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RESILIENCE INTEL

Resilient risk governance: Experience from the Sahel and Horn of Africa

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Resilience programmes often aim to provide services that help build assets and minimise the impact of shocks and stresses on people's lives and livelihoods. But little is known about the way local risk governance systems and institutional arrangements mediate people's access to these services and therefore lead to improved resilience.

KEY MESSAGES

- Evidence related to how ecosystem, financial and climate services can strengthen resilience at the local level is growing in the Sahel and Horn of Africa. There is less evidence regarding the importance of governance systems in mediating access to these assets.
- Institutional arrangements have implications for the delivery of services and how people access them.
- Ecosystem services are often delivered at the local level and governed by complex institutional arrangements. Actors, including governments, non-governmental organisations and community-based organisations, often overlap.
- In many cases, national governments deliver climate services, often bypassing local governance structures. Therefore, while access to and use and application of weather and climate information and services in Africa and elsewhere are increasing, end-users continue to face challenges in receiving and applying these services.
- The formal financial sector is largely absent. Financial services are more often provided informally through women's savings groups or reciprocity within social networks. Increasingly, non-governmental organisations and private sector actors are delivering financial services in places that are vulnerable to climate change and extreme weather events.
- This paper offers a conceptual framework for resilient risk governance and a way forward for researchers and practitioners to build a greater body of evidence on its role in delivering resilience outcomes.

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INTRODUCTION

Risk governance refers to both the institutional arrangements and the policy processes that shape the risk reduction and management approaches (Renn et al., 2011). Increasingly, decision-makers are recognising that multi-level governance is required to manage the range of risks facing communities in developing countries (Pahl-Wostl, 2009). These risks are not only of climate change and disasters but also of conflict, environmental degradation, land use change, food insecurity and human migration and displacement, as well as interacting effects (IPCC, 2014).

In particular, strengthening of risk governance at the local level, in terms of both decision-making and fiscal representation, is now thought to be key in promoting equitable and resilient development (Wilkinson, 2015; Wilkinson et al., 2014).

Most donor-funded resilience programmes today provide different types of services to help households and communities build the assets and skills that will help them anticipate, absorb and adapt to shocks and stresses (Bahadur et al., 2015). In particular, the provision of

Box 1: Key concepts – resilience assets

Ecosystem services are the benefits ecosystems provide that contribute to making human life possible and worth living (Millennium Assessment, 2005). These benefits fall into several categories. *Supporting services* are necessary for the production of ecosystems, including soils, vegetation and cycling of nutrients and water. *Provisioning services* include those that constitute basic needs for human subsistence – namely, food, water and shelter. *Regulating services* create good-quality conditions for human life. They include climate, air, water and disease regulation. *Cultural services* are the non-material benefits people obtain from ecosystems through spiritual, recreation or aesthetic values.

Financial services provide savings, credit and loans or insurance to users, either through traditional banking institutions, such as commercial banks, or informally through 'non-traditional' routes such as microfinance institutions. The ability of individuals or businesses to access financial services differs greatly depending on location and context. Financially inclusive markets should comprise a broad, interconnected system of actors and infrastructure to improve access (Haworth et al., 2016).

Climate services disseminate information about weather and climate to the public or other users (WMO, 2011). These include provision of forecasts over a range of geographical scales (i.e. local, national, regional, international) and timeframes (i.e. days, seasons, years, decades). In general, the smaller the scale, the more difficult it is to provide climate information, and there is a great deal of uncertainty in forecasts at all scales (Jones et al., 2015). Conversely, it is often localised and short-term climate information that is of most use to those on the ground trying to make decisions. As such, delivery and use of climate information are inherently challenging.

ecosystem, climate and financial services is popular in resilience programming (Haworth et al., 2016; Jones et al., 2016). Little is known, however, about how local risk governance systems, and the broader institutional arrangements in which they are embedded, mediate people's access to these services and therefore result in improved resilience. Understanding how governance structures shape the resilience of households and communities is key to the success of resilience-building programmes that are delivered at the community level and also those that attempt to scale up interventions and replicate at a wider scale.

This paper responds to an identified need to better understand the role of local governance systems in building resilience, by answering the following questions:

- How do the services provided through resilience programmes help households and communities build the assets that make them more resilient to climate shocks and stresses?
- How do governance arrangements mediate access to these services?

Questions of risk governance and resilience suggest that particular system characteristics are more supportive of – and facilitate – people's access to resilience services. For example, in theory, a risk governance system that involves a diversity of institutions, engages local communities in a meaningful and effective way and makes space for reflection and learning is more resilient than a more centralised, authoritarian system using fewer types of knowledge and with information flowing in only one direction. Yet it is not clear how these characteristics can facilitate the delivery or use of very different kinds of services, or if some of these characteristics are more important than others. In particular, we are interested in whether risk governance systems made up of multiple types of knowledge and institutions strengthen management of ecosystem, financial and climate services, and, if so, how power dynamics at different scales mediate access to these services for different groups within communities. With a better understanding of these dynamics, it should be possible for donors, practitioners and policy-makers to reinforce those processes that increase the resilience of risk governance systems and therefore communities.

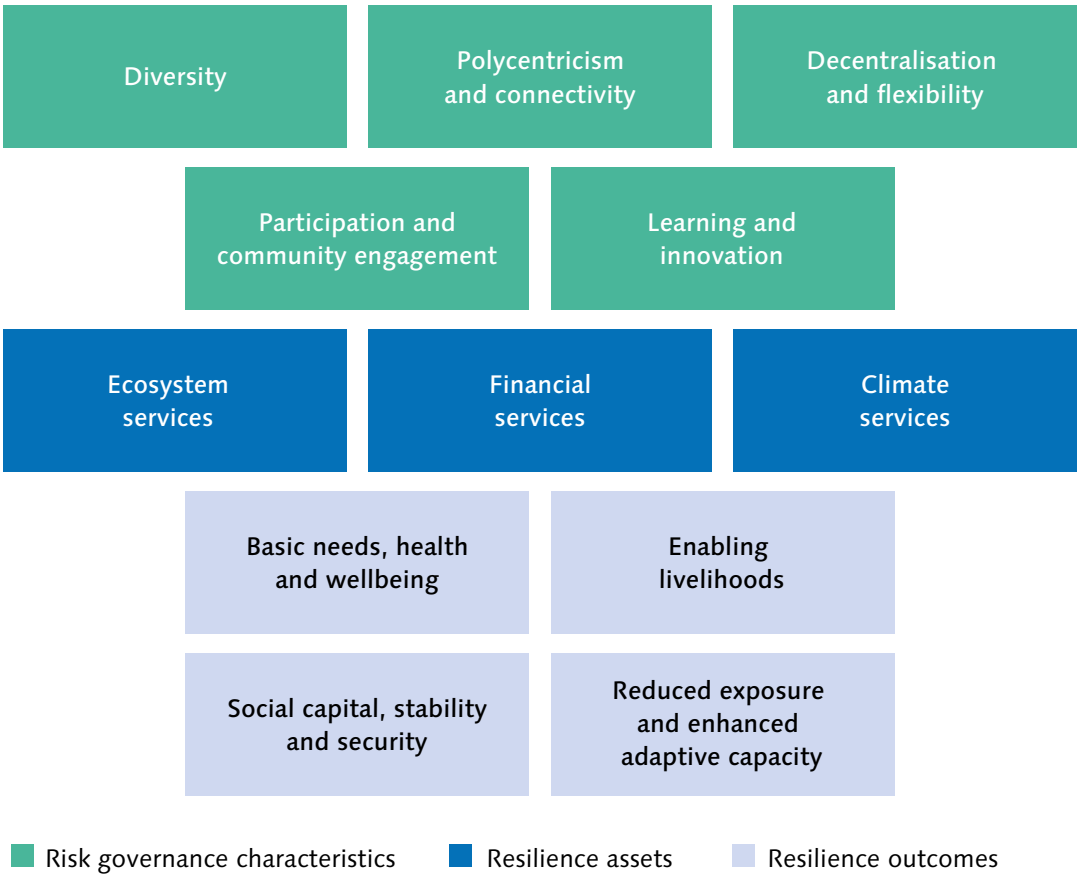
The following sections strive to answer these questions. First, we outline the theoretical perspectives on how ecosystem, financial and climate services contribute to building household assets and strengthening resilience. Second, we explore how institutional arrangements for risk management can best deliver these services to poor and vulnerable communities. The examples provided here focus on the Sahel and Horn of Africa – areas facing significant and increasing climate risk (IPCC, 2014) and where there is an identified need to scale up resilience interventions beyond the community level and engage with governance systems.

WHAT MAKES A RESILIENT RISK GOVERNANCE SYSTEM? A CONCEPTUAL FRAMEWORK

The conceptual approach outlined below aims to shed light on how various factors related to risk governance and access to assets can determine the level of resilience a household or community can experience (Carabine et al., 2015) (see Figure 1).

Five characteristics of risk governance systems have been identified as important for building resilience (Carabine et al., 2015). These are derived from the social-ecological resilience literature (as reviewed recently by Biggs et al., 2015), which recognises that complex and dynamic interactions occur within and between scales (Cumming et al., 2006; Gundersen and Holling, 2002) and people's decisions to adapt are calculated based on many factors. These include individual preferences, prevailing social norms and processes at the global and local levels (Adger et al., 2009; Wilbanks, 2007). The five characteristics are 1) diversity; 2) polycentricism and connectivity; 3) decentralisation and flexibility; 4) participation and community engagement; and 5) learning and innovation.

Figure 1: Conceptual framework linking risk governance characteristics with resilience outcomes



Source: Carabine et al., 2015

Box 2: Key concepts – risk governance characteristics

Diversity
Inclusion of a diverse range of actors and institutions in risk management, both informal and formal, will generate a diversity of responses (Renn et al., 2011; Robinson and Berkes, 2011). In particular, the inclusion of different knowledge systems and blending of scientific and indigenous knowledge is encouraged (Agrawal, 1995).

Polycentricism and connectivity
The structure of the governance system should encourage different kinds of actors to interact with multiple decision-makers across administrative boundaries (Pahl-Wostl, 2009). This polycentrism in institutional arrangements (i.e. multiple sources of decision-making) is needed to address complex problems (Biggs et al., 2015; Osbahr et al., 2010). Similarly, in a risk governance system, connections between institutions across scales are thought to improve communities' resilience to shocks and stresses (Twigg et al., 2013), by helping ensure resources and information are channelled to the local level effectively (Nelson et al., 2007), and lessons from local-level risk management can inform higher-level policies (Wilkinson, 2013). At the same time, it is recognised that risk governance at one particular level can be affected by what happens at other levels of decision-making (Walker et al., 2004).

Decentralisation and flexibility
The decentralisation of decision-making and fiscal responsibility to manage risk to the local level can promote approaches that are more appropriate to the local context (Wilkinson, 2012; Biggs et al., 2015). In principle, a local risk governance system should have the flexibility to make decisions regarding planning and service delivery and change course in response to local conditions (Nelson et al., 2007). In practice, however, decentralising decision-making to the lowest level may not be more sustainable or equitable unless mechanisms are in place to promote financial responsibility and political accountability (Ribot, 2002).

Participation and community engagement
The important role communities play in managing their natural resources and their risks is widely recognised (Manyena, 2006; Nelson et al., 2007; Biggs et al., 2015). Building in processes for meaningful engagement can help foster ownership and ensure solutions are sustainable and focused on local needs (Wilkinson, 2012).

Learning and innovation
Given the complex and changing context in which human and natural systems interact with one another, processes that support iterative learning and help ensure lessons learnt are integrated into management plans are critical (Morgan et al., 2009; NRC, 2009). Continual learning and innovation are valuable processes to enhance institutional memory and avoid mistakes being repeated (Gundersen and Holling, 2002).

GOVERNANCE FOR ACCESSING RESILIENCE ASSETS: EXPERIENCE FROM THE SAHEL AND HORN OF AFRICA

A review of the literature offers numerous examples – ranging from broad descriptors to highly contextual examples – of how ecosystem, financial and climate services can foster adaptive capacity and lead to what we refer to as 'resilience outcomes'. This section reviews the hypotheses for how these three sets of assets can contribute to resilience and what the literature tells us about the role of good governance in delivering them. We offer a particular focus on the Sahel and Horn of Africa regions.

Ecosystem services

Globally, rural livelihoods rely heavily on provisioning, regulating and cultural ecosystem services. Ultimately, ecosystem services also provide many of the basic livelihood assets that contribute to overall health and well-being, including water, fuel, food and fibre, which under normal conditions can strengthen household and community resilience in periods of stress and shock (Carabine et al., 2015). The relative importance of various specific ecosystem services may vary within and between communities. For example, pastoralists inhabiting arid and semi-arid lands in Africa and Asia practise transhumance (moving livestock from one grazing ground to another in a seasonal cycle) as a strategy to exploit spatial variation ecosystem services. These include rainfall patterns, the natural regulation of ground and surface water and the inherent regenerative capacity of savannah and forest ecosystems to help ensure a diversity of resources are available to help withstand shocks. Such shocks range from severe and prolonged drought, to long-term land degradation, to political upheaval (Robinson and Berkes, 2011; Frankenberger et al., 2012; Hesse et al., 2013).

More settled populations depend on the availability of wild edible plants and other non-timber forest products; the provision of primary inputs for alternative livelihood activities, such as timber and charcoal production, fishing and hunting, among others (Shumsky et al., 2014); and cultivating a diversity of crops (Folke et al., 2004). For example, in Ethiopia, forested areas provide wild edible plants and other subsistence food-stuffs, which are particularly valuable during droughts and other periods of hardship. Marketable commodities including frankincense, myrrh, gum arabic, henna and various others offer opportunities for alternative sources of income and the diversification of livelihood activities. Across four districts of Ethiopia, community forestry management has been mainstreamed, with initial results showing promise for achieving sustainable management of ecosystem services like non-timber forest products and the more equitable distribution of their benefits (Flintan et al., 2013). Managing diverse ranges of ecosystem services enables people to pursue alternative income-generating and livelihood strategies during periods of shock or stress, such as adverse weather conditions (Carabine et al., 2015).

For many years, practical support to build resilience in the Sahel and Horn of Africa has aimed to establish community-based natural resource management systems and foster sustainable and equitable governance of common pool resources. This experience has led researchers, development practitioners, policy-makers and others to appreciate the influence governance structures have in mediating the development and provision of those assets and services that underpin such initiatives.

Given the climate-sensitive nature of many livelihood assets, such as pastures, water resources, coastal and inland fisheries and forests, and even physical infrastructure such as roads, bridges and irrigation systems, climate change is poised to create a variety of new and qualitatively distinct challenges to rural livelihoods, which local institutions will be central to addressing. To do so, it is crucial that new and more adaptive risk governance structures and institutional arrangements are forged (Fankhauser et al., 1999; Agrawal, 2008; Sharma et al., 2014; Brown and Sonwa, 2015; Washington-Ottombre and Pijanowski, 2013).

Climate change is poised to create a variety of new and qualitatively distinct challenges to rural livelihoods, which local institutions will be central to addressing.

In many cases, the seeds of such resilient risk governance systems are already present, particularly at the local level. Then the task becomes one of identifying, maintaining, strengthening and better integrating institutions across scales of risk governance. For example, a sizable body of evidence has emerged to suggest that many of the management strategies pastoralists in the Sahel and Horn of Africa regions of Africa employ – including the maintenance of traditional governance structures and various informal institutions – are not merely coping strategies but strategies for managing risk through the optimisation of resources (Hesse and MacGregor, 2006; Little et al., 2008; Krätli and Schareika, 2010; Flintan et al., 2013). Effective drought risk management should incorporate such customary, local-level institutions and other natural resource management authorities (Hesse and Macgregor, 2006), as well as informal institutions such as transhumance, herd-splitting, social and familial networks of livestock 'loaning' and customary property rights regimes (Flintan et al., 2013).

However, the authority and efficacy of these customary institutions have been eroded considerably in recent decades, in part because of policy decisions and development interventions, as well as changing economic, climatic and security conditions (Vedeld, 1994; Helland, 2000). Continuing the previous example, a proliferation of government- and donor-funded wells and boreholes in semi-arid regions of Kenya, Somalia and Ethiopia, coupled with point-source provision of health care, veterinary services, education, emergency food aid and other social protection services, has had significant effects on the pastoralist institutions described above. In turn, this has contributed to negative environmental effects as a result of over-stocking and unsustainable rates of groundwater exploitation, which relate directly to greater sedentarisation and population density (Gomes, 2006; Little et al., 2008). In these cases, the critical role of informal institutions in managing access to resources has been eroded, effectively reducing the resilience of pastoralist communities.

Some sub-Saharan African countries have undergone decentralisation of risk and natural resource management functions in recent years, with equivocal outcomes for access to ecosystem services. Senegal's rural community councils and sub-prefects, Zimbabwe's rural district councils

and comparable entities elsewhere have assumed authority for a variety of tasks key to disaster risk reduction, natural resource management and the provision of resilience-linked services. But often these institutions are without adequate support for greater inclusiveness, accountability or democratisation, not to mention financial and technical capacity (Manyena, 2006). Frequently, the effects undermine customary institutions and governance structures without effectively replacing them. In this way, the failure to adequately integrate formal public and civil sector institutions with informal and customary institutions may actually reduce the diversity of possible responses rather than increase available options (Leslie and McCabe, 2013).

Despite these challenges, innovative governance structures have been developed and piloted to fill these gaps and to create more effective, decentralised and participatory approaches to management of livelihood assets that are sensitive to climate and linked to resilience. One promising example is the Local Conventions approach being instituted in a number of Sahelian West African states. This approach begins with a natural resource assessment, then sees participatory community deliberation on rights of use and access and concludes with formalised agreement among all involved stakeholders. This approach has proved particularly effective in helping avoid and manage conflict over resources in areas marked by a diversity of livelihood strategies (Roe et al., 2009). Another similar strategy, known as the Rural Code, has been developed in Niger. This legal framework grants collective grazing and water access rights to herders in their home areas, while granting the communities authority to negotiate usage rights with other groups. This approach provides both a framework and an incentive for the empowerment of customary governing bodies, effective decentralisation and a clear path toward the equitable provision of important livelihood assets among different stakeholders (Roe et al., 2009). In light of these challenges and opportunities, a number of academics, non-governmental organisations and policy-makers are calling for greater support for local governments, customary institutions and governance innovations as well as greater integration among institutions and across scales (Flintan et al., 2013).

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To increase participation of communities in risk governance, Shared Learning Dialogues were established in Isiolo, in northern Kenya, including stakeholders from among the local pastoralist and agro-pastoralist communities along with government agencies and local civil society organisations. These platforms functioned as fora to both disseminate and deliberate on climate forecasts from the Kenya Meteorological Department, as well as to collectively prioritise adaptation activities and mobilise community resources to implement them (Hesse and Pattison, 2013). The Shared Learning Dialogues led to efforts to deliberately structure natural resource management institutions that were more diverse, participatory, deliberative, decentralised and integrated with other relevant agencies and institutions. A similar approach, with equally encouraging results, is reported by CARE (2012) from the neighbouring province of Garissa in Kenya. However, another initiative, known as the focal area approach, encountered a number of challenges when also implemented in that same location. This was reportedly because failure to adequately integrate the relevant private, public and civil society institutions, along with limited technical capacity on the part of some participating extension personnel, severely constrained the effort's potential impact (Kiara, 2011). While highlighting some of the potential challenges to implementing meaningful governance reform in resilience-building services, these examples do lend further evidence to the importance of these resilience characteristics.

Financial services

Financial services, and in particular credit, offer opportunities for livelihood-strengthening and diversification extending into small-scale manufacturing, trade, the services sector and other activities (GGLN, 2014), in addition to the ability to invest in new or expanded agricultural assets like fertilisers, hired labour, veterinary services, machinery and crop protection products (Madajewicz et al., 2013). Microfinance organisations, particularly savings-driven community-based organisations, have also been shown to serve as excellent forums for developing and refining skills such as household budgeting and financial planning, business management and other aptitudes that can catalyse long-term adaptive planning (GGLN, 2014).

Increased household savings, particularly when coupled with budgeting and financial planning, can make an important contribution to preparedness, not only in the case of unanticipated covariate shocks such as droughts, floods and conflict but also with regard to predictable fluctuations in income and expenditure, including seasonally recurring events (e.g. the 'hunger months' just before harvest, annual school fees) as well as idiosyncratic shocks (e.g. a wedding, illness or injury) (GGLN, 2014).

Evidence of the potential contribution of financial services – including savings, credit, insurance and training in financial literacy – to household and community resilience is convincing (Hallegatte et al., 2016; Haworth et al., 2016). Research on externally supported microcredit schemes has demonstrated that the availability of credit can play a pronounced role in helping women and children avoid acute food insecurity and malnutrition in the immediate aftermath of a shock (Doocy et al., 2005) while reducing the risk of long-term household asset erosion and chronic poverty following disasters (Carter et al., 2004). Even more innovative financial instruments, such as integrated weather-

based index insurance programmes, have shown significant potential for minimising losses and accelerating recovery after climate-related shocks, especially drought (Madajewicz et al., 2013).

Across countries, fiscal decentralisation appears to be a vital component in communities being able to manage and access resilience assets (Manyena, 2006). However, some governments remain hesitant to devolve fiscal authorities to local communities, noting that administration and oversight of so many small grants is in itself often impractical. In Kenya, the jointly funded Arid Lands Resource Management Project, which provided technical support, early warning systems and coordinated response strategies across multiple scales, proved effective in significantly mitigating the damage to the country's pastoralist communities. Complementing these governmental programmes are a variety of participatory climate information services and community-led adaptive planning efforts led by various international research and development organisations.

The institutions that govern the provision of financial services, regardless of whether emerging within communities or initiated by external actors, appear to play a vital role in ensuring households possess the resources necessary to withstand unanticipated shocks. They can also help generate social capital and networks, providing complementary benefits (Brown and Sonwa, 2015; Caretta, 2014; GGLN, 2014). How financial services are designed has an enormous influence on the extent to which that potential can be reached, and there are numerous examples of microfinance organisations failing, either in part or in full, to achieve their stated objectives (Carter et al., 2015; Yaro et al., 2015). Interestingly, many of the design principles employed by the highly successful South African microfinance initiative led by SaveAct correspond closely with the principles of effective governance of common pool resources. These include having clearly defined membership consisting of those with a history of successful collaborative experiences (i.e. savings groups are self-selecting); having rules that are simple and easy to understand, with clear mechanisms for enforcement; and the availability of low-cost adjudication (i.e. savings groups draft their own bylaws, including means of adjudication and sanction).

Climate services

Climate services provide community members with localised, probabilistic weather forecasts – sometimes in conjunction with, or incorporating, traditional and ecological approaches to agro-meteorology – helping farmers, pastoralists and other end-users to make informed risk management decisions, reducing their vulnerability to climate related shocks (CARE, 2012; Kgakatsi and Rautenbach, 2014). The largest improvements in climate services in Africa include those in forecasting and the use of seasonal weather information (Wilkinson et al., 2015).

Medium- and long-term climate forecast data can also serve a variety of functions at local, state/provincial and national levels, including informing decisions around land-use planning; infrastructure investments and urban development; coastal management and flood control efforts; and natural resource management and agricultural policy. Collectively, these functions constitute a contribution to strengthening resilience, although significant challenges exist to the meaningful adoption and use of climate information in developing nations

(Jones et al., 2015). These include the fundamental disconnect between the priorities of producers and end-users of climate forecast data, challenges to effective communication between the two groups and technical issues related to scale and resolution of available information (ibid.). Compounding these challenges are a host of technical, financial and institutional constraints that conspire to limit the uptake and effectiveness of medium- and long-term climate forecasts in public policy-making (Fankhauser et al., 1999; Jones et al., 2015).

The literature on governance and the use of climate services is relatively limited. At the regional level in the Horn of Africa, there is a shift towards greater investment in, and integration across scales of, climate services provision and drought early warning systems (Fitzgibbon and Crosskey, 2013). One example of this trend is the establishment in 2011 of the National Drought Management Authority in Kenya, which has been delegated responsibility for operating Kenya's Early Warning System as well as coordinating district- and community-level disaster risk reduction and contingency funding initiatives. A second, though to date less developed, initiative comes from the Ethiopian Disaster Risk Management Agricultural Task Force. In terms of regional institutional arrangements, drought risk governance is coordinated under the Inter-Governmental Authority on Development in the Horn of Africa Drought Disaster Resilience and Sustainability Initiative. Each member state is responsible for embedding this regional initiative into national processes, with Kenya the most advanced on this, having launched its Ending Drought Emergencies framework in 2015. Institutional development and knowledge management are central to the framework, drawing together a wide range of stakeholders (Carabine et al., 2015). However, across the region climate services remain centrally provided and largely disconnected from local knowledge about the dynamics of weather and seasonality.

At the regional level in the Horn of Africa, there is a shift towards greater investment in, and integration across scales of, climate services provision and drought early warning systems.

WHAT DOES THIS TELL US ABOUT BUILDING RESILIENT RISK GOVERNANCE SYSTEMS?

Experience from the Sahel and Horn of Africa regions does suggest that some aspects of risk governance are more strongly connected than others with particular resilience outcomes. A risk governance system that has all the characteristics explored here would therefore strengthen access to a variety of services and produce multiple resilience outcomes.

A significant caveat is warranted here, however, with important implications for the direction of future research and development efforts. Many developing nations face severe limitations in the availability of human, financial and technical resources, which make it necessary to prioritise development initiatives and governance reforms (Herrfahrdt-Pahle, 2013). In other words, it is rarely possible to achieve all desired risk governance characteristics, in all localities, across all sectors simultaneously. There is a need to further identify and test best practice in terms of how to approach piecemeal governance reform with an aim of

containing costs, maximising synergies and avoiding contradictions.

Also, the level of importance or specific impacts of different risk governance characteristics is likely to vary significantly according to the locality in question, and depending on the types of livelihood activities communities are engaged in. The governance of ecosystem services is seemingly more closely linked to livelihood outcomes, whereas financial and climate services also have the potential to help communities reduce exposure to climate shocks and stresses and enhance adaptive capacity. Enhanced social capital to deal with shocks and stresses appears to be mostly associated with financial and climate services if there are strong processes of learning and innovation in their provision.

All of these gaps point to the need for further evidence that might eventually guide the creation of a decision support tool or tools capable of offering practical guidance on programming on governance reform for improved resilience in light of the diversity of real-world development contexts encountered. In doing so, it will be possible to better identify the entry points for improved risk management and where the thresholds lie in terms of local risk governance.

Ecosystem services are often delivered at the local level and governed by complex institutional arrangements.

CONCLUSIONS

There is a growing literature documenting evidence around how ecosystem, financial and climate services can strengthen resilience at the local level. There is less evidence regarding the importance of governance systems in mediating access to these assets. Most examples can be found in the field of natural resource management, where there is a longer history of interventions aimed at building resilience relative to financial or climate services. The evidence indicates that these services are delivered in different ways through different institutional arrangements, with implications for how people access them.

Ecosystem services are often delivered at the local level and governed by complex institutional arrangements. The mandates and actions of governments, non-governmental organisations and community-based organisations, often overlap. By understanding the structure and function of local risk governance arrangements, decision makers can better identify routes towards more effective resilience programming.

In many cases, climate services are delivered by national governments, often bypassing local governance structures. Therefore, while access to and use and application of weather and climate information and services in Africa and elsewhere are increasing, end-users continue to face challenges in receiving and applying these services. Greater integration between the national, scientific institutions that produce climate and weather information and local, informal institutions, which are more easily accessed, appears therefore to be critical to building resilience. Polycentricism and diversity of institutions, as principles of risk governance, would seem to be particularly important for the delivery of climate services in resilience programmes.

In many areas of the Sahel and Horn of Africa, the formal financial sector is largely absent. In these cases, financial services are often provided informally, by women's savings groups or through reciprocity within social groups. Increasingly, non-governmental organisations are delivering financial services, via village savings and loan associations (VSLAs) for example. Private sector actors are also moving into this service area, delivering microfinance and insurance products in places that are vulnerable to climate change and extreme weather events. In assessing the implications for community resilience of these shifting institutional arrangements, it will be important to consider the role these actors can play in wider risk governance systems.

The literature on resilience is rapidly expanding beyond concepts and theory into areas of practice, looking at the various roles services play in strengthening people's capacities to anticipate and adapt in the face of shocks and stresses. Limited attention has been paid, however, to the institutions governing how households and communities access and use these services. The socio-ecological resilience literature suggests that some risk governance systems will be more effective than others in reaching the most vulnerable. In this paper, we have indicated a way forward for researchers and practitioners to test these hypotheses and build a greater body of evidence on the role of risk governance in delivering resilience outcomes.

REFERENCES

Adger, W.N., Dessai, S., Goulden, M. et al. (2009) 'Are there social limits to adaptation to climate change?' *Climatic Change* 93(3): 335–54.

Agrawal, A. (1995) 'Dismantling the divide between indigenous and scientific knowledge', *Development and Change* 26(3): 413–39.

Agrawal, A. (2008) *The role of local institutions in adaptation to climate change.* Washington, DC: World Bank.

Bahadur, A., Peters, K., Wilkinson, E., Pichon, F., Gray, K. and Tanner, T. (2015) *The 3As: tracking resilience across BRACED.* London: ODI.

Biggs, R., Schlueter, M. and Schoon, M.L. (2015) *Principles for building resilience: Sustaining ecosystem services in social-ecological systems*. Cambridge: Cambridge University Press.

Brown, H.C.P. and Sonwa, D.J. (2015) 'Rural local institutions and climate change adaptation in forest communities in Cameroon', *Ecology and Society* 20(2). doi:10.5751/ES-07327-200206

Carabine, E., Venton, C. C., Tanner, T. and Bahadur, A. (2015) The contribution of ecosystem services to human resilience: A rapid review. London: ODI.

CARE (2012) 'Decision-making for climate resilient livelihoods and risk reduction: A Participatory Scenario Planning approach'. www.careclimatechange.org/files/adaptation/ALP_PSP_Brief.pdf

Caretta, M.A. (2014) '"Credit plus" microcredit schemes: A key to women's adaptive capacity', *Climate and Development* 6(2): 179–84.

Carter, M.R., de Janvry, A., Sadoulet, E. and Sarris, A. (2015) 'Index-based Weather Insurance for Developing Countries: A Review of Evidence and Propositions for Scaling-up', FERDI Working Paper no. 112. Clermont-Ferrand: FERDI.

Carter, M.R., Little, P.D., Mogues, T. and Negatu, W. (2004) *Shock, sensitivity and resilience: Tracking the economic impacts of environmental disaster on assets in Ethiopia and Honduras*. Washington, DC: IFPRI.

Cumming, G.S., Cumming, D.H.M. and Redman, C.L. (2006) 'Scale mismatches in social-ecological systems: Causes, consequences, and solutions', *Ecology and Society* 11(1): 14–34.

Doocy, S., Teferra, S., Norell, D. and Burnham, G. (2005) 'Credit program outcomes: coping capacity and nutritional status in the food insecure context of Ethiopia', *Social Science and Medicine* 60(10): 2371–82.

Fankhauser, S., Smith, J.B. and Tol, R.S.J. (1999) 'Weathering climate change: Some simple rules to guide adaptation decisions', *Ecological Economics* 30(1): 67–78.

Fitzgibbon, C. and Crosskey, A. (2013) 'Disaster risk reduction management in the drylands in the Horn of Africa Building Resilience in the Horn of Africa'. Disaster Risk Reduction Management in the Drylands in the Horn of Africa Brief 4. Nairobi: ILRI.

Flintan, F., Behnke, R. and Neely, C. (2013) *Natural resource management in the drylands in the Horn of Africa.* Technical Brief 1. Nairobi: ILRI.

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L. and Holling, C.S. (2004) 'Regime shifts, resilience, and biodiversity in ecosystem management', *Annual Review of Ecology, Evolution and Systematics* 35: 557–581.

Frankenberger, T.R., Spangler, T., Nelson, S. and Langworthy, M. (2012) 'Enhancing resilience to food insecurity amid protracted crisis', in *Food insecurity in protracted crises: High-level expert forum.* Rome: FAO.

GGLN (2014) *Community resilience and vulnerability in South Africa: Perspectives from civil society on local governance in South Africa*. Cape Town: GGLN.

Gomes, N. (2006) *Access to water, pastoral resource management and pastoralists' livelihoods: Lessons learned from water development in selected areas of Eastern Africa (Kenya, Ethiopia, Somalia)*. Livelihood Support Program Working Paper 26. Rome: FAO.

Gunderson, L.H. and Holling, C.S. (2002) *Panarchy: Understanding Washington, transformations in human and natural systems*. Washington, DC: Island Press.

Hallegatte, S., Bangalore, M., Bonzanigo, L. et al. (2016) *Shock waves: Managing the impacts of climate change on poverty*. Washington, DC: IBRD/World Bank.

Haworth, A., Frandon-Martinez, C., Fayolle, V. and Simonet, C. (2016) *Climate resilience and financial services*. London: ODI.

Helland, J. I2000) 'Institutional erosion in the drylands: the case of the Borana pastoralists', in *Pastoralists and environment: Experience from the Greater Horn of Africa*. Addis Ababa: OSSREA.

Herrfahrdt-Pahle, E. (2013) 'Integrated and adaptive governance of water resources: The case of South Africa', *Regional Environmental Change* 13(3, SI): 551–61.

Hesse, B.C., Anderson, S., Cotula, L., Skinner, J. and Toulmin, C. (2013) 'Building climate resilience in the Sahel', in *Building resilience in the Sahel*. London: IIED.

Hesse, C. and Macgregor, J. (2006) *Pastoralism: Drylands' invisible asset? Developing a framework for assessing the value of pastoralism in East Africa*. London: IIED.

Hesse, C. and Pattison, J. (2013) *Ensuring devolution supports adaptation and climate resilient growth in Kenya*. London: IIED.
IPCC (Intergovernmental Panel on Climate Change) (2014) *Climate change 2014: Impacts, adaptation, and vulnerability. Part B: Regional aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge and New York: Cambridge University Press.

Jones, L., Carabine, E., Roux, J.-P. and Tanner, T. (2015) 'Promoting the use of climate information to achieve long-term development objectives in sub-Saharan Africa: Results from the Future Climate For Africa scoping phase'. London: ODI.

Jones, L., Harvey, B. and Godfrey-Wood, R. (2016) 'The changing role of NGOs in supporting climate services'. *Resilience Intel* 4. London: ODI.

Kgakatsi, I.B. and Rautenbach, C.J. de W. (2014) 'The contribution of seasonal climate forecasts to the management of agricultural disaster-risk in South Africa', *International Journal of Disaster Risk Reduction* 8: 100–13.

Kiara, J.K. (2011) 'Focal area approach: A participatory community planning approach to agricultural extension and market development in Kenya', *International Journal of Agricultural Sustainability* 9(1): 248–57.

Krätli, S. and Schareika, N. (2010) 'Living off uncertainty: The intelligent animal production of dryland pastoralists', *The European Journal of Development Research* 22(5): 605–22.

Leslie, P. and McCabe, J. (2013) 'Response diversity and resilience in social-ecological systems', *Current Anthropology* 54(2): 114–43.

Little, P.D., McPeak, J., Barrett, C. and Kristjanson, P. (2008) 'Challenging orthodoxies: Understanding pastoral poverty in East Africa', *Development and Change* 39(4), 585–609.

Madajewicz, M., Tsegay, A.H. and Norton, M. (2013) *Managing risks to agricultural livelihoods: impact evaluation of the HARITA program in Tigray, Ethiopia 2009–2012.* Boston: Oxfam.

Manyena, S.B. (2006) 'The concept of resilience revisited', *Disasters* 30(4): 434–50.

Millennium Assessment (2005) *Millennium ecosystem assessment: Ecosystems and human wellbeing: Synthesis*. Washington, DC: Island Press.

Morgan, M.G., Dowlatabadi, H., Henrion, M. et al. (2009) 'Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decision making'. Synthesis and Assessment Product 5.2. Washington, DC: US Climate Change Science Program.

Nelson, D.R., Adger, W.N. and Brown, K. (2007) 'Adaptation to environmental change: contributions of a resilience framework', *Annual Review of Environment and Resources* 32(1): 395–419.

NRC (National Research Council) (2009) 'Informing decisions in a changing climate'. Washington, DC: Panel on Strategies and Methods for Climate-Related Decision Support, Committee on the Human Dimensions of Global Change, Division of Behavioral and Social Sciences and Education, NRC.

Osbahr, H., Twyman, C., Adger, W.N. and Thomas, D.S.G. (2010) 'Evaluating successful livelihood adaptation to climate variability and change in Southern Africa', *Ecology and Society* 15(2): 27.

Pahl-Wostl, C. (2009) 'A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes', *Global Environmental Change* 19: 354–65.

Renn, O., Ortleb, J., Benighaus, L. and Benighaus, C. (2011) 'Risks', in *Safe or Not Safe: Deciding What Risks to Accept in Our Environment and Food*. New York: Springer Science+Business Media.

Ribot, J. (2002) *Democratic decentralization of natural resources: Institutionalizing popular participation*. Washington, DC: WRI.

Robinson, L.W. and Berkes, F. (2011) 'Multi-level participation for building adaptive capacity: Formal agency-community interactions in northern Kenya', *Global Environmental Change* 21(4): 1185–94.

Roe, D., Nelson, F. and Sandbrook, C. (2009) *Community management of natural resources in Africa: Impacts, experiences and future directions*. London: IIED.

Sharma, V., Orindi, V., Hesse, C., Pattison, J. and Anderson, S. (2014) 'Supporting local climate adaptation planning and implementation through local governance and decentralised finance provision', *Development in Practice* 24(4): 579–90.

Shumsky, S., Hickey, G.M., Johns, T. et al. (2014) 'Institutional factors affecting wild edible plant (WEP) harvest and consumption in semi-arid Kenya', *Land Use Policy* 38: 48–69.

Twigg, J., Tanenbaum, J.J.G., Williams, A.M. et al. (2013) 'An integrated conceptual framework for long-term social-ecological research', *International Journal of Production Research* 7. http://doi.org/10.1890/100068

Vedeld, T. (1994) *The state and rangeland management: Creation and erosion of pastoral institutions in Mali.* Drylands Networks Programme Issues Paper no. 46. London: IIED.Walker, B., Holling, C.S. Carpenter, S.R. and Kinzig, A. (2004) 'Resilience, adaptability and transformability in social-ecological systems', *Ecology and Society* 9(2): 5.

Washington-Ottombre, C. and Pijanowski, B.C. (2013) 'Rural organizations and adaptation to climate change and variability in rural Kenya', *Regional Environmental Change* 13(3, SI): 537–50.

Wilbanks, T.J. (2007) 'Scale and sustainability', *Climate Policy* 7(4): 278–87.

Wilkinson, E. (2012) *Transforming disaster risk management: a political economy approach.* London: ODI.

Wilkinson, E. (2013) *Disaster risk governance in volcanic areas: A concept note for Work Package 4 of the Strengthening Resilience in Volcanic Areas (STREVA) programme*. London: ODI.

Wilkinson, E., Budimir, M., Ahmed, A.K. and Ouma, G. (2015) 'Climate information and services in BRACED countries', *Resilience Intel* 1(1): 1–20. Wilkinson, E., Caravani, A., Canales Trujillo, N., Nakhooda, S., Terpstra, P. and Peterson Carvalho, A. (2014) *Going in the right direction? Tracking adaptation finance at the subnational level.* London: ODI.

WMO (World Meteorological Organization) (2011) *Guide to climatological practices*. Geneva: WMO.

Yaro, J.A., Teye, J. and Bawakyillenuo, S. (2015) 'Local institutions and adaptive capacity to climate change/variability in the northern savannah of Ghana', *Climate And Development* 7(3): 235–245.

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The BRACED Knowledge Manager generates evidence and learning on resilience and adaptation in partnership with the BRACED projects and the wider resilience community. It gathers robust evidence of what works to strengthen resilience to climate extremes and disasters, and initiates and supports processes to ensure that evidence is put into use in policy and programmes. The Knowledge Manager also fosters partnerships to amplify the impact of new evidence and learning, in order to significantly improve levels of resilience in poor and vulnerable countries and communities around the world.

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