

## Chapter 2

# Desertification in the Sahel: Local Practice Meets Global Narrative

Camilla Toulmin and Karen Brock

**Abstract** For nearly a century, crisis narratives about desertification have dominated policy discourse on the Sahelian drylands. This chapter looks at some of the ways in which these have shaped policy interventions in the drylands over the decades, and how contemporary development thinking offers better options for resilient dryland livelihoods. We argue that solutions to the environmental and economic problems faced by dryland systems—especially in the context of climate change—need to be more firmly rooted in a nuanced understanding of ecological change and the links between climate, vegetation and people. They must also involve a shift in power to local people, recognizing the value of marrying modern science with indigenous knowledge systems. Dryland peoples are more likely to prosper when governments reverse heavy-handed attempts to manage these areas. Greater promise lies with decentralizing power and decision-making to local institutions, and recognizing local tenure rights and systems for securing access to land.

**Keywords** Drylands • Policy • Discourse • Livelihoods • Decentralization and resilience

For many generations, the people of the Sahel have lived with consistently unreliable rainfall and long-term cycles of periodic drought. This is the nature of their dryland climate; it is the backdrop to their lives and livelihoods, and it has been the setting within which they have developed social and environmental strategies to support their prosperity. But for nearly a century, crisis narratives about desert

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advance, and a broader desertification of the region's resources—forged in the aftermath of drought—have dominated policy discourse on the Sahelian drylands. The attitudes and arguments behind these narratives have remained remarkably tenacious, despite being “stuck within poorly researched data on degradation and desertification” (Hesse et al. 2013: 64) and systematically excluding the views, lived experience and practices of Sahelian people.<sup>1</sup>

Many ‘solutions’ to the problems of the drylands, mostly led by international aid agencies and governments, have featured large-scale projects with top-down planning, including human resettlement and large-scale irrigation, all aimed at changing and transforming nature. These interventions, and the scientific research they draw on to frame their design, have frequently misunderstood the highly variable and uncertain resource availability that characterizes this region. They have also disregarded the knowledge of Sahelian people and downplayed the importance of the practices and institutions that underpin their livelihoods in the face of this uncertainty. Although the range of interventions has altered over time, the positions of many international development agencies and national governments in the region continue to reflect the idea that mastery over nature is a better option than understanding and living with the uncertain conditions of the Sahel.

Alongside the mainstream narrative, several counter-narratives—which question ‘desertification’—have emerged from the social, economic and political as well as the biophysical sciences. We locate ourselves in this tradition, alongside other proponents who argue that the biophysical manifestations of desertification and drought in the Sahel are inseparable from their underlying social, political and economic causes, consequences and remedies (e.g., Stamp 1940; Behnke and Scoones 1992; Sendzimir et al. 2011; Andersson et al. 2011). We concur with the view that a policy focus on technical solutions, to the detriment of social and political considerations, runs the risk of failure (Keeley and Scoones 2003), and that a much better balance between science and the knowledge and experience of Sahelian people should form the basis for future interventions in the drylands (Hesse et al. 2013).

Questioning the mainstream narrative is not a denial of the environmental and economic problems faced by dryland systems; on the contrary, we argue that it is critical to understand the ecology, instability and links between climate, vegetation and people, if solutions are to be found that fit within existing institutions and knowledge systems. Looking forward, this recognition of diversity and the significance of local knowledge is particularly important, as dryland people must continue to adapt to the extreme climatic events and hotter temperatures predicted for their ecosystems. Concerted support will be needed, recognizing the knowledge and agency of local people, offering partnership and shared learning, to maintain the resilience of dryland ecosystems within a wider social and geographic landscape (Hesse et al. 2013).

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<sup>1</sup>In contrast with the rest of the chapters in this volume, our use of the term ‘Sahel’ and ‘Sahelian’ also includes the drylands of eastern Africa, and includes Ethiopia and Kenya.

From this perspective, resilient livelihoods in the Sahel can best be strengthened by interventions that support farmers, pastoralists and fishers through decentralized governmental and nongovernmental institutions that recognize them as citizens with rights to natural resources and valid knowledge that can be harnessed. Local management and control are key attributes in building the resilience, diversity and productivity of pastoral, mixed farming and agricultural livelihood systems in the face of climate change.

In this chapter, we look at how the desertification discourse has shaped policy interventions in the drylands over the decades, and ways in which contemporary development discourse may offer better opportunities to support resilient dryland livelihoods. We highlight key historical shifts in the evolution of the narratives and counter-narratives of desertification discourse, and their relationship with both scientific research and the livelihoods of Sahelian people. We trace the development of the ‘received wisdom’—that a combination of inappropriate land use practices, rising population and periodic drought mean that Sahelian dryland ecosystems are being rapidly and permanently degraded by desertification—from its origins in colonial West Africa through the major Sahelian droughts of the 1970s and 1980s. We discuss its subsequent manifestations in the international policy architecture that has framed many interventions in the region.

We go on to examine how policy has responded to other key shifts in the language of development policy—climate change adaptation and mitigation, and poverty reduction—as well as better grounded scientific analysis. We describe a range of development interventions from across dryland Africa associated with different aspects of these narratives on dryland change. We discuss the opportunities presented for successful interventions to strengthen livelihood resilience in the face of climate change.

## 2.1 Desiccation and Blame—The Crisis Narrative

The ideas behind the term ‘desertification’ have been traced to the 1920s and 1930s, when colonial administrators, scientists and foresters began to describe the apparent drying out of their West African territories (Davis—this volume, Mortimore 1989; Swift 1996).

Given the long-held concern of the colonial authorities about desiccation, from December 1936 to February 1937, a joint Anglo-French Commission made its way through northern Nigeria and southern Niger to assess “the extent to which desert conditions are being created, and what is causing these conditions”. While recognizing that 1936 had been a particularly wet rainy season, they concluded that there was no evidence to support a general desiccation of the region. Among their counter-intuitive findings they discovered that tree cover was reduced in the more southerly, wetter districts, due to higher population density, while the long-established farming areas further north were well-wooded due to farmers keeping numerous trees on their farmlands, and using living hedges as field boundaries. They saw abundant natural

regeneration of tree and shrub cover, but also acknowledged that while there was no apparent danger of desiccation, there was “unquestionably an impoverishment of the sylvan conditions of the country ... due almost entirely to uncontrolled expansion of shifting cultivation”. They proposed a solution entailing “permanent farmlands, properly demarcated, regularly manured, adequately timbered with trees of local economic importance and with an assured supply of water.”

Despite the conclusions of the Anglo-French Commission, other views of the encroaching Sahara came to dominate the story of desertification in the 1930s, as discussed in detail by Davis (this volume). This included the work of the British forester Stebbing, who travelled widely in the region in 1937, and concluded that the southern boundary of the Sahara was indeed expanding. Stebbing’s view came to form the foundations of a powerful story of a vicious cycle of desertification: human misuse and population increase cause desiccation, which causes the desert to move south; and rainfall becomes more variable as a result of erosion and vegetation degradation. To counter this cycle, Stebbing proposed the extension of government authority over agricultural practices, an approach that resonated well with French efforts to establish a centralized natural resource management bureaucracy in their colonies, particularly through their Eaux et forêts departments, under which elaborate regulations enforced by a paramilitary force served to constrain the natural-resource use rights of rural people and enrich a small, mostly urban elite (Ribot 2001).

Stebbing’s narrative of the causes and effects of desertification, and the type of interventions needed to stop its destructive effect, were early versions of a blueprint from which many top-down approaches to governing dryland natural resources subsequently stemmed. The “desert advance” story has been replicated and reinterpreted many times since the 1930s by actors with different interests in the Sahel. As an early example of a development narrative (Roe 1991), this story of desertification vastly simplified complex dryland ecological systems, and helped to establish consensus for state intervention to manage resources (Krätli and Enson 2013). It was also associated closely with scientists of particular disciplines—in this case, soil scientists, foresters and physical geographers—and perspectives from other disciplines were marginal (Andersson et al. 2011).

Despite its critics, the desertification narrative became an enduring storyline because it was particularly effective in the service of the ruling political classes of the region, both colonial and post-colonial. Key to this success was its framing of desertification as a crisis, not only generating consensus and giving legitimacy to authoritarian interventions, but also allowing the attribution of blame. The narrative casts Sahelian farmers and, to an even greater extent, pastoralists in the role of culprits in the desertification process (Hesse and Odhiambo 2006; Sendalo 2009). In this framing, their poverty and ignorance are responsible for making them the consequent victims of its impacts.

To really take hold, however, a crisis narrative needs a real crisis (Krätli and Enson 2013). Historically rooted in the droughts of the 1920s, the desertification crisis narrative was used less in the 1950s and 1960s. During this period, although there were still periodic droughts (Mortimore 1989), wetter years in the Sahel

brought greater yields and fewer pressures on scarce water and pasture (Swift 1996); the preoccupations of colonial government became more keenly focused on soil erosion. But when major droughts began to hit the region in the late 1960s, reaching their peak in 1972–74, the desertification crisis narrative found new resonance.

In addition to a large-scale famine relief effort across much of the region, international preoccupation with desertification in the Sahel grew throughout the 1970s, part of a wider growth in concerns about human impacts on the environment which started with the United Nations Educational, Scientific and Cultural Organization's (UNESCO) first Biosphere Conference in Paris in 1968. The international political and institutional response to the drought was spearheaded by a set of United Nations (UN) reviews of the state of scientific knowledge about the causes and effects of desertification in drylands across the world (see, for example, Lamprey 1975; UN 1977). This period, culminating in the UN Conference on Desertification (UNCOD) in 1977, can be characterized by the consolidation of what Hajer (1995) describes as a 'discourse coalition'—a group of actors, usually with a bureaucratic base, who share a similar set of stories that account for why a particular phenomenon exists and what should be done about it. In this case, a discourse coalition formed, with its centre around the United Nations Environment Programme (UNEP), receiving support from a range of actors within African governments which together reinforced the storyline of an "apocalyptic vision" of desertification as "an inexorable and almost contagious process" (Swift 1996: 80).

Just as the received wisdom had served the implicit interests of the colonial project of centralized administration over natural resources 40 years previously, so in the 1970s it dovetailed with the agenda of many independent African governments to strengthen control over their dryland regions. This was especially the case for governments with a significant nomadic pastoral population, who were perceived as a threat to national unity because of their ability, through movement with their herds, to evade registration and taxation by the central state (Fratkin 2001; Niamir-Fuller 1998).

The UN General Assembly endorsed the Global Plan of Action to Combat Desertification that emerged from the UNCOD in 1977,<sup>2</sup> and the Desertification Branch of UNEP was charged with its implementation. Proposed activities included establishing a Sahelian green belt that revived Stebbing's proposal of the 1930s, as well as five large-scale transnational projects to manage the region's aquifers, and a regional livestock project aimed at controlling rangeland degradation through control of stocking levels, perceived to be excessive (UNCOD 1978).

Despite these project activities, when UNEP reviewed progress in 1984, it concluded that the land lost to desertification had continued to rise steadily at the same rate that had been reported in 1977 (Mabbutt 1984; UNEP 1984). But questions must be asked about the quality of the data used to support these

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<sup>2</sup>Resolution 32/172 of 19 December 1977.

assessments. Swift (1996) notes that, in some cases, national government estimates of population and land use change were based on very limited survey data and heavily reliant on expert opinion or assessment. Despite questions raised about data quality (Berry 1983), these estimates were aggregated and translated into global desertification indicators. These indicators were used to produce figures that became the new headlines for the received wisdom on desertification,<sup>3</sup> and then widely used by a broad range of policy actors trying to raise the profile of environmental change on international policy agendas.

In contrast to these aggregate assessments, a growing number of researchers working in the Sahel were finding that the desertification narrative was not borne out on the ground. Their studies showed that the science behind the desertification narrative was poorly understood, and use of the term often confuses three related but distinct ecological processes: drought, desiccation and land degradation. However, their views, along with those of the farmers and herders they studied, were side-lined (Swift 1996). Many such researchers—from a range of disciplines including anthropology, ecology, economics and range science—went on to try and fill the knowledge gap that arose from a lack of primary research on the processes of dryland degradation in the 1970s and 1980s. Often funded by bilateral aid agencies, such research sought to gain recognition for the diverse people, livelihood systems, and settings across the Sahelian region, and their remarkable ability to survive and prosper in often harsh, uncertain conditions.<sup>4</sup> Nonetheless, Andersson et al. (2011) argue that there was a growing disconnection between the desertification discourse and scientific understanding of land degradation, which meant that “when the United Nations finally created the Convention to Combat Desertification (UNCCD) in 1994, policy was seriously disconnected from science” (2011: 306).

By their very nature, mainstream narratives have their detractors, and desertification is no exception. A further upsurge of research into land degradation and Sahelian livelihood systems during the 1980s and 1990s challenged some of the conceptual foundations of the desertification story, allowing the forging of a significant counter-narrative that framed dryland degradation as the outcome of complex interactions between climate, ecosystems and social systems in inherently dynamic environments (Behnke and Scoones 1992). This strand of thought also emphasized the importance and value of local knowledge and institutions for developing the drylands, framing interventions in support of the adaptive capacities of local people (Rochette 1989).

The Earth Summit at Rio in 1992, and the UN conventions that resulted—on desertification, biological diversity and climate change<sup>5</sup>—aimed to establish a new era of international environmental policy and associated frameworks. The two

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<sup>3</sup>“Desertification threatens 35 % of the Earth’s land surface and 20 % of its population; 75 % of threatened area and 60 % of the threatened population are already affected” (Swift 1996: 81).

<sup>4</sup>See, for example Haramata, a research bulletin about the drylands published by IIED between 1987 and 2010.

<sup>5</sup>UN Convention to Combat Desertification (1994), UN Convention on Biological Diversity (1992), and UN Framework Convention on Climate Change (1992).

broad perspectives on desertification—the received wisdom describing an inexorable spread driven by poor land management practices, and the counter-narrative emphasizing the long-term rhythms of climate variability and complex social and environmental dynamics—co-existed uneasily while the new institutional architecture was shaped and solidified.

The received wisdom, embedded in existing international and domestic bureaucratic structures, maintained its dominant position. The alternative narrative found resonance in a set of policy spaces outside those officially labelled as dealing with desertification, and amongst a set of actors who were not part of formal bureaucratic processes, including NGOs. Questioning the value of global processes to address essentially local problems of marginalization, its advocates increasingly sought to fit the science of dryland degradation into national and local policy processes on agriculture, poverty reduction and climate change adaptation.

## 2.2 The Earth Summit and the UN Convention to Combat Desertification

While UNCOD and the Plan of Action to Combat Desertification (PACD) raised the profile of desertification on international environmental agendas during the 1970s and 1980s, the issues of climate change and biodiversity loss were growing in prominence more quickly. Some African states were concerned that this would lead to desertification being ignored, and first proposed a UN convention on desertification in the run-up to the 1992 Earth Summit in Rio (Stringer 2006). Their rallying cry was for resources to support the victims of desertification. Although discouraged by several European countries at the summit—who argued that desertification did not have the same global dimensions as biodiversity and climate change—a commitment was eventually made to establish negotiations on a desertification convention. This decision was seen as a concession to African leaders who needed to show some return from the Rio conference in terms of resources to distribute through their governments.

The process of negotiating the UNCCD opened in May 1993. Burkinabè politician and diplomat the late Hama Arba Diallo was appointed head of a temporary secretariat, and an International Panel of Experts on Desertification<sup>6</sup> was convened. Government representatives were presented with a draft text drawn from documents agreed at Rio and, five negotiation sessions later, the UNCCD international treaty was signed by governments and adopted. Following ratification by 195 states, it entered into force at the end of 1996. Despite lobbying from a number of multilateral organizations which wanted to become the seat of this new convention, an independent Permanent Secretariat was established in Bonn; Diallo became the first Executive Secretary of the UNCCD. A Conference of the Parties

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<sup>6</sup>Which included Camilla Toulmin, one of the authors of this chapter.

(CoP), held every two years, oversees implementation and reviews progress, while a science conference meets to review desertification science and local knowledge.

The principal objective of the UNCCD is to “combat desertification and mitigate the effects of drought, particularly in Africa”. It defines desertification as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities” ([www.unccd.int](http://www.unccd.int)). The language of the convention frames local communities as the main managers of drylands, and appears to reject top-down approaches in favour of involving local communities in interventions to combat desertification. Nonetheless, it operates through a series of National Action Programmes, which identify the main causes and consequences of desertification at the country level and define a programme of priority responses very similar to those of the earlier UN-PACD.

While the Permanent Secretariat administers the UNCCD, it has no powers to enforce the convention. The UNCCD has its own funding institution, the Global Mechanism, but this channels existing financial support, rather than establishing and allocating new resources. New funding comes through the Global Environment Facility (GEF), but “desertification must compete with other GEF issues, and is often a low priority” (Stringer 2006: 1). This has led to the UNCCD becoming the “poor relation” among the three Rio conventions (Tollefson and Gilbert 2012: 1); in 2011, for example, GEF funding to UNCCD was only 10 % of that directed to the UN Convention on Biological Diversity (UNCBD). It has proved difficult to raise funds for the diffuse and poorly described set of problems that comprise desertification, and funding for dryland interventions has increasingly tended to be channelled through non-CCD interventions focused on soils and land management, such as the World Bank’s Sustainable Land Management programme.

A range of other international organizations have recognized the importance of dryland regions, their people and resources for achieving broader global goals, whether it be biological diversity, the MDGs, or livelihood security (IUCN 2009, 2012; UNDP 2011; UN 2011). For some, the drylands are seen as a great untapped resource, where increased investment would yield substantial returns. For others, the drylands need to be addressed because their current low-income status and marginalization puts at risk global campaigns around the MDGs, or achievement of anti-polio campaigns.

The UNCCD competes for recognition and funding with the UNCBD and the UN Framework Convention on Climate Change by trying to get the attention of global audiences. Current documents emphasize the connection between desertification, conflicts and crises. In a 2014 document, the UNCCD Secretariat asserts that 12 million hectares of land become barren each year, and conflicts over land lead to civil war, sexual violence and genocide (UNCCD 2014a). Despite the arrival of a new, dynamic Executive Secretary in 2014, there remain longstanding questions about whether the international convention model is really the right strategy for addressing drylands development. Furthermore, Stringer (2006: 3) notes that “the UNCCD relies on only a small number of scientists relative to the amount of research done on desertification issues [...] so the views of many experts are overlooked”. Over a decade ago, Toulmin (2001) observed that the convention “has



tied people into a series of CoP performances which demonstrate no linkage with real problems on the ground.” By framing land degradation as an issue for action at the global level, the UNCCD lets national governments off the hook for decades of neglect of land, soils and farming systems. It is perhaps too much to expect of a structure created by and answerable to national governments—and therefore accountable at the national level—that it should make a strong case for local people to be at the heart of development.

Below we present two interventions in the Sahel that are related to the UNCCD. The first, the Desert Margins Program (DMP), was conceived when the CGIAR was invited to join the negotiations for the UNCCD in 1993; it was part-funded by the UNCCD through UNEP. The second, the Great Green Wall for the Sahara and the Sahel Initiative (GGWSSI), has been driven by African governments and has also been part-funded by the UNCCD, through the Global Mechanism, with additional support from the European Union (EU). Both illustrate the way that approaches to desertification enshrined in the UNCCD have been translated into interventions, through the new institutional architecture established after Rio.

These two examples illustrate how the international political framework for desertification has been translated into concrete initiatives, and some of the challenges that have ensued from implementation. These include the strong managerial approach to intervention which often overlooks how people actually live in the drylands, and a continued assumption that technology-based solutions to natural resource management problems will trickle down effectively to local people through government and national agricultural research bureaucracies.

### ***2.2.1 The Desert Margins Program—Putting Research into Practice<sup>7</sup>***

The idea of an international programme to address the problems of Africa’s desert margins was tabled in 1993 when CGIAR member, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), joined the international discussions to elaborate the UNCCD. By 1997, the idea had crystallized into the Desert Margins Program (DMP). A five-year pilot phase was launched to identify the causes of land degradation in nine countries on the margins of the Sahara and Kalahari deserts. This provided the basis for the full DMP, a multi-partner programme headquartered at ICRISAT in Niamey, Niger implemented by UNEP, and funded by GEF and nine member countries. Three two-year cycles of research-for-development were planned, commencing in 2002.

The DMP was positioned at the overlap of the CCD and the CBD mandates, resting on the assumption that “desertification can be avoided or reversed by adopting technologies and practices that simultaneously strengthen biodiversity and

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<sup>7</sup>Unless otherwise indicated, the material in Sect. 2.2.1 is drawn from Koala et al. (2013).

improve farmers' livelihoods" (Koala et al. 2013: 1). Acknowledging the importance of indigenous knowledge, DMP researchers set out to "source traditional methods for regenerating land and managing it sustainably" (Op. cit. p. 3).

DMP involved a network of different funding and implementing organizations that crossed many levels and spaces. In addition to ICRISAT and UNEP, four other CGIAR centres, four international research organizations, and national agricultural research systems from each of the nine countries joined forces in this programme.

The first phase identified benchmark sites and selected key land management and livelihood diversification strategies. These included the establishment of tree nurseries and market gardens, mechanized construction of half-moon planting pits, pasture reseeding, and community-based rangeland monitoring. The second phase used the benchmark sites as hubs for demonstrating these options and training local people in their application, with a declared focus on using participatory methodologies.

Despite claiming considerable achievements—including more than 1500 ha of land under improved management in Burkina Faso, Mali, Niger and Senegal, and a part in shifting perceptions about African drylands among national policymakers—funds for the third phase of the DMP, which would have involved the scaling up of successful approaches beyond the demonstration hubs, were "deferred" after a "change in donor funding policies" (Op. cit. p. iii). This was publicly attributed to poor communication of programme outputs, and a "lack of demonstrated impact from the investments made so far" (Op. cit. p. 76)—a potential problem flagged up by a UNEP technical review of the original project proposal in 2001 (UNEP 2001). Privately, some of those involved also highlighted internal communication problems; top-heavy, bureaucratic processes of programme management; and a tokenistic approach to local people's participation.

### ***2.2.2 The Great Green Wall—Reconstructing a Tenacious Anti-Desertification Project***

Championed by former President Obasanjo of Nigeria and proposed to the African Union (AU) Assembly in July 2005, the Great Green Wall for the Sahara initiative originally aimed to arrest the southwards advance of the Sahara desert and improve livelihoods (AUC 2006). The Great Green Wall for the Sahara and the Sahel Initiative (GGWSSI) was formally launched by the AU in 2007 (FAO 2013). The rhetorical roots of the Great Green Wall lie firmly in the received wisdom on desertification. An early concept note for the initiative (AUC 2006: 2) states that "the threat of desertification is real" and that the erosion of livelihoods by the "continuous encroachment of desert areas" is "a source of grave concern".

The idea of a continuous process of forest degradation has a long history in West Africa stretching back to the colonial period, when it was popularized by foresters (e.g., Aubréville 1949; see Davis, this volume), as does the view that "some age-old

deleterious farming and cultural practices would need to be addressed with the view to changing them, while more appropriate ones are introduced or promoted where they exist” (AUC 2006: 6).

In the years following the launch, the EU and the Food and Agriculture Organization of the United Nations (FAO) developed country strategies and project portfolios, assessed capacity needs and implemented pilot projects. During this period, the narrative of the project shifted from its original emphasis on large-scale reforestation—literally, a great green wall of trees to “stop the spread of the desert”—to reflect more contemporary objectives, such as climate resilience and carbon sequestration. In 2010, eleven countries signed a convention to create the Great Green Wall Agency. The GGWSSI was re-launched in Addis Ababa in 2011 as a priority project of the Africa–EU partnership, with resources also provided by FAO and the Global Mechanism of the CCD.

The GEF became involved in 2011, with a ministerial consultation to agree on priority areas it could address with its resources. This led to the development, with the World Bank, of the Sahel and West Africa Program in Support of the Great Green Wall Initiative (SAWAP) (World Bank 2013a). This US\$1 billion portfolio of projects in 12 countries<sup>8</sup> is implemented by the New Partnership for Africa’s Development (NEPAD), through TerrAfrica, a partnership whose members include multilateral agencies, regional organizations and national governments (TerrAfrica et al. 2011). Its headline aim is to expand sustainable land and water management in targeted landscapes and climate-vulnerable areas.

By the time of the 2011 re-launch, much of the promotional and operational language of the GGWSSI had changed. Its headline aim was reported as “tackling the detrimental social, economic and environmental impact of land degradation and desertification in the Sahara and Sahel region, in particular by supporting local community efforts in sustainable management and use of natural resources” (EU 2011: 1) to achieve “a mosaic of actions contributing to a variety of sustainable rural development and natural resource management programmes” (FAO 2013: 1).

The complex institutional architecture of the initiative makes it difficult to find public accounts of the GGWSSI, and assess how successful it has been in the sustainable management and use of natural resources by local communities. A two-page information sheet on GGWSSI produced by the Africa–EU Partnership reports on a 600-ha pilot site in the north of Senegal where reforestation with gum arabic trees started in 2009, and which is being used to “educate local farmers” and supply them with “resilient seeds, technical assistance and a forum to share information with other villages” (Africa-EU partnership nd: 2). But there is little evidence as yet of tangible, local-level outcomes from the first phases of the GGWSSI.

Implementation of the SAWAP is now in progress. Many of the programme components include investment in resilient and carbon-smart natural resource

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<sup>8</sup>Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, Togo.

management—actions to address land degradation, biodiversity conservation, climate change and sustainable forest management—and are consistent with the host of national action plans to combat desertification drawn up under the UNCCD. Although there is strong emphasis on strengthening the capacity of in-country institutions, in line with the aim of supporting the implementation of the UNCCD through building effective partnerships between national and international actors, there is relatively little mention of the local institutions of farmers and pastoralists who are actually managing resources on the ground, day to day. Nor is there any sense that the most effective forms of dryland development could be achieved by recognizing and empowering local people and their institutions.

### 2.3 Looking Beyond Desertification: Other Policy Narratives for Dryland Livelihoods

While the UNCCD has succeeded in maintaining the profile of desertification on international policy agendas, its weaknesses include a failure to create policy synergy with the other Rio conventions, despite the scientific overlap between desertification, climate change and biodiversity loss (Andersson et al. 2011). Consequently, many research and development actors are looking beyond the label of ‘desertification’ in their search for effective, people-centred solutions to the problems of the drylands.

In the decades following the Rio Summit of 1992, two major growth areas in international development policy—climate change and poverty reduction—have offered new spaces and opportunities for making progress in achieving more sustainable livelihoods in the Sahel. While desertification has not been central to either issue, key ideas from climate change and poverty debates have overlapped with and cross-fertilized the work of many researchers and development practitioners in the drylands.

International policy responses to climate change have generated new buzzwords in development policy (Cornwall and Brock 2006), such as ‘adaptation’ and ‘resilience’. They have also created new modes of intervention in natural resource management, such as the Clean Development Mechanism (CDM) and the REDD+<sup>9</sup> mechanism. Based on the concept of payment for ecosystem services through carbon markets, these mechanisms were intended to open up new ways of promoting sustainable land management by putting a price on soil and forest carbon. This frames the maintenance and ‘repair’ of nature as a tradable commodity (Fairhead et al. 2012), and offers farmers and herders a crucial potential role in

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<sup>9</sup>REDD+ is an effort under the UN Framework Convention on Climate Change to provide financial incentives for developing countries to reduce CO<sub>2</sub> emissions from deforestation and forest degradation, and to conserve, manage and enhance existing forest carbon stocks. The Clean Development Mechanism provides for emission reduction projects that generate Certified Emission Reduction units which can be traded in emission trading schemes.

managing carbon stocks in vegetation and soils, and therefore climate change mitigation. Section 2.3.1 discusses an example of a REDD+ project in Kenya which demonstrates the promise of applying such approaches in the drylands.

International policy responses to poverty, crowned by the project to achieve the Millennium Development Goals (MDGs), include an increased recognition of poverty as a multidimensional phenomenon (e.g., World Bank 2000; Alkire and Foster 2009), comprising far more than lack of income, but also including social exclusion and political marginalization. Since the food price crises of 2007–2008, there has also been a radical reassessment of agriculture's importance in development, with many arguing that in sub-Saharan Africa, where the majority of poor people depend on agriculture for their livelihood, the achievement of the MDGs must hinge on agriculture-led growth (Cabral and Scoones 2007). In the rest of this section, we discuss five cases that illustrate how dryland interventions have been shaped by these broader shifts in narrative: the Kasigau project in Kenya (Sect. 2.3.1), the Ethiopian Productive Safety Net Programme (Sect. 2.3.2), changes in post-drought reforestation in Niger (Sect. 2.3.3), two decades of pastoralist water development in Chad (Sect. 2.3.4) and a devolved fund for climate change adaptation in dryland Kenya (Sect. 2.3.5).

### ***2.3.1 Carbon-Funded Development in Dryland Kenya—The Kasigau Project***

The Kasigau project, the first accredited REDD+ project in Africa to issue carbon credits, conserves a 200,000-ha dryland forest in Kenya's coastal region, which is an important wildlife corridor. In 2013, it was one of 15 REDD+ projects in Kenya, only one other of which is located in the drylands. Atela's (2013) study of the Kasigau project, on which this section is based, presents information on project actors and narratives, community and state engagement, land tenure and livelihood impacts gathered through interviews and focus group discussions with participating households, CBO leaders, project staff and government personnel.

The project is a commercial venture, developed by a private US company, Wildlife-Works, specializing in wildlife conservation and ecotourism, which generates carbon through managing a protected forest area, as well as engaging community members in activities meant to reduce pressure on the protected forest. Its activities are designed to reduce greenhouse gas emissions and sequester carbon in soils and vegetation. The project developers have implemented a carbon accounting system and used it to claim carbon payments through the REDD+ mechanism. Ranch shareholders receive some of this revenue, and some goes to fund community projects.

The Kasigau project land was initially classified as government trust land, but was reclassified in the 1970s and allocated to private ranches. Both Somali pastoralists and Taita farming communities held rights in these ranches. By the 1990s, many were dissatisfied by the lack of income-generation opportunities offered by

land ownership, and many sold their shares to immigrants, and to Wildlife-Works, which has become a major shareholder in one of the communal ranches. Other shareholders have leased their shares to the project. Prior to the REDD+ project, the ranch areas were not generating significant incomes for their owners, shareholders or neighbouring local communities, and were thus perceived to be 'valueless'. The project design argues that conserving the dryland forest for carbon increases the land's value to local people.

In contrast to most REDD+ projects in Kenya, the Kasigau project is being implemented in a dryland area where poverty levels are high and access to water and other livelihood assets is very limited. The project earned US\$180,000/year in carbon revenue for its first five years of conservation activities in the protected areas. One third of this goes into a REDD+ project trust fund, the majority of which has been spent on classroom rehabilitation, bursaries for schoolchildren, and community water projects in almost equal proportions. So although local people do not engage in the management of carbon production and accounting, which is carried out by the project, they can apply to the trust fund for local development resources.

Because of the way the project links carbon benefits to specific local vulnerabilities, such as low-value land productivity, water scarcity and illiteracy, it has been favourably perceived among the Kasigau people, appearing to reverse their long history of exclusion from resources by centralized state-based resource management regimes. The success of this project in its early stages rests partly on the unusual mixture of private and communal land tenure systems that prevails in the area. This has allowed those local people who already have formal tenure rights to become shareholders in the carbon-financed enterprise, and those without land rights to benefit from the project in other ways.

But broader changes in national land tenure systems may have an impact on this early success. Kenya established a National Land Commission (NLC) in 2012, one of a range of reforms introduced under the 2010 constitution, with the task of recommending a National Land Policy to parliament. Since its establishment, there has been an ongoing power struggle at the national level between the NLC and the Ministry of Lands. It remains to be seen exactly what the outcome of this highly politicized process will be, but there is a fear that if the new policies favour individual private ownership over communal land tenure, the livelihood opportunities that currently result from the Kasigau project may be lost.

During interviews and focus group discussions, participating households, leaders of community-based organizations, and project and government staff all identified some encouraging signs of success in the Kasigau project. But successful carbon-financed development interventions in the drylands are relatively rare, and it is important to locate them within a broader national context of climate change policy. Ochieng Odhiambo (2013) examines the intersection between climate change and dryland development narratives in Kenya, noting that while climate change debates have fed a traditional storyline which blames pastoral land use for degradation, there is also now a strong counter-narrative. The latter is drawn from many decades of research in dryland agriculture, and it articulates clearly the variability and resilience of the drylands. This latter narrative has been used to

support mobile pastoralism as the best use of marginal drylands, and “views the arid and semi-arid lands as resilient rather than vulnerable, and pastoralists as active producers equipped with traditional knowledge and experience and having in place institutions capable of harnessing the resilience of the arid and semi-arid lands for improved productivity and livelihood security even in the face of climate change” (Ochieng Odhiambo 2013: 22). This approach to the drylands has gained ground within the country’s national climate change response strategy, greatly helped by the active engagement of former Minister for Northern Kenya, Mohamed Elmi, himself from a pastoral background, in advocating this shift in approach.

Hesse et al. (2013) identify the importance of resilience as a key concept in understanding how complex socio-ecological systems react to the bio-physical challenges of climate change. Socio-economic factors—such as the operation of markets, social networks and land tenure—are crucial for building or eroding resilience to the biophysical risks of climate change. The next section discusses a similar recognition of socio-economic factors in increasing or diminishing the possibility of poverty reduction.

### ***2.3.2 Social Protection for the Drylands? Lessons from the Ethiopian Productive Safety Net Programme***

Food aid for drought relief has been an important mode of international intervention in the drylands which, while saving lives, failed to save livelihoods (Hesse et al. 2013). Recent alternatives to this approach include a range of social protection interventions, designed as an integrated set that simultaneously supports livelihoods and strengthens resilience to climate change (Béné et al. 2012). Social protection has not yet been widely applied in the Sahel. In Mali, for example, social safety nets remain very limited in scope, are heavily dependent on external financing, and are poorly targeted. A high proportion of revenue fails to reach the poorest households (Bastagli and Toulmin 2014). Nonetheless, there are lessons to be learned from elsewhere in dryland Africa, such as the experience of extending Ethiopia’s Productive Safety Net Programme from the country’s highlands to its drylands. The challenges of this process highlight the importance of understanding complex dryland livelihoods.

The Productive Safety Net Programme (PSNP), one of the largest social protection programmes in sub-Saharan Africa, was initiated by the Government of Ethiopia in 2004. With the support of a group of donor agencies, implementation began in 2005, targeting 5 million chronically food-insecure people, mostly in highland agricultural regions. The PSNP has now spread to the predominantly dryland, pastoral regions, reaching 8 million beneficiaries in about 1.5 million households (Béné et al. 2012).

Under the PSNP, chronically food-insecure households receive support for several months of the year, and for a period of up to five years, building their resilience until they are better able to cope with moderate shocks. Drought is one of



the most commonly reported household-level shocks in both highland and lowland Ethiopia (Van Domelen et al. 2010).

Targeted households receive cash and food in two ways: either unconditionally (direct support), or in exchange for contributions to labour-intensive public works that are selected through a public consultation process. A World Bank evaluation of lessons learned from the first phase of implementation notes a strong tendency to select natural resource management projects that could “reverse the severe degradation of watersheds, a major constraint on food production” (Van Domelen et al. 2010: 70). Public works activities included building soil and water conservation structures, water harvesting, sustainable farming, and rehabilitating and reclaiming marginal lands.

The first phase of the PSNP was predominantly focused on the densely populated highland agricultural zone of the country, and was designed to respond to the risks and vulnerabilities faced by people living there. Dryland people, whose livelihoods include pastoralism, face different risks and experience different vulnerabilities from farmers in highland ecosystems. Research on the expansion of the PSNP to the dryland Afar and Somali regions highlights the complexity of their livelihoods, pointing out that, “contrary to received wisdom, only a small proportion of lowland populations pursue a purely ‘pastoralist’ livelihood in the way of keeping and moving livestock across the rangeland to access fodder and water” (Sabates-Wheeler et al. 2011: 11). Livelihood strategies include a combination of pastoralism and agriculture, participation in cross-border markets, and the commercial harvest of natural resources. The opening of the pastoral lowlands, particularly for plantation agriculture and irrigation schemes, is an important recent development, posing major challenges to pastoral livelihoods.

Although from the outset the PSNP design envisaged the need for a “pastoral PSNP”, with “public works and transfer payment mechanisms tailored to the needs of pastoralists” (Van Domelen et al. 2010: 26), there is little evidence that the complexity of dryland livelihoods has been well understood. A process to design and implement a pilot programme to tailor the PSNP to pastoral livelihoods was launched in 2006, and the PSNP was extended to the Afar Region in 2006 and to the Somali Region in 2008. But the implementation manual was the same as that used in the highland regions (Sabates-Wheeler et al. 2011). This suggests a lack of understanding of the need for a different design to accommodate the constraints and complexities of a dryland existence. The programme’s instruments need to be re-designed better to respond to the problems of a fluctuating food-insecure population, and the tendency of the poorest people in dryland areas to spend much of their time in peri-urban settings.

### ***2.3.3 Farmers and Dryland Re-Greening in Niger***

Much of the new agricultural development discourse, shaped by the push and pull between different ideas and agencies, favours large-scale, irrigated farming, and



market-driven processes of agricultural modernization. But these approaches have seldom been successfully applied to the small-scale, rainfed crop farming that is at the centre of many dryland livelihood strategies. Krätli and Enson (2013) argue that a systems approach is needed, covering a wider landscape, to illuminate the larger-scale functions of livestock-farming systems at the regional level, which are key to understanding how farmers and herders have managed the efficient cycling of nutrients in the Sahel. Equally, Hesse et al. (2013) highlight the importance of learning from many success stories of dryland crop production in the Sahel to understand the factors that help maintain sustainable land management under variable market, social and climatic conditions. Two decades of positive change in land management in Niger have occurred despite such variable conditions (Boubacar, Chap. 7).

In the last 30 years of the 20th century, drought and famine resulted in livestock losses and human migration on an immense scale in Niger. High levels of soil erosion and tree mortality fuelled the story of a relentless advance of the Sahara desert. Since the mid-1990s this story has been challenged by the reforestation of more than 5 million hectares in Maradi and Zinder Regions, estimated to involve 200 million trees and to have had a positive influence on the livelihoods of 4.5 million people (Sendzimir et al. 2011).

Most regions of the Sahel have experienced increased rainfall since the late 1980s, but few have witnessed the extent of re-greening evident in the Maradi–Zinder region, or the rates of increase in tree density since the drought of 1984–85. By examining the interaction of biophysical, livelihood and governance parameters underlying these changes, the analysis shows that forest decline was reversed when certain interventions were able to change vicious cycles to virtuous ones.

International response to the intense Sahelian drought of the early 1970s led to internationally funded projects for food security and reforestation, but tree planting schemes failed to reforest any significant area. The first successful experiments in reforestation were prompted in the early 1980s by the identification of a deep root system that allowed “shrubs” to regrow into trees when pruned in a particular way. An international NGO, Serving in Mission, experimented with and formalized these insights as a set of practices now known as ‘farmer-managed natural regeneration’. They were influenced by a donor-prompted review of existing agricultural practices, undertaken after the widespread failure of post-drought reforestation interventions.

When another severe drought in 1984–85 devastated the livelihoods of hundreds of thousands of farmers, Serving in Mission offered a food-for-work programme, with labour invested in farmer-managed natural regeneration. When the rains returned, enough farmers continued to apply this approach that news of its promising results spread throughout the Maradi–Zinder region.

Growth in these methods coincided with national political changes triggered by the death of Niger’s president in 1987, which led to a decade of political vacuum. While it deprived the Maradi–Zinder region of central government resources, it also meant that forestry officers—“a quasi-paramilitary force that on occasion could perversely interpret the law so as to extract prohibitive fines” (Sendzimir et al. 2011: 6)—no longer determined tree management on farmers’ fields.

New-found opportunities for farmer autonomy were reinforced by an increasing donor emphasis on self-reliance, partly in response to the failure of earlier interventions. An International Fund for Agricultural Development (IFAD) project supported the development of oversight committees to enable local people to decide how and when to apply farmer-managed natural regeneration, aided by NGO outreach campaigns. From the late 1980s, IFAD also worked with regional offices of the agriculture and environment ministries to support the introduction of farming innovations, and also the establishment of monitoring and learning organizations.

Sendzimir et al. conclude that “systems analysis also shows why there was no single silver bullet to restore the integrity of agro-ecosystems or the communities that relied on them. A number of interventions at different scales and at different times combined to foster successful woodland regeneration.... Interventions catalysed the shift from vicious to virtuous circles, and it is this multi-layered pattern of reinforcement that has sustained re-greening.... The failure of single-issue policies becomes more understandable when one recognizes that the pattern of interactions was more important to the sustained success of re-greening than any single factor or process” (Op cit: 17).

This case serves as powerful illustration of the possibilities for change that lie beyond the boundaries of single projects, programmes and policies, but are nonetheless influenced by each. Discussing this case alongside several other well-documented accounts of resilient agro-sylvo-pastoral systems in the Sahel, Hesse et al. (2013) conclude that there are many different ways to support dryland crop and livestock farming, including strengthening customary land tenure, protecting livestock corridors, identifying and sharing innovations in crop and forage management to generate high-value residues for fodder, sharing soil and water conservation practice, and strengthening local seed networks for circulating local varieties more resilient to drought.

Nonetheless, the contrast between this agenda and current policy approaches to agriculture in the Sahel remains stark. The World Bank’s 2013 draft regional approach to the Sahel (World Bank 2013b) places the expansion of irrigation at the top of its list of priorities for the region, making no direct mention of dryland crop farming, and illustrating that considerable work remains to be done to shift the narrative in key agencies. There is no evidence of the World Bank having learned any lessons from previous dryland interventions, especially poor performance in large scale irrigation schemes. Nor is there any acknowledgement that local people, their knowledge and institutions constitute a great asset in developing more resilient livelihood systems.

### ***2.3.4 Pastoral Water Development in Chad***

In many sub-Saharan African countries, pastoralism is still portrayed in public opinion as an outdated practice rather than a major contributor to national

economies; Shanahan (2013), for example, notes that pastoralists remain invisible in the press, unless there is a story to be told about conflict between pastoralists and farmers. Yet a recent evaluation of two decades of work on pastoral water development funded by the Agence Française de Développement (AFD) in pastoral areas of Chad (Krätli et al. 2013), illuminates what can be done to overcome such persistent stereotypes.

Between 1993 and 2013, the AFD implemented a series of water sector interventions in pastoral areas of Chad, comprising 11 projects in three regions and representing two decades of uninterrupted support for the pastoral economy. The evaluation of these interventions found that, although they were not without problems, they represent an innovative approach to pastoral development, firmly based on the new understandings of pastoralism that emerged in the 1980s and 1990s. The approach has been widely praised for its support for water infrastructure, set within a political and institutional arena within which to manage conflict.

The received wisdom on pastoralism, embedded in orthodox desertification narratives, labels it as illogical, archaic, subsistence-based, with pastoralists and their hungry livestock as the major culprits in generating irreversible desertification (Herskovits 1926; Murdock 1959; FAO 1980). The first AFD projects were launched in an era when the Government of Chad was still following the colonial policy of trying to settle (and thereby control) nomadic people, and to encourage them to take up different forms of livestock rearing, especially ranching. The basic principle of the early AFD projects—which were innovative, especially in Francophone West Africa—was to recognize the importance of pastoral mobility, and find ways to safeguard it. This principle was derived from research evidence which in 1993 was still marginal and countercultural: that livestock mobility was a key strategy in the successful and sustainable exploitation of inherently unpredictable Sahelian rangelands (Behnke et al. 1993).

Applying this principle to the provision of water meant shifting from a sectoral approach—which for 40 years had restricted livestock movement by ignoring traditional water use rights—to a pastoral water development approach, which uses water as an entry point for interventions aimed at supporting pastoral mobility. The end goal of AFD's pastoral water development intervention was not water provision per se, but instead, "water provision as a means of safeguarding pastoral systems, governing pastoral spaces and achieving peace, and a strategic decision to operate on a scale that encompasses the main north–south transhumance routes" (Krätli et al. 2013: iv).

So, although the AFD projects resulted, for example, in the rehabilitation of wells, the construction of seasonal ponds, the marking of transhumance corridors and creation of new water points, they did so using methods that prioritized social consensus, and developing tools for dialogue. They also worked on the basis of free access to pastoral water, to be managed by a set of local institutions. In a region where water-related conflicts between pastoralists and farmers are not uncommon, the evaluation notes that "what is most striking is that in 20 years there have been no violent conflicts over the works funded" (Op cit: iv). This case study demonstrates the importance of investing in both physical infrastructure, and intangible

institutions which, though invisible to the eye, are critical to building effective systems for managing dryland resources.

### ***2.3.5 A Devolved Fund for Climate Change Adaptation in Kenya***

A long history of marginalization has left many dryland areas with weak institutions to plan and govern resources, ineffective services, and higher levels of poverty than other regions. Climate change will exacerbate these existing causes of inequality. A pilot project in Kenya's Isiolo County (IIED 2014) has developed and tested a model for climate change adaptation in a dryland environment which is characterized by high mobility and variability. It has established a devolved County Adaptation Fund (CAF) to finance investments in public goods, which have been prioritized by communities as critical to climate change adaptation.

Kenya's 2010 constitution grants county governments authority over social and economic development within their county, to be planned according to local priorities. This legal framework for decentralized governance has provided the opportunity to develop the Isiolo CAF.

The first phase of the process was funded by grants from the UK Department for International Development and the Catholic Organization for Relief and Development Aid, and has been supported by the Government of Kenya. Before establishing the CAF, capacity-development and institution-building initiatives were implemented, an important part of which was building a common understanding of dryland ecology, livelihoods and climate change. This was achieved through workshops for community members and government personnel on climate and ecology; community-led resilience assessments, to understand factors that strengthen or undermine capacity to address climate variability; and the production of digital resource maps for planning (Hesse 2014).

The CAF is managed by adaptation planning committees, appointed following an information campaign and public selection process. Together with government planners and local organizations, the committees conduct participatory livelihood and resilience assessments. They then use the findings to design investments that will promote climate resilient growth and adaptive livelihoods, based on agreed criteria.

In its first round, the CAF invested in: the rehabilitation, fencing and construction of dams, wells and tanks, and accompanying water governance activities; funding the operational costs of traditional range management institutions; rehabilitation of a livestock laboratory; a vaccination programme and livestock survey; and a radio station transmitter. The second round followed the pattern of the first, but also saw increased engagement with county government, legislature, and donors—with strong interest in the workings of the fund expressed by groups from dryland areas in other countries.

To date, the CAF has been run as a pilot for local level adaptation planning, with revisions to the procedure manual for the second round based on lessons from the first. But broader lessons are relevant for the successful adaptation of this bottom-up community-led approach to planning.

While bottom-up development planning initiatives like the Isiolo CAF have important technical lessons, they are also fundamentally political processes in support of devolution. As such, they need continual support from existing government institutions and local communities, and ways found to demonstrate clearly the benefits of community-led approaches. This demands leadership from a team of people from the community who understand the issues and process, and who command respect. In Isiolo, this was initially provided by government staff and local organizations, and is now increasingly being provided by local people who are members of the adaptation planning committees.

Development partners and implementing organizations need to strike the right balance between ensuring genuine control by local communities over decision making, and guaranteeing sound financial management in a context of high risk. This means good communication, transparency, and timely and regular provision of information to government and development partners.

The final aim of this process is to mainstream this kind of approach into local government, by building local ownership of the process, and seeking every opportunity to integrate leadership and accountability with local institutions.

These examples show how success can be achieved in dryland areas, when proper attention is given to local people, institutions and knowledge systems. In some cases, the introduction of new measures has been key, such as establishment of new markets, as in the dry forests of Kasigau, Kenya, and of safety nets in Ethiopia. In other cases, it has been the removal of government constraint that has unleashed energy and innovation, such as in Niger and Chad. In the case of northern Kenya, it has been the political recognition of local voices and priorities as central to decision-making and allocation of resources. The new Constitution of 2010 has been central to achieving this turn-around, which reverses many decades of neglect, and offers new space for local people to take charge of their own decision-making structures.

## **2.4 Conclusions: A New Profile for the Sahel**

A new paradigm for drylands development has been in the making for more than a decade, drawing on evidence of what works, in a range of settings. While recognizing that there is no ideal recipe for unqualified success, its key elements involve a shift in power to local people, and removing attempts at bureaucratic control. This shift in the politics of development includes marrying modern science with indigenous knowledge systems, decentralizing power and decision-making to local institutions, and recognizing local tenure rights and systems for securing access to land. Recent debate around how to support adaptation to climate change, and build

resilience to climatic shocks, has focused on the importance of community-based adaptation (e.g., Bryan and Behrman 2013). Alongside the decentralization of decision-making, there have been trials with local funding models, aiming to demonstrate that ‘good governance’ at local levels offers an alternative system for delivering funds, better tailored to local circumstances, than control and allocations made at national level.

This new paradigm has also been supported by landmark work on pastoral ecology from the early 1990s. This helped shift thinking away from classical analysis based on the concept of equilibrium towards seeing dryland grazing systems as inherently unstable, driven by fluctuations in rainfall, and with no assumption of some state of equilibrium to which they tend to return (Westoby et al. 1989; Behnke et al. 1993). Drawing on complexity theory, revisions to pastoral ecology have led to very different prescriptions for policy and project interventions. Such changes in approach need to become embedded in university courses and training programmes to ensure the next generation of professionals and government administrators are properly prepared for the reality of the systems they study and administer. A start has been made on this with a series of training materials developed, tested and implemented in West and East Africa, which have been adapted into a 2–3 week course on pastoralism that is being taught at undergraduate and postgraduate level at the universities of Jijiga, Bule Hora and Samara in Ethiopia (C. Hesse, pers. comm.).

Looking back over 35 years of engagement in drylands research and development, there has been a constant tug-of-war between those who advocate a rooted decentralized approach, drawing on local knowledge and perspectives, and those who assert their power and expertise through planning large-scale schemes and mobilizing big investments. At times, the bottom-up paradigm seems to be in the ascendant, with vocal champions in key positions able to argue the case. At other times, the top-down planners seize back the initiative, using a crisis narrative—such as the urgency of addressing climate change—to retake the initiative and regain control of budgets. In the most recent bout of wrestling, the World Bank and EU have put more than US\$8 billion on the table for major investments in irrigated agriculture and livestock development in the Sahel, to address both security and climate change concerns (World Bank 2013c). Plans are to develop ‘growth poles’ which will offer prospects for economic development and jobs for people who might otherwise be tempted to take up arms. The big official funding agencies have been joined in this modernization agenda by a range of new actors, such as agribusinesses seeking land, and investors in large-scale infrastructure, such as dams. These new actors are much less ready to listen to hard-won evidence for local approaches working best. They want to establish control, make big investments, and see results.

Reversing this imbalance in knowledge, political power and funding is thus an ongoing political battle. Scientists whose work challenges the equilibrium models held so dear by proponents of ranching and sedentarization continue to engage in policy debates to shift attitudes. NGOs and researchers help demonstrate the rationale for indigenous knowledge and land use practice by learning from, communicating the experiences of, and advocating on behalf of farmers and pastoralists.

But the power of interests often pushes in favour of large scale investments, regardless of suitability, and heavy-handed management by government when local people are much better placed to make sound decisions about land and water use.

In some cases, central government has found it increasingly difficult to maintain its administrative hold on distant dryland regions, and consequently has relinquished effective bureaucratic control. This welcome reversal of centralized power was at the root of the re-greening of the Sahel in the 1980s, when the government of Niger ceded control to local communities in part due to limited resources, and in part through a formal process of establishing decentralized government (Boubacar, Chap. 7). Elsewhere, a shift in the politics and power can help dryland regions and their populations achieve greater voice, as has been the case in Kenya. Following the 2003 elections, in which the ruling party lost power for the first time since independence, a new Ministry for the Development of Northern Kenya was established, and drylands development was made an integral part of Kenya's medium-term development plan 'Vision 2030' (Government of the Republic of Kenya 2007). A new constitution was adopted in 2010, which pledged greater powers to decentralized local government, and two years later was launched the national policy for the sustainable development of northern Kenya and other arid lands, bringing to an end their historic marginalization.

But offering clear evidence of the benefits of more participatory approaches and the use of indigenous knowledge and practice is not the only factor at work in shaping the balance of power in dryland regions. There is an innate political and bureaucratic urge to master and control. Governments are usually keen to maintain or re-establish an administrative or military presence, especially in border lands, and there are growing interests keen to push big schemes that can mobilize large-scale resources, especially for irrigation.

Setting dryland regions within the broader global picture, there is growing recognition that we must re-design our economic system if we are to live within the resources of our single planet. Agreement in 2015 of a set of Sustainable Development Goals is the clearest global manifestation of this at present, alongside the goal of agreeing a set of targets to limit greenhouse gas emissions, and thereby keep projected climate change within what is hoped will be non-catastrophic levels. While we might seek to master nature, there are limits we must understand and respect if we are to maintain a prosperous society for all. For generations, local communities in the drylands have known the importance of living within their means, but it is only gradually that their expertise has been called upon by those designing policy and practice.

The picture of dryland futures has become further complicated in the last decade by a crisscrossing of new opportunities and growing conflicts. In sub-Saharan Africa, groundwater reserves appear much larger than had been thought (MacDonald et al. 2012), offering new possibilities for livestock and cropping. Solar energy has transformed options for millions of people 'off-grid', and could generate large-scale supplies if challenges in technology and transmission can be resolved. The search for oil, gas and other minerals has increased interest and investment in formerly neglected regions. Mobile phones have been a tremendous

boon in linking formerly marginal areas into mainstream communication, markets and information sources. Under favourable circumstances, urbanization and market development provide an extension of livelihood options for rich and poor alike. But at the same time, growing conflict and occupation of large desert spaces by militant groups—in Libya, Mali, Niger, northern Nigeria, northeast Kenya and Somalia—are driving a stronger security interest in managing these large arid areas. A strong military presence now blocks the transit of goods, movement of herds and management of water and grazing in several former pastoral zones, and herders themselves have become caught in the crossfire.

UNCCD (2014b) makes an explicit link between land degradation, poverty, migration and conflict. It argues that land degradation, if unchecked, will bring further extremism, radicalization and resource-driven crises, as people seek ways to assure their survival. In its latest strategy, UNCCD states that “our failure to act is bringing issues that were once imagined to be domestic problems into matters of global instability” (UNCCD 2014b: 4). Decentralized management of land and resources, which recognizes the role of Sahelian farmers and herders in decisions that shape their livelihoods, is being squeezed out in favour of top-down security concerns. While climate change is adding greater uncertainty to rainfall and temperature patterns, and setting new parameters within which people must organize their lives. Let us try to learn from evidence and experience, and put dryland people, their knowledge, institutions and priorities at the centre of plans for these variable and uncertain regions.

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