



Managing the Boom and Bust

Supporting Climate Resilient Livelihoods in the Sahel

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- Building capacity to act on the implications of changing ecology and economics for equitable and climate resilient development in the drylands

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For decades the Sahel has been presented as suffering from irreversible degradation, leading to desert advancement and the impoverishment of the population. This issue paper develops an alternative profile and identifies the considerable potential of the Sahel's dryland ecosystems. It explores the inherent resilience within existing crop and livestock production systems based on exploiting climatic variability; systems which local people in the Sahel have used to establish successful local and national economies. This new profile can help re-define development interventions and promote a more climate resilient future.

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Summary

Resilience has emerged as a key concept for understanding the ways that complex socio-ecological systems react to a range of trends, cycles and shocks. Climate resilience describes an ability to withstand the challenges of climate change – challenges that include rainfall failure, increased temperatures and greater variability. The converse of resilience is vulnerability. In the Sahel it is increasingly evident that it is the interplay between the bio-physical challenges and a broad range of socio-economic factors that underlies social vulnerability. Increasingly relevant are the operation of markets, social networks and political institutions – all interacting individually and together in ways that can increase or diminish the impact of particular risks.

In common with other drylands the Sahel is frequently portrayed as a low potential, often degraded and fragile territory. Yet the evidence for this is inconclusive on both the ecological and socio-economic front. Research now shows that it is essential to observe drylands over much longer timeframes, and that climatic variability including drought is the norm. New understanding also demonstrates that variable climate makes dryland ecosystems spatially and biologically heterogeneous, and through this heterogeneity they are more resilient, not fragile.

Dryland production systems have evolved in ways that manage the inherent risks of operating in environments where climatic variability is the norm. Strategies involve diversification of assets and activities, together with significant investments by local people in social and institutional capital. For both pastoralists and dryland farmers, strategies are often pursued over a very wide area, spanning different ecosystems and across national frontiers. Thriving markets across the Sahel illustrate that climate variability is not a constraint to food production if managed well: it is an opportunity, made possible through mobility and combining different livelihood spaces.

Livestock mobility is essential for accessing the best grazing (i.e. high nutritious value), water and markets, and for coping with drought conditions. In the Sahel the strategic importance of livestock mobility at regional level is now recognised by national and international regulations facilitating livestock mobility within and between nation states. But further work is needed to re-open traditional transhumance routes, demarcate new

ones, reduce risks of crop damage, and offer an arena for conflict resolution. Successful production requires the strengthening of livestock mobility through initiatives that work at the appropriate scale and remain flexible.

For dryland farming the strategies to cope with highly variable rainfall conditions are seed diversity, farming different soils in different locations, rainwater harvesting, improving soil fertility, combining trees and crops, livelihood diversification and maintaining strong social networks. Technological innovation and increasing access to local and national markets are encouraging farmers to intensify dryland production techniques using both local and external knowledge. Crop-livestock links are also crucial in securing resilience within both production systems.

Undermining the functionality of pastoralism and dryland farming are a number of factors that could be addressed through more targeted development interventions. Across the Sahel rising land values are eroding customary tenure norms. Despite legislation asserting rights of livestock mobility there is often a gap between law and practice. Common grazing and woodland are particularly vulnerable to large-scale land acquisitions, and currently only lightly protected by administrative provisions. Developing accessible, effective mechanisms for securing rights and tenure is central to long term production and resilience. Protection of these rights is of especial importance to women for whom the commons represent a vital household resource.

Much of the difficulty faced by farmers and livestock keepers in the Sahel stems more from poor governance than the biophysical challenges. The inability of the state to protect key resources from poorly planned development interventions has been critical. Decentralised local government has the potential to break the mould and bring natural resource management back to local level control. But so far decentralisation has not fulfilled its promise, in large part because financial autonomy has not followed discretionary authority. The failure of the state to deliver on basic service provision also represents a major challenge for productive communities. A concerted effort towards more appropriate delivery of core health and education services is now needed to shift Sahelian countries from the bottom of global league tables.

Despite their low Human Development Index levels, most Sahelian countries have seen considerable growth and diversification in farm production and incomes, particularly associated with favourable market conditions around towns and cities. Small towns play an important role in the livelihoods of rural people, as markets and as part of a wider strategy for income diversification. A pro-active policy of building stronger local economies needs investment in communications so future urban growth stays away from capital cities.

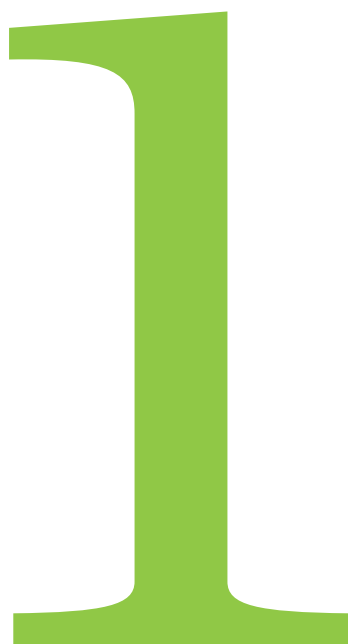
It is increasingly clear that vulnerability to drought and climate change is largely a product of unequal access to public resources, and the chronic imbalance in power and resources found across the drylands due to their political marginalisation. Likewise it is now recognised that the provision of food aid during droughts, while saving lives in the short term, does little to save livelihoods. Social protection schemes can help build resilience when they are better targeted, allow greater control by recipient communities, and are both climate-smart and flexible. Market-based approaches to protecting assets in times of drought also offer considerable promise and suggest private enterprise and vulnerable communities can target cash injections much more effectively than governments and donors.

Support for climate resilient livelihoods in the Sahel needs to consider and address the following:

- Explicitly recognise variability, instability and unpredictability as inherent features of the environment.
- Strengthen existing production systems that respond to variability by supporting livestock mobility at scale and scaling up sustainable land management practices within dryland farming.
- Build resilience through improved development policy and practice by: securing land rights and tenure security; strengthening local governance through decentralisation; the pro-active development of small towns; providing appropriate and accessible basic services; refocusing social protection schemes; and embracing market based approaches for asset protection.

The significance of climatic variability

The climatic variability of the Sahel is its most dynamic and positive element. The dryland ecosystem responds to scattered and unpredictable rainfall, and creates areas of abundance that are both highly valuable and resilient.



The Sahel means 'shoreline' in Arabic and describes the southern margins of the great Saharan desert. Spreading the width of Africa, it combines characteristics of both the ocean of sand to the north and higher rainfall lands to the south.

In agro-ecological terms, the Sahel is usually taken as that area receiving between 200–800mm of mean annual rainfall, and includes much of the national territory of Chad, Burkina Faso, Mali, Mauritania, Niger, Senegal and The Gambia.¹ The Sahel region has always been highly integrated into the wider West and North Africa region, with long-established patterns of migration south to better watered coastal countries, and northwards to the oases of the Sahara and onto the Maghreb coast. Remittances from migrants represent a significant share of household incomes in many Sahelian settlements.

Policy limitations

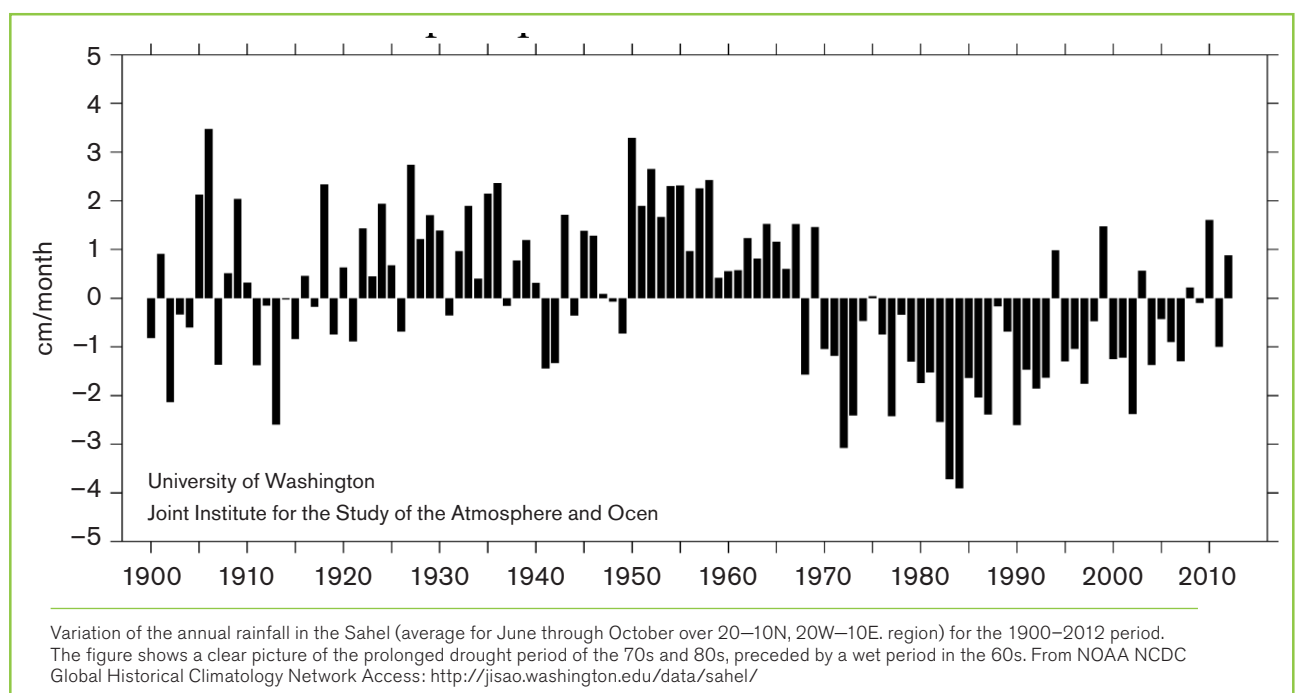
In the southern Sahel much of the agricultural production system is agro-sylvo-pastoral: involving a mix of millets, cowpea, and sesame cultivation, along with tree management, livestock keeping, and occasional fishing and hunting. In the northern Sahel livestock production is predominant, relying on extensive movement of herds over long distances. Millions of pastoralists and agro-pastoralists live across the Sahel as a whole.² Investments in agricultural development however have generally been both small and inappropriate, with national policies consistently focusing on cash crops for export (cotton) and large-scale mechanised production (sugarcane, rice in the Niger and Senegal river valleys).

Like many places in the drylands, food security and development policies in the Sahel are frequently based upon a presumed limitation of the natural resource base – a limitation that emphasises scarcity, variability and degradation due to variable rainfall and frequent drought. Such policies justify interventions to 'stabilise' these conditions, often through costly and unsustainable investments in imported technology and infrastructure. The agricultural system that results is both centralised and top-down, and frequently leads to the loss of productive land for family farming. It is now becoming increasingly clear that defining drylands in terms of scarcity and degradation is not only wrong, but that such policies undermine existing resilience strategies and fail to capitalise on the economic potential of drylands.

Drylands as disequilibrium environments

The last 20 years have seen a radical improvement in our understanding of the dynamic nature of drylands, providing us with far greater insight into dryland production systems. Seminal work has demonstrated that drylands are better understood as disequilibrium environments, where climatic variability – characterised by rainfall that is highly scattered and unpredictable over time and space, and droughts that are unpredictable but periodic and expected – are the norm rather than the exception.³ We now know that in drylands the lower the rainfall, the greater the annual deviation from the long-term mean, and therefore the greater the fluctuations in primary production (e.g. pastures). We also now know that inter-annual variability in rainfall needs to be

Figure 1. Sahel precipitation anomalies 1900–2012



understood across longer timescales: for example, over the past 100 years the Sahel has experienced cycles of wetter and drier periods, with the last 20 years showing a return to wetter conditions but with greater spatial and temporal variability – possibly due to climate change (see Figures 1 and 2). This variability and drought needs to be recognised as inherent features of the Sahelian environment, and not as external “shocks” or perturbations to what are otherwise constant conditions. This understanding now also needs to be fully incorporated into development policy.

Ecological instability and resilience

The climatic variability of the drylands, now identified as both dynamic and normal, is the characteristic that Sahelian production systems are built upon. In the Sahel, plant growth (the basis of agro-sylvo-pastoral production) is driven by the amount and distribution (spatially and temporally) of annual rainfall. The seeds of different plant species react differently to different rainfall conditions: for example grasses may be annual or perennial, and millet may be short or long-cycle. Soil type, soil fertility and topography all interact with this plant diversity and the variable moisture conditions, further influencing plant germination and growth to maturity the production of the next generation of seeds, as well as pasture quality. In drier years short-cycle annual grasses will dominate pastures, but once rainfall conditions improve the perennials will return. Likewise, formerly ‘bare’ areas, often perceived as degraded, re-generate under improved rainfall conditions with dormant seeds germinating in response to greater humidity. It is this capacity of the dryland ecosystem to adjust to changing conditions whilst maintaining its functional integrity that classifies it in ecological terms as unstable but resilient.⁴

Inherent adaptability

Pastoral and agro-pastoral production systems have always operated within the variable climatic conditions in the Sahel, based on an inherent understanding of the environmental risks – e.g. it may or may not rain in the right place, at the right time in the right amount. This is normal and production under these conditions is managed through a range of different strategies. For dryland farmers risk management strategies include planting different varieties of millet with different maturation times or different crops on different soils. Pastoralists will raise different species of livestock or split herds to graze in different areas. In understanding why vulnerability arises it is important to distinguish between risks of this nature that are inherent to, and managed by, the system, and the induced vulnerability that is a result of external factors undermining the ability of the system to function properly⁵.

BOX 1: HARNESSING ENVIRONMENTAL VARIABILITY FOR FOOD PRODUCTION

Patchy rainfall in the drylands means that pastures become available in unpredictable and ephemeral concentrations across the rangelands. As nutrients accumulate as the plant grows until they are eventually used by the plant itself to complete its cycle, so the nutritional ‘profile’ of the rangelands rises and falls further differentiated by plant species, soil type and topography. For livestock production systems the difference between abundance and scarcity in diets means selectively using pasture when its nutrient content is at its peak. Pastoralists use mobility to enable targeted and timely access to these nutrient peaks, tracking the random concentration of nutrients in space and time. Mobility is therefore not only a way of coping with a difficult environment, but more importantly is a strategy to harness environmental instability in the drylands for food production. In this way, when free to operate according to its logic, pastoralism can turn the unpredictable variability of dryland environments into an asset, something that globalised agricultural systems find so problematic.

Source: Based on Krätli, S., Hülsebusch, C. Brooks, S & Kaufmann, B 2013a. Pastoralism: A critical asset for food security under global climate change. *Animal Frontiers* 2 (5): 42–50.

But dryland production strategies do not only minimize the hazards of drought, they are also designed to maximise production under conditions of variability⁶. Every year in the Sahel there will be localised pockets of pasture ‘failure’ due to the scattered nature of rainfall in time and space. Pastoral production strategies – including livestock mobility, the maintenance of common property tenure regimes, and negotiated access to resources (see details in ‘Production systems responding to variability’) – lessen the impact of these normal, localised failures by enabling animals to move to other ‘successful’ areas where rain has fallen and pastures have grown. Seen in this way, mobility can be understood as not just a response to pasture shortage but as a response to abundance. Through their mobility pastoralists are able to track nutrients within pasture across the ever-changing diversity of dryland ecology – turning the unpredictable variability of the rangelands into a valuable resource for food production (see Box 1)

Degradation narratives and contradictions

Much development policy routinely portrays small-scale farmers, and particularly pastoralists, as being responsible for land degradation. The common narrative

is broadly: the highly variable, unpredictable and scattered rainfall in dryland areas leads to scarce, fragile and poor quality resources that limit productivity; this compels local communities to over-farm or to over-graze their land, thereby exacerbating scarcity and degradation, further reducing productivity, and inducing desertification.

Although land degradation in the drylands is of widespread concern, explanations on its causes are increasingly contentious and remain unresolved, and the common narrative fails to recognise the logic of dryland production systems. In recent years there has been widespread criticism of the manner in which much of the research to assess the extent and trajectory of land degradation has been implemented. Recent work analysing land use change over several decades, and at the regional scale of the Sahel, confirms the need for more long-term observations.⁷

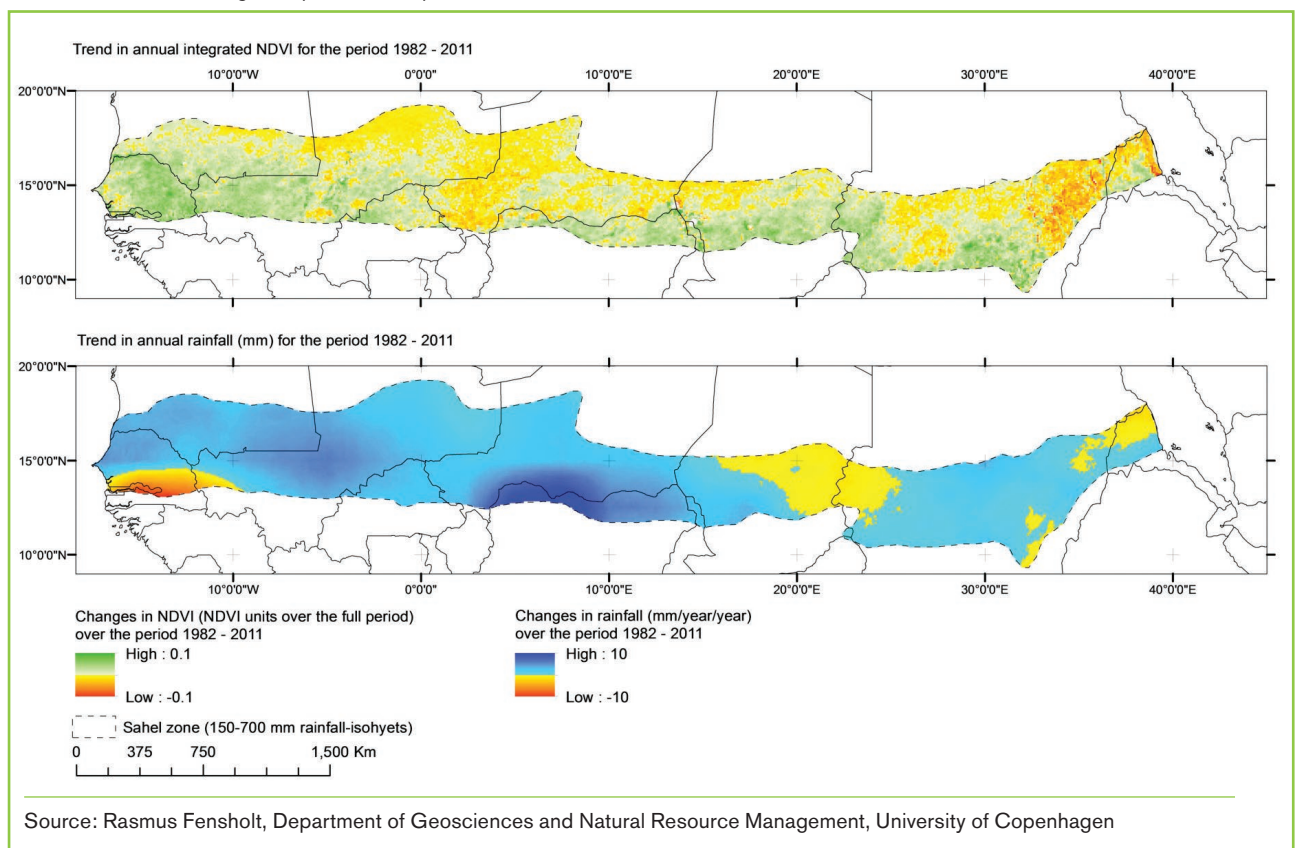
The use of data sets produced on the basis of satellite images from the NOAA AVHRR satellite/sensor system, covering the period 1982 to 2011, allowed analysis of longer-term trends in vegetation productivity. These studies demonstrate that, in fact, vegetation productivity has increased in the Sahel-Sudan zone over 1982–2011 (see Figure 2) contradicting results from many localised case studies. The result confirms the evidence of

the recent 're-greening of the Sahel'. The common belief that the drylands are more prone to degradation due to their "dryness" has also been disproved, with no evidence suggesting a correlation between land degradation and aridity.

Recognising the boom and bust

The failure of conventional approaches to agricultural development, particularly in the drylands – locked into the "command-and-control" of food production⁸ and seeking to remedy environment instability often at great costs and with limited success – means that radical new thinking is needed. In the Sahel, food security and development policies need to explicitly recognise variability, instability and unpredictability as inherent features of the environment; features that need to be harnessed in a positive manner not anomalies to be "corrected." Development approaches need to capitalise on the knowledge, experience and ingenuity of people whose production strategies either exploit the heterogeneity and variability of their environments to maximise production, or adapt to it during periods of stress to minimise loss. New approaches are needed that strengthen our understanding of the dynamics and inter-linkages between complex socio-economic and biophysical drivers of land-cover change.

Figure 2. Trends in the 'integrated Normalized Difference Vegetation Index' (iNDVI), which is an indicator of 'net primary productivity' (NPP) and annual rainfall, The figure represents the period 1982–2011.



Production systems responding to variability

Dryland communities exploit the inherent climatic variability of the Sahel to maximise livestock, food and cash crop production; using livelihood strategies that are wide ranging, diverse as well as integrated. Rising pressures on farm and grazing land are undermining their ingenuity and resilience rather than the biophysical challenges.



With the historical focus of agricultural policy seeking to 'remedy' environmental instability, relatively little attention has been paid by Sahelian governments and donors to supporting existing production systems – many of which successfully operate under conditions of variability and unpredictability. In recent years a number of policies have now recognised the importance of livestock mobility.

In the Sahel, food and cash crops under family-based production systems are combined with livestock, trees, and in some areas, fish, to form the backbone of local livelihoods and the wider rural and urban economy. Successful agricultural intensification in northern Nigeria, southern Niger, central Burkina Faso and parts of Senegal can provide valuable lessons. Here, communities living in the 'boom and bust' context of the Sahel have always been part of more diversified economies – linked into larger commercial and social systems – and this is how they survive and prosper. Similarly, successful mobile livestock production not only supports the livelihoods of millions of rural producers, but also provides incomes for a growing urban population and generates a huge international trade fuelled by escalating demand for meat and dairy products.

The success of such strategies in managing multiple stresses and opportunities is determined more by macro-economic than local factors, and the challenge is to improve these linkages for both parties – larger society and local dryland communities.⁹ Thus for climate resilient development in the Sahel it is important to understand the production strategies being pursued by households in order to identify the factors that strengthen their resilience, and also address those that undermine their functionality.

Livestock production

Mobility for maximising production and managing risk

The importance of livestock to rural and urban livelihoods, and the wider national and regional economy of the Sahel, is highly significant. In Niger, livestock are the second highest export earner (see Box 2).¹⁰ A 250 per cent growth in demand for livestock products is anticipated for the Sahel and West Africa region by 2025, due largely to a growing urban population particularly in the coastal countries.¹¹ For individual households livestock provide a form of savings, insurance and currency for building social capital and higher nutritional diets. In the Sahel these values are largely generated through mobile livestock management systems, in various forms, with mobility being the key strategy that responds to climate and resource variability.

BOX 2: THE ECONOMIC IMPORTANCE OF LIVESTOCK IN THE SAHEL

In Burkina Faso, 70% of the cattle population are herded by transhumant Fulani.

In Mali, exported live animals were worth USD44.6 million in 2006.

In Niger, the livestock sector is the 2nd source of export revenue after uranium, with pastoralists and agro-pastoralists providing 81% of the production. Mobile livestock production is 25% higher than sedentary production in the same area.

In Chad, pastoral livestock make up 80% of ruminant, 18% of GDP, 53% of agricultural GDP and 30% exports.

Sources: IIED & SOS Sahel, 2009. Modern and Mobile: the future of livestock production in Africa's drylands. IIED, London.
République du Niger, 2011. Initiative '3N' pour la sécurité alimentaire et le développement agricole durable 'les Nigériens nourrissent les Nigériens' Rass, N. 2006 Policies and strategies to address the vulnerabilities of pastoralists in sub-Saharan Africa. PPLPI Working Paper 37. Pro-poor Livestock Policy Initiative, FAO, Rome. De Verdière, C.P. 1995. Les conséquences de la sédentarisation de l'élevage au Sahel. Etude compare de trois systèmes agro-pastoraux dans la région de Filangé, Niger. Thèse présentée pour obtention du titre de Docteur de l'Institut national Agronomique, Paris-Grignon.
Saleh, O.M. 2011. L'élevage transhumant au Tchad: contraintes et actions en cours pour la sécurisation des systèmes pastoraux. In : Alfaroukh, I.O., Avella, N. and Grimaud, P. (eds) Actes du colloque national : la politique sectorielle du pastoralisme au Tchad. Quelles orientations ? 1-3 mars 2011, République du Tchad, Ministère de l'Élevage et des ressources Animales, D'Djamena, Tchad.

Livestock mobility maximises productivity under conditions of variable pasture production and variable nutritional quality (as shown in Box 1). In the Sahel this translates into livestock keepers accessing northerly pastures that are richer in nutrients during the rainy season, and then progressively moving south as the rainy season draws to an end. Mobile livestock arrive, ideally, in farming areas just after the harvest to benefit from crop residues and other grazing. Depending on the type of mobile livestock system, these movements will span hundreds, and in many cases 1,000 to 2,000 kilometres a year.

Underpinning these mobility strategies is a system of reciprocal grazing rights and common property tenure regimes designed to allow negotiated access to areas of nutritious pasture and water points. The spatial and temporal variability in pasture availability and quality means that private land ownership, or enclosing of the rangeland, cannot work as a production strategy. To ensure resilience over the long term other production strategies will also include keeping a variety of species – camels, cattle, goats – whose different feeding habits respond to the diversity of plant species in the drylands. Herd splitting – in which some of the herd

are sent to extended kin as part of a reciprocal social relations strategy – is also a crucial resilience strategy for accessing grazing distributed across the vast landscapes of the Sahel.

To address food security needs in the short term, as well as the viability of the livestock herd in the medium term, households need to sell their livestock. Mobility is also the relevant strategy here as a critical component for food security resilience is obtaining good terms of trade between livestock and other foodstuffs – particularly cereals. Obtaining the best prices requires mobility. Mobile camel herding Mohamid Arabs based in eastern Niger for example will sell their livestock to Libyan and Algerian traders in the north of Niger (where they get higher prices), and then travel several hundred kilometres south into Nigeria to purchase millet and sorghum at prices that are well below the market price in Niger.¹²

Mobility is thus the primary resilience strategy for livestock production in the Sahel, and during periods of drought mobility becomes absolutely essential to avoid system collapse. Unable to save all the herd, pastoralists will focus on saving a core stock of breeding animals from which to reconstitute the herd after the drought, and will move them quickly, and often over large distances across national borders, to find alternative grazing. Detailed research by Thébaud, in eastern Niger, following the 1984 drought, contrasted the herd structures of 350 Fulani families and found that those that had moved with their core herd to Nigeria, and even Cameroon, had not only much larger herd sizes by 1987, but also had more viable herd structures than

families who had not managed to move long distances. The more highly mobile WoDaaBe had on average 44 cattle per family two years after the drought compared to only between 2 and 7 cattle per family for less mobile groups.¹³

Securing pastoral mobility for resilience

The strategic importance of mobility in livestock production is now recognised by the African Union in its Policy Framework for Pastoralism in Africa,¹⁴ and mobility is now legally protected in most Sahelian countries. The ECOWAS International Transhumance Certificate facilitates cross-border livestock mobility between its 15 member states; and Mali, Mauritania and Niger, and to a lesser extent Burkina Faso, have all passed specific pastoral laws that recognise and support pastoral mobility within and between countries. Though imperfect, policy and legislation are not now the major constraints to mobility in the Sahel – it is their implementation – with much work needing to be done to identify and re-establish effective routes for livestock passage. With rising pressure on farm and grazing land throughout much of the region, customary tenure regimes (see 'Building resilience as part of policy and practice') are being severely eroded by those able to persuade the state to allocate land for other uses, fragmenting rangeland and curtailing mobility.

A growing body of experience now exists in the Sahel on how to secure the strategic movement of livestock between the highly nutritional rainy season pastures in the northern Sahel, with dry season grazing (including crop residues) in the southern farming



Wodaabe pastoralist leading Bororo cattle to water, Niger

Source: Steve Anderson

BOX 3 SUPPORTING LIVESTOCK MOBILITY IN CHAD AND NIGER

The Agence Française de Développement (AFD), in its support to pastoralism in Chad and Niger, used pastoral water development not as an objective in itself but as an 'entry point', and a means to secure livestock mobility in a manner that: improved the productivity of both livestock and rainfed crop-farming (economic objective); avoided rangeland degradation (ecological objective); and enhanced dialogue and understanding between different pastoral and farming communities (social objective).

This approach represents a radical departure from previous pastoral development programmes in the Sahel that focused just on addressing one component of the system (e.g. veterinary health, water, range management) without sufficient attention to considering how by "improving" one component (e.g. providing more permanent water, better veterinary care) it would impact on the other components.

Source: Krätli, S., Monimart, M., Jallo, B., Swift, J. & Hesse, C. 2013b. Evaluation et capitalisation de 20 ans d'interventions du Groupe AFD portant sur le secteur de l'Hydraulique pastorale au Tchad. Rapport Final, IIED, Mai 2013

belt.¹⁵ Interventions involve: re-opening traditional transhumance routes and demarcating new ones; developing either permanent or temporary water (deep wells or water pans) along the migratory routes and in grazing areas; and the strengthening of customary institutions (or creating new hybrid ones) for the management of water, livestock corridors, and for mediating conflict. Important elements within all of the interventions are the need to work at the appropriate scale and the need to incorporate flexibility.

Working at scale – Initiatives for livestock mobility must incorporate the full geographical area within which pastoralism is undertaken, and plan for and protect the whole system. In the Sahel this will require

a cross-border approach involving the leaders of all transhumant groups, customary leaders from both pastoral and farming communities, and the different levels of local government authority. Consultations will need to start at village government or commune level, and will progressively involve the district, the region, and neighbouring countries.

Incorporating flexibility – Livestock mobility is a response to changing climatic circumstances, and initiatives need to be equally agile. For example, infrastructure in support of pastoral mobility – such as transhumance corridors – should not be marked with concrete beacons where routes will change course from one year to the next according to variable



First green grass, Eastern Niger, June 2005

Source: Marie Monimart

local climatic and social conditions. Other pastoral resources that enable livestock mobility (watering and resting points) also need to be formalised without being overly prescriptive and rigid. The availability of water is crucial for accessing distant pastures, and the careful management of water points through the use of customary principles can help ensure a balance between livestock numbers and pasture availability.

Dryland Farming

Diversity for maximising production and managing risk

Despite the low levels and high variability of rainfall in the Sahel, various forms of agriculture are practised even in regions with very little access to water. Even at an average of 300 mm of rainfall a year, dryland farmers can manage to get a millet harvest on sandy soils if

the amount and timing of the rain is distributed right. Most farmers spread the risks by sowing both long and short cycle millet varieties, and using animal manure to speed up growth of the latter within the short growing season. To enhance their resilience farmers diversify into a range of off-farm incomes. The production of dryland crops (millets, sorghum, sesame, cowpea) will frequently be combined with rearing cattle, sheep and goats; alongside a range of other activities such as woodcutting, crafts, trading, weaving and other off-farm activities.

Dryland farming systems are often integrated with rainwater harvesting, with the rainfall runoff from hardpan surfaces captured into planting pits where seed and compost are concentrated. In this way, even in low rainfall areas, high levels of water and moisture availability can be achieved around the growing plant (see Box 4). Small-scale irrigation has also been developed in many places, with water tapped through

BOX 4 : EXAMPLES OF SUSTAINABLE LAND MANAGEMENT PRACTICES FOR RESILIENCE IN DRYLAND CROP FARMING

A number of case studies from relatively densely populated areas in the Sahel reveal that sustainable land management is achievable through the employment of a number of relatively simple management practices. Although not necessarily cheap in terms of labour and cash, their use becomes technically feasible or economically desirable depending on the area, household and season in question.

Farm tree management Planting or assisted natural regeneration of selected woody plant species valued for the goods and services they provide, i.e. food and income, fodder, firewood, soil fertility, wind erosion control, etc. Assisted regeneration seems to be a more common practice than replanting, although high incidence of the latter has been observed in some areas. A study from northern Nigeria revealed that only a minority of landholders did not plant trees and those who did planted between 1 and 20 per year. Two-thirds of landholders provided protection for seedlings that regenerate spontaneously, most commonly from livestock. Farm tree management also involves pruning and lopping for multiple purposes: to harvest fuel or fodder, improve fruit yield, reduce shade on crops, prevent seed eating birds from roosting, provide cuttings for wind, and for water erosion control on fields.

Control of wind and water erosion Stone bunds, improved gully control, planted field boundaries, coverage of soils with branches and crop residues (reduces wind and water erosion, and 'traps' sand and dust in dry seasons and surface water in wet seasons), planting spreading intercrops (cowpea, groundnuts), and maintaining adequate densities of mature farm trees.

Soil moisture control Improved planting pits (*zai*), field ridging (by hand-hoeing or ox-ploughing), stone bunds, increased cultivation of flat and lower lands, turning the soil before onset of rains (rather than after first rains), and more frequent weeding (reduces competition for water between weeds and crops).

Soil fertility management Intensified use of animal manure (collection from rangelands and in animal pens for distribution on fields), improved management of animal manure (dry compost, manure pits, stall feeding), intensified use of green manure, crop rotation and use of nitrogen-fixing intercrops (cowpea, groundnuts), protecting or planting leguminous trees, 'trapping' dust in dry season, and in a few cases, chemical fertilizers. The availability of animal manure has increased through increasing livestock numbers, especially of small ruminants, and especially after the devaluation of the CFA in 1994, and the closer integration of livestock with cropping (manure and fodder linkages).

Sources: Bolwig, S., Rasmussen, K., Hesse, C., Hilhorst, T. & Hansen, M.K. (2011) New perspectives on natural resource management in the Sahel, SEREIN Occasional Paper 17, Sahel-Sudan Environmental Research Initiative, Denmark.

Cline-Cole, R. (1998) Knowledge claims and landscape: Alternative view of the fuelwood-degradation nexus in northern Nigeria. *Environment and Planning D Society and Space*, 16, 311–346.



Sorghum thriving under the canopy of a *Faidherbia albida* tree: this traditional parkland system in Burkina Faso protects the environment while sustaining food production

Source: William Critchley

pumps or through construction of small dams. Along the river Niger there are thousands of small, irrigated plots for vegetable gardens and fruit orchards. Where the resources exist and the price is right, farmers are remarkably ingenious in making maximum use of a water source, even transporting soil to create onion gardens on bare rock – as found on the Dogon plateau.¹⁶

In the Sahel trees are a vital part of these dryland farming systems, providing shade, fruits, fodder, fibre, fuel, as well as products for tanning, making furniture, and charcoal. Fishing is another significant source of income, and food, for millions of households across the Sahel. The Inner Niger Delta is of particular importance as a source of fishing, alongside herding and farming. Home to 35,000 fish-dependent families, the annual production can be more than 100,000 tons in a good year.¹⁷

Livelihood diversification in dryland farming systems is crucial for building a more resilient pattern of income. In a study of two villages in central and southern Mali, households and individuals were involved in diversification away from farming that involved both shifts in space and activity. Strategies included: migration to Cote d'Ivoire to work on plantations, investment in urban property, farm work elsewhere, establishing orchards, collection of bush produce, firewood collection and sale, and trade. The options will differ according to location and the person or household involved, and women will have a different range of options than men, as will richer people versus those with fewer resources.

Securing resilience in dryland crop farming

Following the droughts of 1973–4 and the mid-1980s, it was widely asserted that the West African Sahel was suffering such degradation that it would soon no longer be able to support a settled population, and plans were made to engineer the transfer of millions of people into the better-watered regions of coastal West Africa. It is now suggested that it was the over extension of intensive agriculture northwards, and the consequent marginalisation of pastoralism, during what we now know was a period of better rainfall, that was in large part to blame for the famines that resulted when the rainfall pattern changed.¹⁸

Recent and careful research into local knowledge and farming practice has uncovered many existing and new methods for sustaining livelihoods in the Sahel. In the last ten years there has been a major transformation of vegetative cover, based on a process of natural regeneration of trees and shrubs, known as the “re-greening of the Sahel.” As of now, in the case of Niger, it is thought that 4.5 million people’s livelihoods have been improved as a result of 200 million trees re-generated over an area of 5 million hectares of former scrub-land in the Maradi and Zinder regions of Niger.¹⁹ This re-greening is also happening more broadly in parts of Mali and Burkina Faso.

There is now abundant evidence of Sahelian farmers maintaining or increasing the productivity of their farmlands in the face of low rainfall and high variability, despite rapid population growth and adverse policies.

In fact a key driver identified for increases in productivity is population growth, together with the expansion of markets, encouragement for farmers to intensify land management through experimentation, adoption or intensified use of improved technologies or management practices, and increased labour and capital investments. The improved technologies include integrated soil fertility management: involving various combinations of animal and green manure, rotated or inter-cropped legumes, farm trees and inorganic fertilizers – based on both local and external knowledge. Some of these improvements in farm technique have stemmed from project interventions, others are the product of local ingenuity, while yet others are a hybrid result of farmers testing out and adapting new crops, techniques and inputs they have seen practised elsewhere.

In Kenya an experiment was launched based on small-scale irrigation to increase the resilience of local communities. To offset the need for financial capital to develop irrigation, a public-private partnership (PPP) was established. The PPP leases community trust land or common land and shares the costs with private investors and local farmers. Such small-scale irrigation projects benefit from advancing technologies, growing urban and export markets, and improving market infrastructure.²⁰

Integrated crop-livestock production

Despite the innovative resilience strategies of dryland farmers, they still depend heavily on livestock as a risk management strategy better able to respond quickly to climate variability. Since the Sahel droughts of the 1970s and the 1980s, there has been a progressive shift in livestock ownership from pastoralists to sedentary farmers in the southerly zone of the Sahel. In Mali, for example, it is estimated farmers from the south of the country now own 41 per cent of the national herd.²¹ Livestock are an essential component of the farming systems, providing not only manure and traction, but also as a source of investment and savings. Without livestock the dryland farming systems would collapse.

To maintain livestock productivity whilst avoiding crop damage, those farmers with sizeable herds take them on seasonal transhumance, particularly during the cropping season, to access nutritious pastures. The direction of movement depends on the country and local context. In southern Niger and Chad livestock are taken north to the rich wet season pastures in the drier Sahelian belt; whilst in southern Mali and Burkina Faso animals are moved further south into northern Cote d'Ivoire or Benin. This livestock mobility promotes crop-livestock integration in a way that avoids the constraints of mixed farming at the farm level. These constraints include the low nutritional value of crop residues (insufficient for year round balanced diet if livestock are sedentary) and land degradation from constant year-round grazing pressure – particularly during the rainy season when plants need to complete their productive cycle.

The crop-livestock links are both complementary and competitive for space and resources. Farmers rely heavily on animal dung to manure their land, due to high prices for chemical fertiliser and the perception that its great strength can “burn” the crop, especially in low rainfall years. Such dung comes from both farmers’ own livestock and those of visiting herders, who come south at the start of the dry season to seek water, graze stubble, and trade with settled communities. In many farming areas expansion of cropping has reduced grazing land availability, and long established livestock corridors allowing herds to move between areas have been ploughed up, thereby increasing the likelihood of animals straying into fields and causing crop damage. Livestock mobility at scale allows both systems to specialise and make good use of resources in different ecological zones, while also mutually benefiting from social and economic exchanges at certain times of the year. This results in systems that are more productive and resilient than those that seek to produce both crops and livestock in the same ecological space.²²

Building resilience as part of policy and practice

Development interventions should strengthen existing, resilient, dryland production systems by targeting governance, insecure tenure and poor service provision. Drought based interventions need to focus on the rebuilding of livelihoods, combining social protection mechanisms and asset protection.



Despite the successful harnessing of the resources of the Sahel through their production systems, farmers and livestock keepers faced considerable difficulties stemming from poor governance and ill-judged interventions intended to help them. On-going development priorities include securing land tenure systems and making decentralisation work for resources in the public domain. Pro-resilience development interventions are also needed to strengthen market towns and deliver services more appropriately. During periodic (but expected) droughts, when production fails, farmers and livestock keepers in the Sahel need external intervention and support, but this should be better focused towards retaining their livelihoods, not just saving their lives. Good development policy and practice needs to build upon the adaptation strategies in place, thereby strengthening individuals, communities and existing institutions. With adaptation efforts rarely entailing activities not found in the development 'toolbox',²³ 'climate proofing' development is fortunately more of a re-targeting than a complete restructuring.

Securing land tenure

Across the Sahel increasing land pressure and insecure land tenure are compromising agro-pastoral production systems as they seek to adapt to climatic variability. Mobile livestock keepers are finding it harder to maintain a seasonal presence, and rights of passage, in an agricultural landscape increasingly tightly occupied by fields, whilst land tenure insecurity amongst dryland farmers discourages adaptation efforts aimed at increasing crop productivity. A particular impact for resilience strategies is the removal of common lands containing higher value resources – wetlands, land close to water sources, woodlands – as it is these 'hot spot' areas that often make the crucial difference in the success or failure of dryland livelihoods.

The evidence points to demographic change, urbanisation, greater market integration and large-scale investment flows as being the reasons behind rising land values in the Sahel. Increasing fragmentation of family farms resulting from demographic growth, and farm subdivision through inheritance, is creating a long-term trend towards ever-smaller plots, and has been documented in Mali's irrigated Office du Niger scheme. The growing concentration of landholdings in parts of the region, particularly through land acquisitions by urban elites, has been documented in Burkina Faso; whilst large-scale land acquisitions for plantation agriculture led by foreign investors is also evident in Mali and Senegal. Whatever the driving forces behind the pressure for land, its impact is most acute in areas held under customary tenure.²⁴

Customary tenure

The mechanism through which most of the rural population in the Sahel gains access to land is customary tenure. These are systems usually based on unwritten rules: their legitimacy founded on tradition as shaped both by practices over time and by systems of belief – although in reality customs have often been changed and 'reinvented' many times. The dominant, if somewhat stereotyped, view of customary resource tenure systems specifies that: land is usually held by clans or families on the basis of blends of collective and individual rights; is accessed on the basis of group membership and social status; and is used through complex systems of multiple rights.

Important differences exist between customary tenure for cultivated lands and areas used for grazing. On grazing lands, pastoral tenure systems tend to emphasize collective rights over land, water and grazing, based on negotiated, flexible and reciprocal arrangements that enable herd mobility (see 'Production systems responding to variability'). This arrangement recognises and secures the multiple interests and demands involved, including those who use the land and resources for only short periods of time. On cultivated land, customary systems often entail collective rights, but typically involve the allocation of farming rights over specific plots by the land management authority (a 'chief', for instance) to smaller family units. In many cases farming rights are conditional upon the continued use of the plot. While such rights are often inheritable, restrictions usually exist on sales (especially to outsiders).

Profound socio-economic and cultural changes have now eroded customary systems in many places. Where pressures on land are becoming more acute, customary rules form the object of much contestation. Customary authorities are reinterpreting their traditional prerogatives and giving away collective land for personal gain. Also, as large-scale land acquisitions bring into contest the land claims of local groups and those of international investors, limited legal recognition of customary rights makes local groups vulnerable to dispossession. Securing continued access to strategic resources in the face of growing pressures on land is key to ensuring resilience of local livelihoods, particularly for livestock keepers who depend on livestock mobility during the dry season and at critical times.

Women's rights to land

Across the southern Sahel, women constitute a large portion of the economically active population engaged in agriculture, both as farmers and as farm workers, and play a crucial role in ensuring household food security. Yet in many cases their rights in arable land are secondary, derived rights, which can be lost on the death/divorce of a husband, making them particularly



Woman at work in her garden, Mali

Source: Oxfam Italia

vulnerable. In southern Niger, tradition and social norms are in fact being reinvented to exclude women from land, including: the tightening up of women's seclusion practices; the application of a mother's social duty to give her land to a married son; and the erosion of '*gamana*' in which husbands must allocate land to their newly married young wives. These changes are increasingly excluding women from farming, leading to a 'de-feminisation' of agriculture and reduced resilience.²⁵

Practical options for strengthening tenure security

Growing land competition requires improved mechanisms for negotiation and mediation between competing uses or users. Insecurity in land tenure can undermine efforts to increase agricultural productivity, and where agriculture is intensifying as a result of socio-economic forces or development projects, weak land rights can expose more vulnerable groups to dispossession. For pastoralists the fragmentation of the Sahelian rangeland is vastly undermining production. Despite policy efforts to establish land registration systems in several Sahelian countries, the number of people with registered land titles remains a fraction of the population, and is predominantly urban. Developing accessible, effective and sustainable ways to secure

local land rights and manage competition among multiple interests must be a central component of adaptive development strategies. Options include:

- *Recognising and recording local land rights*

Rather than focus on individual title there is now recognition that land laws must build on local concepts and practices. Several countries have now made explicit efforts to protect customary land rights and include them in land records – for instance Niger's Rural Code of 1993, Mali's Land Code of 2000–2002, and Burkina Faso's latest law on rural land tenure (Law No. 034- 2009/AN of 2009).

- *Strengthening capacity for developing effective land management systems*

Despite the efforts of the new legislation, tools to support their implementation are frequently lacking. Needs include low cost surveying, mechanisms for recording land transactions, and drawing up local agreements for management of common woodlands, water bodies and grazing. Making land tenure matters work as part of decentralisation is also a key challenge not only for inclusive and democratic governance, but also for the long-term stability of the region.

- *Interventions that improve women's land rights, including legislative reform*

The implementation of laws protecting women's rights is constrained by entrenched cultural practices, lack of legal awareness, limited access to courts and lack of resources. In rural areas effective interventions to improve women's land rights need to include not only legislative reform but also concrete steps to bridge the gap between law and practice.

- *Enabling herders to access grazing resources through locally negotiated resource management agreements*

Important innovations are underway throughout the Sahel in the form of local conventions (conventions locales), which are community-based agreements concerning the management of shared natural resources. These conventions have been set up and negotiated by all interested natural resource users, usually with support from development projects. They are an attempt to overcome the weaknesses of previous approaches to natural resource management focusing on individual villages (e.g. the gestion du terroir approach), which often resulted in the exclusion of groups not resident in the village, particularly transhumant herders.²⁶

Securing governance through decentralisation

The importance of local government

There is widespread acceptance that governance and management of natural resources is better undertaken at the local level. Centralised state agencies rarely have the knowledge, reach, skills or resources necessary to be effective across all communities and ecosystems, whereas local governments are in a better position to respond in a flexible, timely and appropriate manner to the highly variable and heterogeneous Sahelian environment.

Effective local governance is particularly important for those goods in the public domain that are central to local livelihoods and the economy (e.g. water, rangelands, forests, market information), with decision-making processes over their planning and management needing to be undertaken at the local level to reflect local people's priorities. Effective resource management is management that harnesses local adaptive knowledge and experience within the existing livelihood production strategies that are currently exploiting or lessening the risks associated with climate variability. Service provision that is tailored to the local context is also better able to complement and reinforce livelihoods (see later in this section).

In building the resilience of individuals and groups in the Sahel it is particularly essential to reach the marginalised and the most climate-vulnerable, and to do so in a harmonised way. Interventions that are located within existing broader governance frameworks – i.e. in a context of devolved governance – are likely to achieve this more effectively than constructing parallel mechanisms for the management of public goods. Good local governance can also create the conditions for more sustained citizen engagement – including the willingness to pay taxes – thereby providing the resources to further reinforce the autonomy and downward accountability of local government.

The decentralisation framework

Since the late 1970s various initiatives with decentralisation have been underway across the Sahel. Decentralised local government has been seen as central to building more effective health, education, and administrative services for the vast and varied nations of this region; given the inability of national government agencies to play these roles on the ground. Decentralised management of land, water, and grazing are also recognised as essential. Unfortunately, in practice, very few democratic local governments in the Sahel have been given the means to be able to represent and engage local citizens in the management of resources in the public domain.²⁷ They have neither the discretionary authority over land and natural resources, adequate and appropriate technical support and equipment, or sufficient financial resources.

Practical options for strengthening local governance

Despite current disappointment with the extent and impact of decentralisation in the Sahel, the reforms themselves offer an institutional framework that lends itself to building climate resilient livelihoods and economies. Making decentralisation work, including in land tenure matters, is key for the long-term stability of the region and has been the principal political demand of certain ethnic groups. Significant support to the decentralisation process in the Sahel has been provided since the late 1990s from international financial institutions, bilateral donors, research organisations, and a host international and national NGOs. But much remains to be done to translate the policy infrastructure into capacity and implementation at local government level. Good practice suggests:

- *Work directly with democratic local authorities.*

A nine-country comparative study across Africa, Asia and Latin America, found that the decision to either work with, or choose to bypass, local elected governments, had a significant impact on the ability of these emerging institutions to deliver meaningful

services.²⁸ By creating parallel mechanisms for the delivery of public services or the management of public goods, control over resources rightfully in the public domain was being fragmented, leading in some cases to discrimination and elite capture.

- *Build the capacity of local people to hold government and other institutions that govern them to account.*

Citizens need a thorough understanding of the key legal provisions within decentralisation laws to understand the issues at stake, and how they can participate in and influence the local decision-making processes that affect their lives and livelihoods (e.g. land use planning processes, resource allocation for service delivery). In the Sahel existing initiatives include government-led awareness raising programmes, participatory budgeting by local government authorities in Senegal and Mali,²⁹ and the design of training programmes in local languages to enable communities better articulate the rationale of their livelihood systems to local and national government authorities.

- *Target the under privileged and marginal groups*

Citizens marginalised by enduring power relations include women, castes, migrants, youth and pastoralists. These groups, lacking options and assets, are likely to be more vulnerable to extreme climate events. Building the capacity of the excluded to participate in decentralisation involves changing both theirs' and others' attitudes and behaviour. In certain societies customary institutions can offer opportunities of empowerment – for example among the Tuareg, institutions such as *ebategh* and matrilineal kinship networks are important in protecting women from social and economic hardship.³⁰

- *Consider the use of local development funds to strengthen financial autonomy.*

Local governments in the Sahel are mostly dependent on central government or external actors for finance, undermining their autonomy and ability to undertake flexible planning. UNCDF has been experimenting with Performance Based Grants Systems (PBGSSs) in which local governments need to comply with a set of minimum conditions in order to access grants. Upwards of 15 countries now use them and there is evidence that the incentives they include have resulted in genuine improved local government performance.³¹

Supporting small towns development

Indicators of success

The importance of income diversification as a resilience strategy, and the need to trade, means that small and large towns play an important part in the livelihoods of rural people in the Sahel. A successful town is also an illustration of rural livelihoods successfully harnessing the surrounding resource base. Currently, around 35 per cent of the Sahelian population is living in urban centres, but this varies greatly with Senegal for example having 60 per cent of its population in urban areas. On average, half (about 52 per cent) of the world's urban population currently live in small local urban centres, with population sizes ranging from just a few thousand to 100,000.

Some towns in the Sahel have grown very rapidly in the last ten years and are likely to expand greatly in the next 10–20 years, but others have failed – often due to agricultural decline. Towns will stagnate, or even revert to rural settlement status, if their population declines below a set threshold (which is usually the national definition of what constitutes an urban centre). Small towns that thrive share a common set of factors. Their economy is often largely based on providing access to local, domestic and international markets; and in adding value to local production through processing, grading, packaging and transport – i.e. activities that generate demand for non-farm employment and often attract migrant workers. Thriving towns are also ones that support additional economic activities or services – restaurants, hotels, portering and telecommunications, or higher order services such as banks and lawyers – activities that serve the surrounding rural region as well as providing valuable employment opportunities.

The importance of non-farm income and markets

While alarmist views of climate-induced mass migration suggest that dryland farmers are preparing to flee their land, evidence suggests that the opposite is in fact far more likely. Farmers will go to great lengths to keep a foothold in farming, but rely on access to non-farm income sources in order to stay there. Local small towns help balance irregular incomes from agriculture/pastoralism and provide this in a more easily accessible way than cities. Temporary and seasonal movement to local urban centres for non-farm employment is far preferable for resilience than permanent migration to larger cities. As well as being a survival strategy for the poorest groups, local migration can also be an accumulation strategy for wealthier groups. In areas with high-value agriculture, such as horticulture, non-farm

incomes are an important source of cash for investment in family farms.

Important elements that can help foster this 'virtuous circle' of rural-urban relations include infrastructure and a relatively equal access to land and water in the surrounding rural area for small-scale family farms. The former is essential to access markets beyond the local area, the latter is essential for farmers to be able to respond to demand from urban-based consumers and traders. It is also crucial to ensure that incomes and purchasing power are broad-based, and stimulate demand for goods and services distributed by small towns to their rural region.

Practical options for strengthening small towns

A pro-active policy of urbanisation and the development of small towns can play a valuable role in furthering rural resilience, whether as a source of key services, or a place to generate non-farm incomes to balance variable revenues from the crop and livestock sectors. Building strong local town economies requires investment in transport, power and telecommunication connections that make economic activity profitable away from the capital city. At the same time serious thought is needed to design urban growth and infrastructure in ways that reduce the impact of climate change, especially flood events and heat waves. More substantial support is needed by national and regional governments to help small towns to play their role, in order not only to be economically successful but also to promote sustainable development.

Appropriate service provision

Successful agricultural production systems in the Sahel depend on a healthy labour force, with the provision of appropriate and accessible healthcare services also crucial for coping with shocks and stresses when production systems fail. Education services are an increasingly integral part of building resilience within production strategies, mainly as part of diversification strategies into alternative livelihoods. But rural Sahelians, even those living in small towns, have had very limited access to health and education services for decades. The situation is worse for those communities living in the more remote northern and far eastern areas of the Sahel.

National governments have consistently failed to provide adequate services in health and education in the Sahel due to lack of resources and, for certain areas and populations, have used inappropriate delivery systems. Structural adjustment policies in the 1980s and 1990s exacerbated the problem with the private sector only

investing in those areas, almost exclusively urban, where profits could be assured – leaving the NGO sector unable to fill the gap in the vast rural hinterland. For pastoral and agro-pastoral communities, delivery systems based on a single fixed-point model, and in the case of education, inappropriate curricula, has created additional problems. The failure of the state to deliver on basic service provision has meant that ordinary people in the Sahel have often preferred to keep at a distance from the state rather than expecting its support. This background of mistrust has an impact at local government level, where the lack of tax revenue means resources for maintaining service provision are not generated.

Health for resilience in mobile communities

Poor quality in healthcare services, gender inequalities and high maternal mortality rates are some of the main issues affecting the health vulnerability of mobile peoples. Infant mortality rates are a strong reflection of this. A study conducted in Munch indicated that almost 50 per cent of children in the 'Azawad' region of northern Mali die before they reach five years old.³²

Political insecurity and a lack of adequate nutrition during drought combine to increase vulnerability amongst pastoral populations, making access to health care increasingly necessary. To ensure equality in health care, policy and institutional strategies need to be adapted to take into account the lifestyle of pastoralists, and increased decentralisation in decision-making needs to be implemented. Health care must move away from a focus on settled communities and integrate the needs of the mobile population into national policy.³³ Good practice suggests:

- Pastoralist women are particularly impacted by remoteness from medical services and require specific targeting.
- Services need to address both accessibility and equitability issues.
- Community-based health workers and community case management are proving effective in the delivery of local healthcare in rural areas.
- Remote service provision requires appropriate governance structures – decentralisation and mobile technology are potential tools.

Education for resilience in mobile communities

Pastoralists increasingly acknowledge education as being a way to advance diversification of household labour and mitigate shocks. For many, education symbolises a route out of poverty, even if the results

do not always bear this out. Many pastoral families will divide their families, sending some children through the education system whilst retaining others at home to continue as pastoralists. This trade-off can be hugely problematic for pastoral communities. The move by some into formal learning results in a depletion of labour resources for the family production team, weakening their ability to ensure adequate productivity. At the same time, those who leave lose access to the informal education that is fundamental to their survival in their pastoral communities on their return. This last issue can be particularly detrimental, as developing strong social networks is a key strategy in pastoral communities, and without this the child of a pastoral family would significantly lack the capabilities necessary for successful pastoral production. Seen this way, education can in fact result in increased vulnerability rather than greater resilience.

The sacrifices made by pastoral families in sending their children to school are rarely adequately rewarded. Schools in the drylands frequently lack sufficient funding, staffing or equipment. Education systems remain geared towards sedentary livelihoods, and provide a timescale and curricula often at odds with pastoralist livelihoods. Many “educated” pastoralists will leave school lacking the skills, and even the inclination, to return to a pastoral lifestyle. They pursue alternative livelihoods (if they are lucky) or end up as poorly paid labourers or night watchmen in small rural towns or the capital city.

In the context of globalisation and increased exposure to world economic markets, education could play a key role in providing pastoralist communities with the resilience to face and adapt to new challenges. Boarding schools and mobile education services have been tried in many countries and remain the most common approaches in East and West Africa for providing pastoral children with a formal education. In recent years, there is a growing interest and an emerging body of more innovative practice seeking to address the conceptual and practical challenges of providing universal education to mobile pastoral communities. These approaches are based on family learning, and open and distance learning approaches and techniques.³⁴

The Distance Learning (DL) approach, based around using radio, proposes a more pastoral friendly education system by combining the benefits of the existing school systems with distance learning, but making face-to-face education unnecessary. It is to be trialled in Kenya with the proposed establishment of the New Commission on Nomadic Education in Kenya (NACONEK). Visiting teachers with written material would support the process, and mechanisms for monitoring and evaluation would be incorporated. Teachers would use cell phone networks to keep in touch with the mobile community,

and the curriculum would be modified to incorporate specific pastoral modules. The mobile education initiative will be initially implemented in two pastoral regions in Kenya and intends to combine pastoral needs with the human right to an education, without increasing the vulnerability of those involved.

Social transfers in support of resilience

Loss of pastoral livelihoods

Millions of US dollars have been spent on drought relief in dryland Africa since the 1970s, with nearly all of this money gone on buying food aid which, while saving lives, has failed to save livelihoods. For many pastoral communities in the Sahel the return of the rains after a drought does not allow them to return to mobile livestock keeping. Having lost their animals during the drought, they either remain in or around the towns from which they received the food aid that saved their lives, sometimes succeeding in a new livelihood, or they try their hand at agriculture, charcoal making or, in extreme cases, adopt a violent lifestyle. This failure is not only a human tragedy but also an economic and social one, as governments bear the price of livestock production foregone, the cost of supporting these communities and the price of social dislocation that can extend to insecurity and conflict. The loss of livelihoods for the youth of the Sahel is particularly crucial in the face of expanding radical Islam, leading the French Foreign Minister, Laurent Fabius, to coin the term ‘Sahelistan’ to reflect the region’s growing similarities with Afghanistan.

Poverty, vulnerability and marginalisation

A key reason for the increasing vulnerability to drought and climate change is unequal access to public resources. Across the drylands of Africa political marginalisation of communities has resulted in a chronic imbalance in power and resources. Kenya’s End Drought Emergencies strategy for example notes that the principal production system in the drylands – mobile livestock keeping, pastoralism – has not enjoyed the same level of investment as other production systems, such as crop farming, which receive priority allocation of infrastructure funding, favourable fiscal packages, and publicly subsidised inputs. Social protection mechanisms can help redress this imbalance in accessing public resources, and if appropriately implemented can also strengthen climate resilience.

At a recent international conference, a distinction was made between poverty (lack of resources), vulnerability (uninsured risk) and marginalisation (lack of voice), and it was suggested each of these can be addressed,

respectively, through social assistance, social insurance and social justice – all under the framework of social protection.³⁵ Evidence from pastoralist dryland areas suggests that both poverty and vulnerability are a consequence of lack of voice – with neither poor herders nor richer pastoralists yet able to exercise sufficient leverage over the state to assure the basic rights to which they are entitled as citizens. Participatory forms of devolved planning and governance offer a means to end this exclusion, with resilience building measures needing to be embedded into emerging political processes at the county level (see earlier in this section). But with decentralisation as yet making little impact in the Sahel the need for externally funded social protection measures will remain significant for some time to come.

Practical options for more resilience in social transfers

The development literature suggests a number of conditions under which social protection programmes, and specifically cash transfer programmes, can be undertaken in ways that help retain livelihoods and can strengthen climate resilience.³⁶ Good practice suggests:

- *The poor should have direct control over the cash transfers, thereby reinforcing their knowledge and ability to act and influence.*

Unconditional cash transfers allow registered households the latitude to use them in the way they think best. Evidence from Kenya suggests that households use the payments in a variety of ways, including expanding and diversifying their diet, paying education expenses, starting or expanding businesses, paying off debt and accessing credit.

- *People should participate in the scheme for an extended period of time, thereby allowing benefits to accrue.*

Mechanisms can be installed whereby registered households graduate out of the programme as their status improves.

- *Targeting and implementation arrangements need to be climate-smart and sufficiently flexible to allow expansion and contraction in response to both expected and unforeseen risks.*

The possibility of expanding cash transfers at times of extreme weather events (e.g. floods, drought), will help to mitigate the impact of the immediate risk and allow the longer-term processes of climate-resilient planning to continue with less disruption.

- *Targeting and implementation arrangements should not be socially divisive.*

Targeting and registration processes and databases developed for social protection could help identify those vulnerable under different climate change scenarios, and inform decisions made by agencies responsible for disbursing climate adaptation funding.

- *Programmes need to be rooted in domestic political agendas and local understanding of need, thereby increasing the prospects of sustainability.*

Development agencies often tend to establish social protection through partnerships with other donors and implementing NGOs. But such programmes need much firmer rooting at both national government level and sub-national government.

- *Programmes should be complemented by a range of other measures that address the multiple dimensions of risk and vulnerability.*

Social protection needs to move from being project-based to being integrated with other social and economic measures. Cash transfers alone are insufficient to build climate resilience – the payments are often too small, and the coverage too low. Local climate adaptation funds are one way of providing the complementary services and investments that pastoralists, and others, require.

Market based approaches to resilience

The use of market-based approaches for protecting assets is gaining considerable traction in the development literature. The use of private drought insurance – common elsewhere in the world – is also now more feasible with satellite imagery providing accurate evidence for claims.

Destocking during drought

During the drought of early 2006, the USAID-funded Pastoralists Livelihood Initiative piloted a commercial destocking intervention in southern Ethiopia. The pilot was able to successfully demonstrate that by helping pastoralists to sell some of their animals at reasonable prices in the early stages of the drought it is possible to save livelihoods as well as lives. By selling some of their animals pastoralists had money to buy food and access the livestock services that they wanted for maintaining their core herd, rather than relying on the services aid agencies provide. Expenditure on livestock accounted for 37 per cent of the income derived from destocking. Herd maintenance might involve the purchase of fodder or veterinary care, extending support to local markets and service providers.

In the Ethiopia pilot a novel approach to protecting assets was also organised in the absence of advice or support from government or aid agencies. Pastoralists

paid private truckers to transport some of their remaining cattle to alternative grazing areas, illustrating how people will protect their assets when they have the resources to do so. From the money procured through destocking, it is calculated that as much as 79 per cent was spent on local goods or services, highlighting the additional livelihood benefits from the approach in terms of supporting local markets and services as part of post-drought recovery. The use of income to buy livestock feed and veterinary drugs from the private sector indicates that free provision of livestock services by NGOs or government may not be needed if an adequate destocking response can be organised.

Private traders were provided with loans of USD 50,000 during the Ethiopian intervention, sufficient funds to bridge the short-term gap in capital flow during the drought. Traders then purchased 20,000 animals to the value of around USD 1 million, vastly exceeding the value of the loans. Given the current loan arrangements offered by the government and private banks in Ethiopia, particularly for livestock activities, there is a need to design and institutionalise 'fast-track' loan schemes to support large-scale destocking during the early stages of a drought. Long-term investments in domestic and export livestock marketing could also support resilience, along with better risk assessments of droughts, contingency planning and clear triggers for intervention. The potential for commercial destocking to reach the most vulnerable pastoralist households requires further research, as does the most appropriate combinations of livelihoods-based interventions, such as destocking and food aid.³⁷

Drought insurance

Pastoralists can now buy private insurance to cover the loss of their herds to drought, and receive compensation in the event of animals dying because there is not enough pasture to feed them. This service has long been available to pastoralists in Mongolia and has now been piloted in northern Kenya by the International Livestock Research Institute. Known as Index-Based

Livestock Insurance, it is intended to help pastoralists invest in protecting their livestock assets as a result of drought and reduce their risks of destitution.

Index-based insurance is based on a fixed trigger mechanism not directly related to any individual production unit, such as a family herd or farm. Rather, the trigger for payment is based on calculating, for example, average livestock mortality levels in a particular area, or the cumulative rainfall in a season in a specific area using measures of pastures availability recorded by satellites – the Normalized Differenced Vegetation Index. Compensation is automatically paid to all those individuals who took out premiums if data shows that livestock mortality is above or total seasonal rainfall is below the threshold set by the insurance company.³⁸

The commercial partners in the IBLI pilot were Kenya's Equity Insurance Agency and UAP Insurance. To date, the IBLI pilot has distributed two indemnity payouts; the first was to all insured divisions of Marsabit district of Kenya in October 2011 and the second to two divisions of Marsabit severely affected by droughts in March 2012. IBLI has now been scaled up in a second phase to include seven additional districts in northern Kenya. It is also being expanded into Ethiopia. The pilot phase proved there is sufficient demand and opportunity for scaling-up but there is a need for increased coordination among government institutions, private sector and civil society actors. A knowledge building and marketing campaign also needs to be adopted alongside the implementation of the programme to help dispel common misconceptions over its features and coverage. In the long-term transaction costs will also need to be lowered to ensure commercial viability and sustainability without subsidy support.³⁹

Looking forward

This paper has demonstrated that considerable inherent resilience exists within Sahelian communities, with livelihood production systems responding effectively to climatic variability and supporting vibrant local, national and regional economies. But it has also highlighted where livelihoods are currently buckling and becoming more vulnerable, suggesting that this is frequently the result of external factors beyond the control of communities.

The last 20 years have seen great progress in understanding the non-equilibrium, dynamic and highly productive nature of drylands – evidence that now needs to be at the forefront of policy and practice. At the same time lessons learnt within development interventions have built a body of knowledge on how best to support dryland communities.

Climate resilient development in the Sahel needs to consider and address the following:

1. Explicitly recognise variability, instability and unpredictability as inherent features of the environment: features that need to be harnessed in a positive manner not anomalies to be “corrected.”

2. Strengthen existing production systems as the backbone of local livelihoods and the wider rural and urban economy, and address the factors that undermine their functionality.

- Support livestock mobility at scale, being critical not just in pastoral economies but as key production and insurance assets in crop farming and urban economies:
 - Work at the appropriate geographical scale
 - Develop infrastructure according to the system’s dynamics
 - Use water provision as an instrument of good governance
 - Take the time to build consensus
 - Combine formal and customary governance
 - Address land tenure issues
 - Retain flexibility
 - Take a systemic rather than a sectoral approach

- Support agricultural production as a complement to livestock herding:

- Look to scale-up success stories of sustainable land management practices in dryland crop farming, and address key constraints in market access (for example improvement in rural roads, better links between formal and customary actors, abolition of subsidised imports).

3. Build resilience through improved development policy and practice

- **Secure land rights and tenure security** by supporting the implementation of new land tenure legislation, including the development of practical tools that local land institutions can use in their work
 - Recognise customary land rights, which are the entitlements through which most people gain access to rural land.
 - Support broader common property resources and collective rights – the key public goods central to building resilient and equitable economies/livelihoods.
 - Strengthen capacity in developing effective land management systems.
 - Improve women’s land rights through legislative reform and help bridge the gap between law and practice.
 - Enable herders to access grazing resources through locally negotiated resource management agreements, and secure rights and management of trans-boundary resources, grazing, wetlands and rivers.
- **Strengthen local governance through decentralisation.** The necessary policy infrastructure is largely in place but the capacity of local government bodies and citizens needs to be built.
 - Work directly with democratic local authorities.
 - Build citizenship and the capacity of local people to hold government to account.
 - Redress entrenched inequality (e.g. gender, migrants, mobile peoples).

- Establish local development funds to strengthen financial autonomy.
- **Invest in the development of small towns.**
Rapid urbanisation means towns and cities have become key elements in economic diversification. Proposals need to build a clear understanding of impacts of urbanisation on livelihood resilience of different groups. How can urbanisation offer promising opportunities for incomes, employment, rural-urban links.
- **Support the provision of appropriate services** particularly in pastoral areas (e.g. mobile education, mobile health services). Appropriate education is a critical pathway for the development of alternative, but complementary, livelihoods.
- **Refocus social protection mechanisms.**
Adaptive social protection mechanisms can build the productive assets of the most vulnerable so they can recover from drought periods. Fragmented approaches to social protection, drought risk reduction and local climate adaption can be overcome by embedding efforts to build climate resilience within permanent institutional processes. Build and document social protection programmes, specifically cash transfer programmes, under the following conditions:
 - The poor have direct control over the cash transfers, thereby reinforcing their knowledge and ability to act and influence.
 - People participate in the scheme for an extended period of time, thereby allowing benefits to accrue.
 - Targeting and implementation arrangements should be climate-smart and sufficiently flexible to allow expansion and contraction in response to both expected and unforeseen risks.
 - Targeting and implementation arrangements must not be socially divisive.
 - Programmes must be rooted in domestic political agendas and local understanding of need, thereby increasing the prospects of sustainability.
 - Programmes should be complemented by other measures that can address the multiple dimensions of risk and vulnerability.
- **Use market based approaches to protect livestock assets.** For example commercial destocking and drought insurance.

Notes

1. This issue paper focuses on the Sahel as a whole, but pays particular attention to Burkina Faso, Chad, Mali, Mauritania and Niger. It draws on an extensive literature from academic case studies, project reports, and government documents, alongside experience on policy and practice aimed at increasing resilience from other dryland regions.
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For decades the Sahel has been presented as suffering from irreversible degradation, leading to desert advancement and the impoverishment of the population. This issue paper develops an alternative profile and identifies the considerable potential of the Sahel's dryland ecosystems. It explores the inherent resilience within existing crop and livestock production systems based on exploiting climatic variability; systems which local people in the Sahel have used to establish successful local and national economies. This new profile can help re-define development interventions and promote a more climate resilient future.

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