A local government official explained that '*the government put a policy* [in place] *for decentralisation. But until now, some ministries did not decentralise … some ministries that have decentralised, it's easier to implement projects with those. But the ones who are in Windhoek – it's very difficult.'* The findings of this study highlight a major barrier to be that the vision and goals of decentralization have not been adequately matched with appropriate capacity building activities, contributing to what we call 'the adaptive capacity challenge' (Figure 4).

One area within Namibia's adaptation activity space that the adaptive capacity challenge comes to the fore is local water governance. In accordance with a decentralized approach, community members are called to take on voluntary positions with Water Point Committees (WPCs). Their responsibilities as members of the WPC involve the provision and management of water resources, which are distributed to local consumers via communal standpipes. However, because their membership to the committee is voluntary, those responsible for opening taps and collecting water service

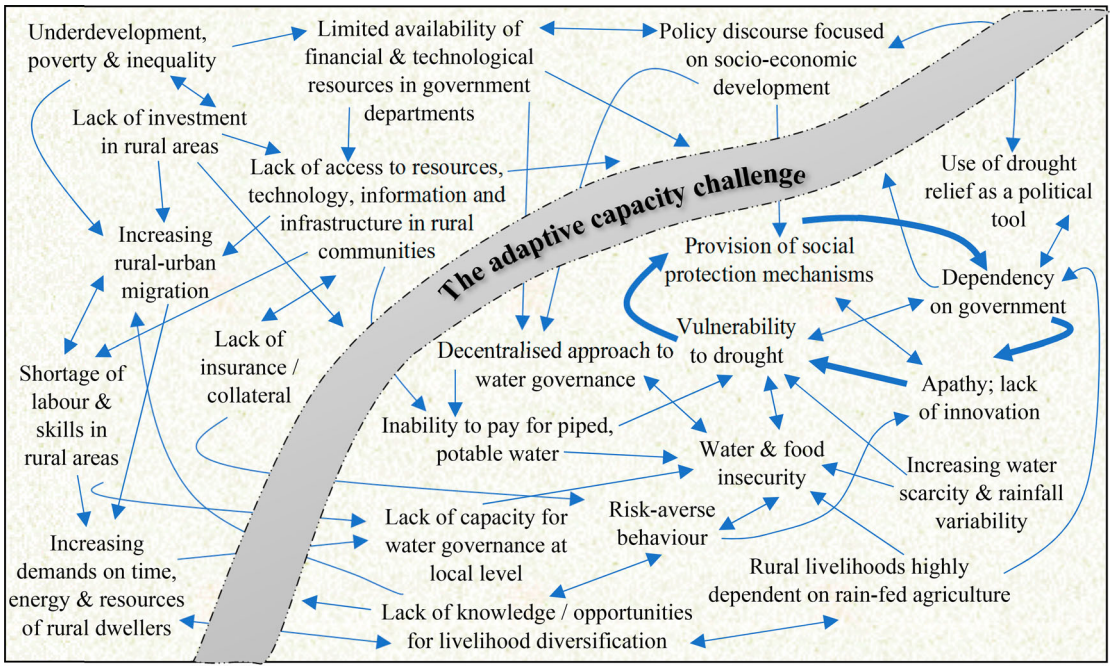

Figure 4. The adaptive capacity challenge. Source: Author's own.

payments can only do so at times that do not conflict with their regular work (also see Bosworth, Hegga, & Ziervogel, 2018; Ziervogel & Hegga, 2018). Unfortunately, with a lack of investment in rural areas and limited opportunities for livelihood diversification and skills development, there is an increasing pattern of rural to urban migration, particularly among younger members of the population. As a result, there is a shortage of labour in these areas, which places greater demands on the time, energy and resources of (increasingly elderly) rural dwellers. Many WPC volunteers therefore find it difficult to deal with water management issues and balance the demands of their voluntary tasks with the daily activities that are essential for sustaining their livelihoods – most notably small-scale, rain-fed farming. A government official from the Directorate of Water Supply and Sanitation Coordination explained:

> *You find the person who is responsible to open the water point at 10* [a.m.], *that person has come to town. The people have to get water, and the person is not there … You go there in the morning and in the afternoon, the person is not around. So now we are in the process of setting up a way to remove those water points … Because right now, the committees are not working at all.*

The failure of a decentralized water governance model has been one factor contributing to significant water insecurity in the region. Other intersecting challenges in this regard include increasingly frequent and severe droughts; financial deficits, which preclude some households from purchasing piped water; a lack of infrastructure for supplying potable water to rural communities; and deficits in both the knowledge and technology needed to harvest and store water when the rains do come. Water shortages have serious implications for crop productivity and livestock mortality, which in turn affects household food security, income generation, human health and overall wellbeing.

> *We were heavily affected by the* [2013 / 2014] *drought,"* a national government official reflected. *"We had nothing … The farmers were forced to stop* [working] *on their plots. There was not enough grazing, not enough water for giving to animals … If there is no water, what can you do?*

Because rural communities largely do not have the skills, assets, know-how or technical support services needed to adapt to these challenges, many become stuck in a 'vulnerability trap.' Thus, without targeted investment in rural development – including in infrastructure, basic services, markets and vocational training – policy interventions such as decentralization can result in maladaptive outcomes. This can be seen, too, in the case of Namibia's drought relief programme, which was introduced in the 1960s, soon after the country's independence.

Whereas drought relief can be important for helping the most vulnerable communities to cope with drought in the short-term, it can simultaneously create a dependency problem whereby people expect, and wait on, government to provide for them (also see Maru, Smith, Sparrow, Pinho, & Dube, 2014). This undermines people's capacity to adapt autonomously and there is an evident lack of innovation and drive within vulnerable communities in Namibia. This sense of apathy was observed by a member of an NGO, who had been talking with local community members about environmental change over the years, and about what could be done to ensure resource security in future: '*Someone in Ogongo, a lady, told me that … she does not care anymore'* the interview respondent reflected; *'that as* [a] *community* [we] *just a have an 'I do not care anymore' attitude.*' This suggests that, because of their vulnerability, people are more concerned with meeting their immediate needs than planning for the future. This mindset can be traced back to the tendency of vulnerable people to adopt risk-averse behaviour, which itself is partly a result of poverty and subsequent insurance and collateral deficits.

However, a narrative of indifference and inaction is perpetuated by the expectation, based on experience, that government will provide support when resources do become scarce, or when communities are impacted by disasters like droughts or floods.

The findings of this study further show that part of the dependency problem is that social protection mechanisms, like drought relief, are used as a political canvassing tool: by promising this support to communities, politicians are more likely to secure votes in election years. As such, they have a perverse incentive to uphold the status quo. An employee at a national-level NGO explained that

> the [institutional] environment right now is enabling [only a] few, and life becomes much more difficult for the people that are already vulnerable … it's actually the system that makes them dependent. Sometimes it is not by choice. But maybe it's the reality.

Figure 5 shows how the provision of drought relief can give rise to a dynamically interlinked set of barriers, causing a vicious cycle of dependency and undermining the adaptive capacity of vulnerable communities.

The barriers linked to the adaptive capacity challenge are rooted in several of Pelling et al.'s (2015) 'sites,' including: the biophysical environment (e.g.: drought and water scarcity); institutions (e.g.: the decentralization policy and drought relief programme), technology (e.g.: resource and capacity deficits), behaviour (e.g.: rural-urban migration) and discourse (e.g.: apathy, dependency). By mapping out these intersecting barriers, it becomes evident that a more strategic approach towards providing government support is needed if communities are to become resilient to climate change in the long term. This includes supporting communities not only in drought years, when they are at their most vulnerable, but in good rainfall seasons too. Moreover, the type of support that is provided needs to be reassessed with capacity building in mind.

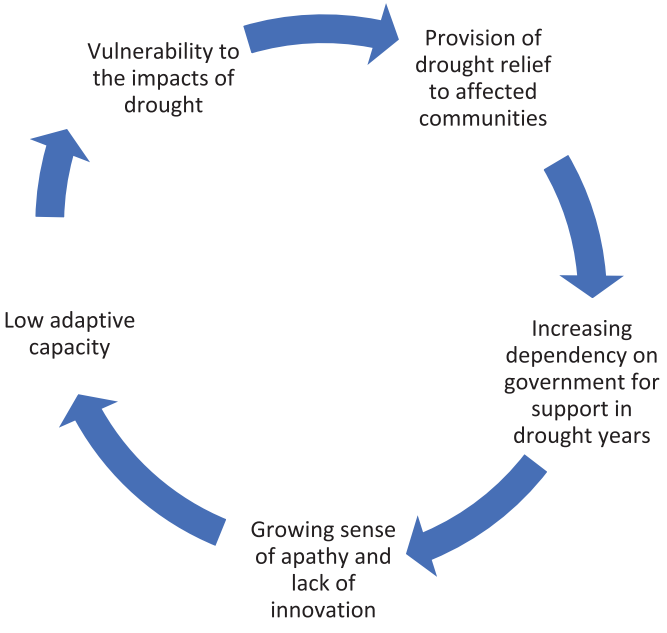

Figure 5. If not rolled out strategically and with capacity-building as a key objective, drought relief can cause a vicious cycle of dependency, perpetuating a state of vulnerability within affected communities. Source: Author's own.

Concluding discussion

This paper has provided some insight into Namibia's adaptation activity space, in which an array of barriers have served as roadblocks to adaptation policy and practice. The two 'avenues' described in the previous sections detail some of the challenges being faced and begin to highlight just how complex the adaptation activity space is. Consider Avenue 1: 'the policy-practice partition.' While a national policy agenda for adaptation exists on paper, this does not always translate to effective adaptation on the ground. A lack of technology, human capacity and finances for adaptation activities contribute strongly to the policy-practice partition; but so too do more 'software' barriers, such as power dynamics within government, the perception of climate change as a 'green' (environmental) issue, as seen in places like South Africa too (Ziervogel & Parnell, 2014) and a poor understanding of community needs and values. These barriers do not arise autonomously but are driven by overarching institutional arrangements and policy discourses, which themselves are informed by underlying structural challenges like poverty, wealth disparities and gender inequality.

Similarly, Avenue 2: the adaptive capacity challenge shows how vulnerability has been perpetuated by the convergence of several barriers, including water scarcity, budget deficits, a lack of infrastructure and limited access to alternative livelihoods. At times, these more proximate 'hardware' barriers can overshadow the underlying drivers of the challenges being faced. In the case of local water governance, for example, we see that the failure of decentralization has more to do with a lack of investment in capacity building at the local level, than with the decentralized approach itself (also see Bosworth et al., 2018). Through the lens of the adaptation activity space, we are also able to see how the challenges associated with the 'policy-practice partition' have filtered into 'the adaptive capacity challenge,' in which the decentralization policy and drought relief programme have not been implemented effectively or sustainably in practice. And vice versa, the slow implementation of the Country Climate Smart Agriculture Programme (Avenue 1) is due, in part, to a lack of capacity to adapt within farming communities (Avenue 2).

The examples provided in this study further illustrate how barriers that arise within the adaptation activity space might coalesce to give rise to cumulative challenges, reinforce negative feedback mechanisms that maintain the status quo or undermine otherwise virtuous adaptation interventions. For example, conservatism associated with customary values interweaves with dependency attitudes, risk aversion, and information, resource and capacity deficits to create stronger barriers to the uptake of novel or alternative farming practices. Also evident are the impacts of intersecting barriers across space and time which can result in 'resilience tradeoffs'(Chelleri et al., 2015). For example, higher-level institutional and political challenges, like a lack of coordination in government and the low prioritization of the adaptation agenda, filter down to the community level where the consequences of these barriers play out with more immediate effect.

Understanding the dynamics within the adaptation activity space and recognizing how barriers interact can help decision

makers to grasp where and in what form adaptation interventions could be introduced. In some cases, these may be incremental adjustments to existing processes or initiatives. For instance, improving the degree to which adaptation is mainstreamed into development practice by ensuring that climate change is explicitly included in policy and planning processes across sectors and governance scales. Greater strategic investment in rural development, awareness raising, and skills development are also important for building the adaptive capacity of communities and for addressing some of the barriers to adaptation.

While incremental adaptation is necessary, it will also be important for stakeholders to begin recognizing where more transformative forms of adaptation are required. These will necessarily challenge the very system in which adaptation takes place by questioning the social conventions and contracts that form its foundation (Matyas & Pelling, 2015; Pelling et al., 2015). For example, while drought relief is important for helping the most vulnerable communities to cope in dry years, the underlying political incentives for relief programmes need to be questioned; while the overall approach to government support needs to be transformed such that communities are left empowered, rather than being left with hand-outs that only address vulnerability in the short-term. When transformation plays out in the adaptation activity space, it creates opportunities for new relationships and dynamics of power to be formed and allows the deep-seated drivers of vulnerability and risk to be tackled.

To begin addressing the barriers to adaptation in Namibia, we argue that a more integrated approach to adaptation is needed. This integration should occur:

(a) between national, regional and local level government. This includes greater alignment of policies and strategies, which itself depends on improved communication and cooperation among ministries, as well as a commitment to more inclusive and collaborative planning processes;
(b) across time, meaning that short-term interventions (such as drought relief and time-bound, donor-driven projects) need to be complemented by more strategic programmes that build the adaptive capacity of vulnerable communities in the long-term. This might include skills development, awareness raising around climate change and adaptation options (e.g.: through on-site demonstrations) and the creation of opportunities for livelihood diversification (e.g.: through greater investment in rural economies); and
(c) among actor groups with diverse knowledge and experience, including government, farmers, community members, NGOs, researchers and the private sector. Integration between government and communities is particularly important for ensuring that adaptation interventions consider, and are tailored to, the needs and values of local people; while integration between NGOs and government or boundary organizations is essential for ensuring that adaptation projects are impactful across broader spatial and temporal scales.

It is important to recognize, however, that interventions aimed at realizing a more integrated approach to adaptation can themselves come with an array of difficulties. For instance, Pasquini, Cowling, and Ziervogel (2013) highlighted how efforts to mainstream climate change adaptation in local government in South Africa's Western Cape Province have been thwarted by various barriers, ranging from a lack of understanding of climate change, to internal party politics and a disinterest in the adaptation agenda. Spires, Shackleton, and Cundill (2014) discussed the challenges of working with local communities to implement planned community-based adaptation in developing countries. They found that issues such as the persistence of technical and managerial discourses and ineffective communication between experts and community members are common barriers to realizing this more integrated adaptation approach on the ground. Adaptation practitioners in Namibia should therefore remain aware of these potential issues and find ways to mitigate them as they work toward achieving a more integrated adaptation activity space.

The framework used in this study is a useful conceptual tool for understanding the drivers of and intersections among seemingly discrete or unrelated barriers to adaptation. By learning from experience and anticipating the roadblocks or cul-de-sacs that might arise at different intersections, decision makers can begin to proactively identify and implement adaptation solutions. In doing so, it will be important to plan adaptively and recognize when incremental interventions will suffice, and in what instances more transformative adaptation is needed. Future studies could focus more explicitly on how this could be done, and indeed on how transformation agendas could be operationalized in practice. This is an important moment when adaptation practitioners in Namibia could work together more to identify innovative ways to incorporate adaptation initiatives into existing development agendas (rather than framing adaptation as something 'extra') (Eriksen & Brown, 2011); to capitalize on existing strengths (such as a robust sense of community trust in local leaders); and to make use of existing resources, including traditional agro-ecological knowledge, the presence of individuals committed to the climate change agenda and the strong NGO and donor support base. In this way, and with continuous engagement and capacity-building at the local level, a more effective and sustainable adaptation activity space could be realized.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by International Development Research Centre: [Grant Number 107640-001]; Department of Science and Technology, Republic of South Africa: [Grant Number 0123/2014].

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References

Adger, W. N. (2016). Place, well-being, and fairness shape priorities for adaptation to climate change. *Global Environmental Change*, *38*, A1–A3. doi:10.1016/j.gloenvcha.2016.03.009

Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2012). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, *3*(2), 112–117. doi:10.1038/nclimate1666

Ampaire, E. L., Jassogne, L., Providence, H., Acosta, M., Twyman, J., Winowiecki, L., & van Asten, P. (2017). Institutional challenges to climate change adaptation: A case study on policy action gaps in Uganda. *Environmental Science and Policy*, *75*(June), 81–90. doi:10.1016/j.envsci.2017.05.013

Ampaire, E., Okolo, W., Acosta, M., Jassogne, L., Twyman, J., Muindi, P., & Mwongera, C. (2016). Barriers to successful climate change policy implementation in Tanzania findings from a desk review and exploratory studies in Lushoto, Kilolo and Bagamoyo Districts, Tanzania. Research Program on Climate Change, Agriculture and Food Security (CCAFS). Retrieved from https://cgspace.cgiar.org/handle/10568/78576

Antwi-Agyei, P., Dougill, A. J., & Stringer, L. C. (2014). Barriers to climate change adaptation: Evidence from northeast Ghana in the context of a systematic literature review. *Climate and Development*, *5529*(January), 1–13.

Bedsworth, L., & Hanak, E. (2010). Adaptation to climate change: A review of challenges and tradeoffs in six areas. *Journal of the American Planning Association*, *76*(4), 477–495. doi:10.1146/annurev-resource-100516-033554

Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., & Kabat, P. (2013). On the nature of barriers to climate change adaptation. *Regional Environmental Change*, *13*(5), 1119–1129. doi:10.1007/s10113-013-0421-y

Biesbroek, G. R., Termeer, C. J. A. M., Klostermann, J. E. M., & Kabat, P. (2014). Rethinking barriers to adaptation: Mechanism-based explanation of impasses in the governance of an innovative adaptation measure. *Global Environmental Change*, *26*, 108–118. doi:10.1016/j.gloenvcha.2014.04.004

Biesbroek, R., Dupuis, J., Jordan, A., Wellstead, A., Howlett, M., Cairney, P., … Davidson, D. (2015). Opening up the black box of adaptation decision-making. *Nature Climate Change*, *5*(6), 493–494. doi:10.1038/nclimate2615

Bosworth, B., Hegga, S., & Ziervogel, G. (2018). When participation is not enough: Lessons from decentralised water governance in Namibia. ASSAR Briefing Note. Retrieved from https://www.weadapt.org/knowledge-base/assar/lessons-from-decentralised-water-governance-in-namibia

Burch, S. (2010). Transforming barriers into enablers of action on climate change: Insights from three municipal case studies in British Columbia, Canada. *Global Environmental Change*, *20*(2), 287–297. doi:10.1016/j.gloenvcha.2009.11.009

Chelleri, L., Minucci, G., & Skrimizea, E. (2016). Does community resilience decrease social–ecological vulnerability? Adaptation pathways trade-off in the Bolivian Altiplano. *Regional Environmental Change*, *16*(8), 2229–2241. doi:10.1007/s10113-016-1046-8

Chelleri, L., Waters, J. J., Olazabal, M., & Minucci, G. (2015). Resilience trade-offs: Addressing multiple scales and temporal aspects of urban resilience. *Environment and Urbanization*, *27*(1), 181–198. doi:10.1177/0956247814550780

Chhetri, N., Stuhlmacher, M., & Ishtiaque, A. (2019). Nested pathways to adaptation. *Environmental Research Communications*, *1*, 1–14.

Davies, J., Spear, D., Chappel, A., Joshi, N., & Togarepi, C. (2018). Considering religion and tradition in climate smart agriculture. Insights from Namibia. In A. Nowak, & T. Rosenstock (Eds.), *The CSA Papers: Data leaks to help create a climate-smart future* (pp. 3–12). Nairobi: ICRAF. Retrieved from www.assar.uct.ac.za

Davies, J., & Ziervogel, G. (2017). 'Learning by doing' - lessons from the co-production of three South African municipal climate change adaptation plans. In H. Fünfgeld, S. Maloney, & M. Granberg (Eds.), *Local action on climate change: Opportunities and constraints* (pp. 53–71). Stockholm: Routledge.

Dupuis, J., & Knoepfel, P. (2013). The adaptation policy paradox: the implementation deficit of policies framed as climate change adaptation. *Ecology and Society*, *18*(4), 31. doi:10.5751/ES-05965-180431

Eakin, H., Tompkins, E. L., Nelson, D. R., & Anderies, J. M. (2009). Hidden costs and disparate uncertainties: Trade-offs in approaches to climate policy. In N. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to climate change: Thresholds, values, governance* (pp. 2112–2226). New York: Cambridge University Press.

Eisenack, K., Moser, S. C., Hoffmann, E., Klein, R. J. T., Oberlack, C., Pechan, A., … Termeer, C. J. A. M. (2014). Explaining and overcoming barriers to climate change adaptation. *Nature Climate Change*, *4*(10), 867–872. doi:10.1038/nclimate2350

Ekstrom, J. A., & Moser, S. C. (2014). Identifying and overcoming barriers in urban climate adaptation: Case study findings from the San Francisco Bay area, California, USA. *Urban Climate*, *9*, 54–74. doi:10.1016/j.uclim.2014.06.002

Eriksen, S., & Brown, K. (2011). Sustainable adaptation to climate change. *Climate and Development*, *3*(1), 3–6. doi:10.3763/cdev.2010.0064

Few, R., Morchain, D., Spear, D., Mensah, A., & Bendapudi, R. (2017). Transformation, adaptation and development: Relating concepts to practice. *Palgrave Communications*, *3*, 17092. doi:10.1057/palcomms.2017.92

Gero, A., Meheux, K., & Dominey-Howes, D. (2011). Integrating community based disaster risk reduction and climate change adaptation: Examples from the Pacific. *Natural Hazards and Earth System Science*, *11*(1), 101–113. doi:10.5194/nhess-11-101-2011

Gifford, R., Kormos, C., & McIntyre, A. (2011). Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *Wiley Interdisciplinary Reviews: Climate Change*, *2*(6), 801–827. doi:10.1002/wcc.143

Harvey, D. (2010). *The enigma of capital: And the crisis of capitalism*. London: Profile Books.

Hughes, S., Gnatz, D. M., Borquez, R., Romero-Lankao, P., & Rosas-Huerta, A. (2013). Institutional capacity for climate change responses: An examination of construction and pathways in Mexico City and Santiago. *Environment and Planning C: Government and Policy*, *31*(5), 785–805. doi:10.1068/c12173

IPCC. (2014). Part A: Global and sectoral aspects. (Contribution of working group II to the fifth assessment report of the intergovernmental panel on climate change). *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, 1132. Retrieved from https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-FrontMatterA_FINAL.pdf

Kates, R. W., Travis, W. R., & Wilbanks, T. J. (2012). Transformational adaptation when incremental adaptations to climate change are insufficient. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(43), 7156–7161. doi:10.1073/pnas.111552

Lebel, L., Li, L., Krittasudthacheewa, C., Juntopas, M., Vijitpan, T., Uchiyama, T., & Krawanchid, D. (2012). *Mainstreaming climate change adaptation into development planning* (vol. 8). Bangkok: Adaptation Knowledge Platform and Stockholm Environment Institute. Retrieved from http://www.indiaenvironmentportal.org.in/files/file/mainstreamingclimate

Leck, H., & Roberts, D. (2015). What lies beneath: Understanding the invisible aspects of municipal climate change governance. *Current Opinion in Environmental Sustainability*, *13*, 61–67. doi:10.1016/j.cosust.2015.02.004

Lehmann, P., Brenck, M., Gebhardt, O., Schaller, S., & Süßbauer, E. (2015). Barriers and opportunities for urban adaptation planning: Analytical framework and evidence from cities in Latin America and Germany. *Mitigation and Adaptation Strategies for Global Change*, *20*(1), 75–97. doi:10.1007/s11027-013-9480-0

Longhurst, R. (2016). Semi-structured interviews and focus groups. In N. Clifford, M. Cope, T. Gillespie, & S. French (Eds.), *Key methods in Geography* (3rd ed., pp. 487–492). Melbourne: Sage. Retrieved from http://ir.obihiro.ac.jp/dspace/handle/10322/3933

Maru, Y. T., Smith, M. S., Sparrow, A., Pinho, P. F., & Dube, O. P. (2014). A linked vulnerability and resilience framework for adaptation pathways in remote disadvantaged communities. *Global Environmental Change*, *28*, 337–350.

Matyas, D., & Pelling, M. (2015). Positioning resilience for 2015: The role of resistance, incremental adjustment and transformation in disaster risk management policy. *Disasters*, *39*(s1), s1–s18. doi:10.1111/disa.12107

Mendelsohn, J., Jarvis, A., & Robert, C. (2002). *Atlas of Namibia: A portrait of the land and its people*. Cape Town: Philip Publishers.

Ministry of Environment and Tourism. (2011). *National policy on climate change for Namibia*. Windhoek: Government of the Republic of Namibia.

Ministry of Environment and Tourism. (2013). *Republic of Namibia national climate change strategy & action plan 2013–2020*. Windhoek: Ministry of Environment and Tourism.

Ministry of Environment and Tourism. (2015). *Republic of Namibia country climate smart agriculture programme 2015–2030*. Windhoek: Ministry of Environment and Tourism and Ministry of Agriculture, Water and Forestry.

Morchain, D., Spear, D., Ziervogel, G., Masundire, H., Angula, M., Davies, ... Hegga, S. (2019). Building transformative capacity in southern Africa: surfacing knowledge and challenging structures through participatory Vulnerability and Risk Assessments. *Action Research*, *17*(1), 19–41.

Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences*, *107*(51), 22026–22031. doi:10.1073/pnas.1007887107

Nalau, J., Handmer, J., Dalesa, M., Foster, H., Edwards, J., Kauhiona, H., … Welegtabit, S. (2016). The practice of integrating adaptation and disaster risk reduction in the south-west Pacific. *Climate and Development*, *8*(4), 365–375. doi:10.1080/17565529.2015.1064809

Newsham, A. J., & Thomas, D. S. G. (2011). Knowing, farming and climate change adaptation in North-Central Namibia. *Global Environmental Change*, *21*(2), 761–770. doi:10.1016/j.gloenvcha.2010.12.003

Nightingale, A. J. (2017). Power and politics in climate change adaptation efforts: Struggles over authority and recognition in the context of political instability. *Geoforum; Journal of Physical, Human, and Regional Geosciences*, *84*(June 2016), 11–20. doi:10.1016/j.geoforum.2017.05.011

O'Brien, K. L. (2009). Do values subjectively define the limits to climate change adaptation? *Adapting to Climate Change - Thresholds, Values, Governance*, 164–170. doi:10.1017/CBO9780511596667.011

Pasquini, L., Cowling, R. M., & Ziervogel, G. (2013). Facing the heat: Barriers to mainstreaming climate change adaptation in local government in the Western Cape Province, South Africa. *Habitat International*, *40*(July 2015), 225–232. doi:10.1016/j.habitatint.2013.05.003

Pasquini, L., Ziervogel, G., Cowling, R. M., & Shearing, C. (2014). What enables local governments to mainstream climate change adaptation? Lessons learned from two municipal case studies in the Western Cape, South Africa. *Climate and Development*, *7*(March 2015), 60–70.

Pelling, M., O'Brien, K., & Matyas, D. (2015). Adaptation and transformation. *Climatic Change*, *133*(1), 113–127. doi:10.1007/s10584-014-1303-0

Republic of Namibia. (1997). *A decentralisation policy for the Republic of Namibia*. Windhoek: Ministry of Regional Local Government and Housing.

Roberts, D. (2008). Thinking globally, acting locally — institutionalizing climate change at the local government level in Durban, South Africa. *Environment and Urbanization*, *20*(2), 521–537. doi:10.1177/0956247808096126

Roberts, D. (2010). Prioritizing climate change adaptation and local level resilience in Durban, South Africa. *Environment and Urbanization*, *22*(2), 397–413. doi:10.1177/0956247810379948

Roberts, D., & O'Donoghue, S. (2012). Urban environmental challenges and climate change action in Durban, South Africa. *Environment and Urbanization*, *25*(2), 1–21.

Ryan, D. (2015). From commitment to action: A literature review on climate policy implementation at city level. *Climatic Change*, *131*(4), 519–529. doi:10.1007/s10584-015-1402-6

Schensul, J., & LeCompte, M. (2012). *Essential ethnographic methods: A mixed methods approach* (Vol. 3). Plymouth, UK: AltaMira Press.

Shackleton, S., Ziervogel, G., Sallu, S., Gill, T., & Tschakert, P. (2015). Why is socially-just climate change adaptation in sub-Saharan Africa so challenging? A review of barriers identified from empirical cases. *Wiley Interdisciplinary Reviews: Climate Change*, *6*(3), 321–344. doi:10.1002/wcc.335

Solecki, W., Dorsch, M., & Pelling, M. (2015). Resistance, resilience and transformation in response to risk and hazards in urban coastal settings: A framework for Scenario and case study analysis. *1*, 1–22.

Spear, D., & Chappel, A. (2018). Livelihoods on the Edge without a Safety Net: The case of Smallholder crop farming in north-central Namibia. *Land*, *7*, 1–11.

Spear, D., Zaroug, M. A. H., Daron, J. D., Ziervogel, G., Angula, M. N., Haimbili, E. N., … Davies, J. E. (2018). *Vulnerability and responses to climate change in drylands: The case of Namibia*. London, UK: International Development Research Centre and UK Aid. Retrieved from www.assar.uct.ac.za

Spires, M., Shackleton, S., & Cundill, G. (2014). Barriers to implementing planned community-based adaptation in developing countries: A systematic literature review. *Climate and Development*, *6*(3), 277–287. doi:10.1080/17565529.2014.886995

Suri, H. (2011). Purposeful sampling in qualitative research Synthesis. *Qualitative Research Journal*, *11*(2), 63–75. doi:10.3316/QRJ1102063

Turner, S., Fünfgeld, H., & Robertson, S. (2016). *Strategies for embedding climate change adaptation in public sector organisations*. doi:10.13140/RG.2.1.1200.7449.

Von Hase, F. (2013). *Facilitating conservation agriculture in Namibia through understanding farmers ' planned behaviour and decision making*. Alnarp, Sweden: Swedish University of Agricultural Sciences. Retrieved from http://stud.epsilon.slu.se

Westskog, H., Hovelsrud, G. K., & Sundqvist, G. (2017). How to make local context matter in national advice: Towards adaptive comanagement in norwegian climate adaptation. *Weather, Climate, and Society*, *9*(2), 267–283. doi:10.1175/wcas-d-16-0063.1

Zeidler, J., Kandjinga, L., David, A., Turpie, J., & Malema, D. (2012). *Climate governance & development case study Namibia*. Namibia: Heinrich Boll Stiftung.

Ziervogel, G., & Hegga, S. (2018, June 17). Why ordinary people must have a say in water governance. *The Conversation*. Retrieved from https://theconversation.com/why-ordinary-people-must-have-a-say-in-water-governance-97940

Ziervogel, G., & Parnell, S. (2014). Tackling barriers to climate change adaptation in South African coastal cities. In B. Glavovic, & G. Smith (Eds.), *Adapting to climate change: Lessons from natural hazards planning* (pp. 57–73). Dordrecht: Environmental Hazards. doi:10.1007/978-94-017-8631-7_3.

Ziervogel, G., & Taylor, A. (2008). Feeling stressed: Integrating climate adaptation with other priorities in South Africa. *Environment Science and Policy for Sustainable Development*, *50*(2), 32–41. doi:10.1038/vital795