

Opportunities for Reducing Vulnerability and Enhancing the Sustainability of Livestock Systems

Cornelis de Haan with Polly Ericksen, Fiona Flintan, Andrew Mude, Alexandre Ickowicz, Abdrahamane Wane, and Ibra Touré

Overall Strategy and Vision

Building on the analysis presented in chapter 3, this chapter provides a summary of the technology and policy options used to address the three determinants of vulnerability and resilience: exposure, sensitivity, and ability to cope. Thus, this chapter seeks to cast the most appropriate interventions in the framework of the overall study, with the long-term goal of reducing livestock owners' vulnerability and emergency aid dependency and enhancing their resilience. While not meant to provide an exhaustive and comprehensive description of all options available (which anyway is not possible given the large variation in conditions across study countries), this chapter covers the proven and more promising interventions and presents good practices for each.¹

The vision for the future is that in pure grassland areas (Aridity Index, AI = 0.05–0.20), priority attention is on reducing vulnerability by rebalancing the ratio of land/livestock/people and maintaining productivity at levels that will not lead to degradation of the natural resource base on which these systems depend. This means focusing particular attention on ensuring diverse and alternative income sources and on more policy and institutional support to enhance pastoral systems' sustainability.

In the semi-arid and dry sub-humid regions (mostly mixed farming with AI = 0.20–0.65), the focus is on sustainable intensification, productivity enhancement through improving technical practices, and policies and institutions.

An overview of the main interventions, the shock(s) they address, and the main expected outcome(s) is given in table 4.1. The rest of this chapter is devoted to elaborating each of these.

Table 4.1 Interventions to Enhance Resilience in Livestock Systems, SSA Drylands

<i>Priority Intervention</i>	<i>Main Shock(s) Addressed</i>	<i>Main Determinant(s) of Resilience Addressed</i>	<i>Main Impact (Equity, Environment, Economic Growth)</i>	<i>Preconditions for Scaling Up</i>
Early offtake	Drought	Sensitivity	Environment Economic growth	Price Market
Animal health services	Sanitary Drought	Exposure, Sensitivity	Economic growth	Capacity building
Protect/ensure mobility for pastoralists	Drought Economic Social (Sanitary)	Exposure Sensitivity Capacity to cope	Environment Equity Economic growth	Methodology control Multi-stakeholder approach Recognition of land rights
Index based livestock insurance	Drought Sanitary (Social)	Sensitivity Capacity to cope	Equity Economic growth	

Note: SSA = Sub-Saharan Africa.

Reducing Exposure to Shocks

Grassland and Pastoral Systems

Enhancing Mobility through Water Resource Development

Water resource development can play an important role in facilitating mobility as it enhances the feed balance of drylands in three aspects. First, development of water resources—mainly by constructing shallow wells and drilling boreholes—can open up these areas for grazing, and thereby improve the overall amount of feed resources available, providing additional flexibility during times of drought. Second, water resource development reduces the range that livestock have to trek to a water point, thereby increasing the efficiency of feed utilization. In addition, better-quality water reduces livestock diseases associated with bad-quality drinking water. A positive impact on animal health and livestock keepers' livelihoods has been noted in many projects (Bonnet et al. 2004; Ickowicz et al. 2010; Krätli et al. 2013). Finally, as water resource development is one of the most demanded interventions by pastoralists, well-implemented water points can be a major step towards (re)gaining pastoralists' trust.

Although development of water resources has often been cited as a primary cause of range degradation, this view is now being challenged. Several long-term studies carried out in Senegal show no major vegetation changes after 30 years of major investments in pastoral watering points (Diouf et al. 2005; Mieke et al. 2010). The Chad pastoral water program supported by *Agence Française de Développement* (AFD), which has established 1,100 pastoral water structures in the last 20 years, is less definitive in its recent environmental assessment: in spite of extensive ecological monitoring, the project could not confirm or refute whether the structures had helped regenerate plant cover or avoid its degradation (Krätli et al. 2013; Mtisi and Nicol 2013). There also seems to be a growing,

although not confirmed, consensus that comprehensive coverage of water points over a large area prevents excessive concentration of livestock pressure and causes less environmental damage (or is neutral) than *ad hoc* uncoordinated, piecemeal establishment of single water points (Ickowicz et al. 2010; Krätli et al. 2013).

Designing the appropriate institutional framework supporting water development for livestock in drylands areas is critical. Previous government-directed and donor-funded programs have often failed, as infrastructure was not adequately maintained and broke down after external finance stopped. Inadequate definition of users' rights often led to a permanent water supply, which in turn attracted permanent settlers, disrupting the established equilibrium between wet and dry season grazing, sometimes even leading to pastoralists being excluded from the water point (Pratt, LeGall, and de Haan 1997). Such poorly designed interventions can lead to environmental degradation and increased conflict and instability. On the other hand, a well-designed project integrating traditional local users' rights and state legislation, allowing grazing control by these users in line with the actual carrying capacity of the surrounding areas, can be a useful tool in sustainable range management, and can diminish local conflicts (as seen in Chad, as described above).

In summary, critical requirements in the design of pastoralist water infrastructure to facilitate mobility include: (i) a participatory approach during establishment, seeking agreement of all actors on issues such as siting, users' rights, and cost sharing; and (ii) mechanisms for making access to water dependent on the surrounding rangeland ecology and production.

Enhancing Mobility through Land Use Planning

Integrated and participatory land use planning is essential, ensuring: (i) the possibility that pastoralists can move in uninterrupted fashion from wet to dry-season grazing areas, particularly Sahelian transhumant pastoralists; and (ii) access to critical dry season grazing and watering areas for all groups. These critical requirements to enable mobility should be embedded in national legislation. The diagram in box 4.1 illustrates the complexity of this, given the overlapping pastoral land use systems and the many actors involved.

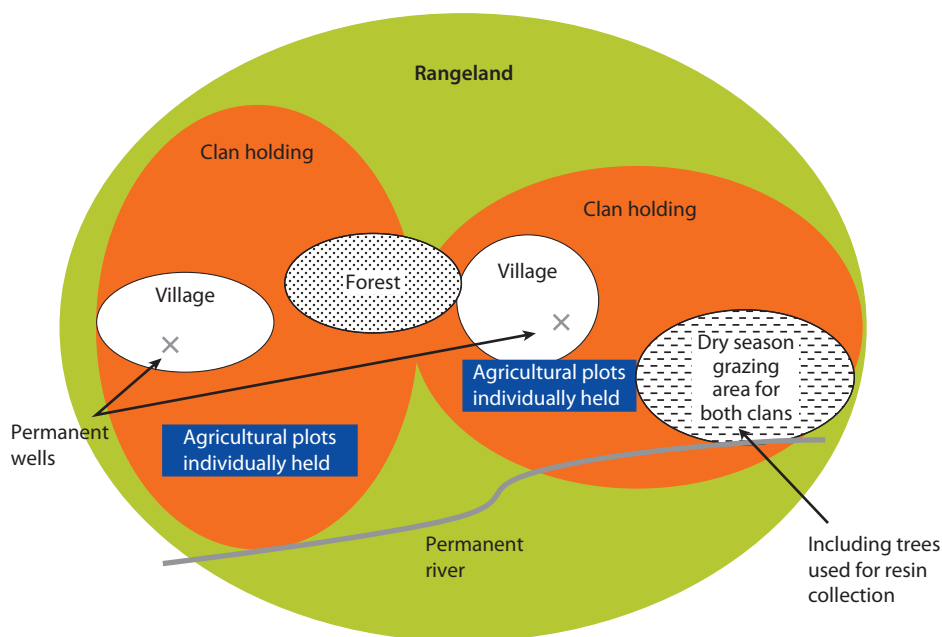
Transhumant corridors, enabling pastoralists' herds to move between wet season and dry season higher-potential areas (valley bottoms, and/or sub-humid savannahs) are an important traditional feature of West African land use. However, arable and agro-pastoral farmers have often encroached on these corridors. Any integrated pastoral development effort should therefore include, through a participatory approach involving all actors, the (re)definition of the exact course of the corridors, and they should be well marked.

Dry season grazing and livestock watering access is critical for sustaining mobility and reducing conflicts. Closing these resources is generally thought to undermine the entire pastoral production system and has been a major cause of conflicts, for example, in the Senegal River valley in 1989–91, and in localized disputes throughout the region (Touré and Wane 2010). For example, about 90 percent of conflicts in Niger are due to dry season crop residue grazing and access

Box 4.1 Natural Resource Governance in Drylands

Key factors to consider in developing supportive policy and legislation for securing pastoral lands include the need to ensure that the complex nature of land use and governance in pastoral lands is accounted and accommodated for (see figure B.4.1.1). This requires a framework that incorporates diversity and is dynamic and flexible, likely an approach that provides for protection of different layers of resource access and governance systems. This could follow an approach where protection is given to a pastoral “territory” based on the larger landscape or rangeland, with customary governance systems taking care of resource governance therein; or it could follow an approach that requires formal governance structures and institutions for each and every layer of access and tenure arrangement.

Figure B.4.1.1 Existence of pastoral territories within a larger landscape



Source: Flintan (2013).

to water (Turner et al. 2007). Delineating special areas for dry season livestock grazing, although at local level politically sensitive, is an important aspect of maintaining mobility that must be included in land use planning.

Related to the dry season grazing access issue is the development of irrigation schemes. Past irrigation schemes involving pastoralists have often failed because of technical problems, a high turnover of pastoralists settled in the irrigation schemes because of cultural preferences for a livestock-based livelihood, and competition for labor (Sandford 2013). Sandford argues that more recently, pastoralist-related private irrigation schemes are becoming successful as the tech-

nical problems have been addressed, cultural preferences are less pronounced, and the increasing poverty and skewedness of herd ownership have favored labor prices in irrigated agriculture. Pastoralist-related irrigation schemes could be important vehicles in the search for alternative income sources and livelihood diversification, where possible, but more evidence is needed.²

In this context, it is interesting to consider the economics of converting dry season grazing areas into arable farming zones. Most studies consider only the productivity of the livestock system during the dry season, ignoring its year-round value. This leads in general to favorable economics for the conversion to agriculture. Behnke and Kerven (2013) took a more comprehensive approach in their assessment of the Awash irrigation scheme for the returns to cotton, cane, and livestock, assuming no production for the latter if access to the valley was closed. They found that livestock owners earned about the same net revenue per ha as efficient private cotton farmers (and a much higher net annual revenue than inefficient state cotton farms). Feasibility studies should consider holistically the options in land use policies, particularly for the conversion of key dry season resources, considering the entire production system and annual production cycle.

In summary, integrated land use planning, covering transhumant corridors and key dry season grazing resources, is needed to safeguard mobility. This needs to occur at the national level with enabling legislation and at the intermediate and local levels with actual planning.

Reducing Numbers of Animals in Drylands

The low offtake rate found by some studies (such the 3.3 percent in the Borana long-term recall survey) highlights the need for enhancing market access. A recent International Food Policy Research Institute (IFPRI) study (Headey et al. 2012) argues for a transformation process, particularly by enhancing commercialization through improved infrastructure and pre-drought destocking activities. Pastoralists would be more likely to sell if they could easily restock once the drought ended. While this argument has some merit, especially for pre-drought early offtake, this background paper argues that the offtake is already higher than often assumed, but that there are other functions of livestock such as animal traction, that leave less scope for major increases in offtake.

One particular form of increased commercialization is integration of extensive drylands production systems with more intensive fattening/finishing operations in higher-potential areas. This could reduce grazing pressure on pastoral areas, thereby leading to higher availability of forage resources for remaining animals, reduced need for mobility, and higher flexibility in case of drought. This is a well-known (and logical) theory, although little quantitative data exist. As shown in chapter 5, this would increase herders' income as well as the overall output of red meat in Sub-Saharan Africa (SSA). Stratification of livestock systems, under which drier zones produce feeder animals that can then be fattened in the higher-rainfall and therefore less drought-prone highlands of East Africa or the savannas of West Africa, provides a way of intensifying the pastoral drylands

value chain. Stratification has not worked well in the past at a regional scale, primarily due to limited demand for the higher-quality meat produced through such systems, and the inefficiency of para-statal companies involved in feed lots, for example in Kenya, Nigeria and Côte d'Ivoire. With demand now emerging for higher-quality cuts, new opportunities are appearing. In effect export-oriented private outgrowing operations are already emerging in East Africa, and have been a traditional cottage industry producing for religious holidays in West Africa. Stratification requires the establishment of more remunerative options for pastoralists to invest the revenues of earlier sales, probably combined with insurance, to reduce the importance of the risk reduction function of drylands livestock. For the rest of the chain, what is needed are credit facilities for outgrowers and processors, and the introduction of market-driven quality standards. On a policy level, introduction of grazing and watering fees would be a positive incentive for destocking stock at an earlier age.

In summary, stratification can increase the value added of drylands livestock, increase herders' income, address the demand and supply gap, increase overall efficiency of rangelands, and possibly free up grazing areas for reproductive stock. As such, stratification can be an important tool for reducing exposure and poverty.

Livelihoods Diversification through Development of Alternative Income Sources within Drylands

Seeking alternative sources of income within the drylands is a means of reducing exposure. Income diversification is particularly relevant during times of drought (Homewood et al. 2009; Little et al. 2008; McPeak, Little, and Doss 2011), as it enables households to recover by using income sources not dependent on livestock production. In addition, the poorest pastoralists and those who are exiting livestock production can benefit from selling their labor and from petty trade activities connected to livestock markets. As pastoral livestock production will remain the most viable production opportunity in drylands, efforts to create markets and value addition opportunities linked to the sale of livestock should be encouraged (Aklilu et al. 2013). In West Africa, small-scale or semi-industrial milk value chain development linked to pastoral areas where market opportunities do exist (near urban areas or rural cities) seems to have a significant impact on pastoral livelihoods (Corniaux et al. 2012). As the authors of Common Market for Eastern and Southern Africa (COMESA) Policy Brief 3 (2009) advise, however, diversification is not a panacea; some forms enhance welfare but others can increase risk. Diversification must therefore complement rather than compete with livestock production. Positive diversification examples include activities such as veterinary and input retail supply, post-slaughter livestock processing, and animal fattening, as they keep value added in the pastoral areas. Taking up crop farming, already quite widespread in West and East African drylands, is, of course, another alternative form of livelihood, although one not normally preferred by pastoralists.

McPeak and Little (2014) classified the herder populations from southern Ethiopia and northern Kenya according to their livestock assets and integration in the cash economy. They showed that households with smaller herds and lower cash income had a much lower rate of “bouncing back” to the income and asset resilience threshold, set here at US\$0.50 per capita per day, than households with the same herd size per capita that sought other sources of income. A similar trend occurred for households with larger herds [more than 3.5 tropical livestock unit (TLU) per capita]: those households that sought to combine herding with strong involvement in the cash economy recovered to the income and asset threshold much faster than those who stayed in livestock husbandry only. These interesting trends further support the need for diversification of assets and income.

In this context, the potential of payment for environmental services (PES) is worth exploring, particularly if it can provide an income stream that is not so tightly coupled with drought. Pastoral and agro-pastoral lands deliver a number of ecosystem services from which pastoral people currently benefit, both in financial and other terms. These include the provision of fuel wood and other natural products such as gum arabic, the delivery of water and soil health and nutrients to support rangeland production, carbon sequestration, and rangeland forage production as a support function to livestock and wildlife and cultural services, such as tourism. The concept of paying land users to change land management practices to provide “public good” services recognizes that financial incentives are an appropriate mechanism for compensating people for livestock production lost and services provided.

The drylands of East Africa are home to many wildlife species, and livestock and wildlife have long coexisted. Wildlife tourism is a thriving industry that generates considerable income for Kenya and Tanzania in particular. The recognition of this reality, and to avoid competition between livestock and wildlife, has led to creation of a number of different schemes to pay livestock keepers to manage their lands to enable passage and grazing for wildlife. The practices include: reducing livestock stocking density or restricting grazing; maintaining open wildlife corridors and seasonal dispersal areas; controlling poaching of wildlife; protecting natural vegetation; and avoiding fencing or subdividing land (Silvestri et al. 2012). While there is great interest in payments for wildlife conservation, such schemes are still very new and face certain challenges. Successful cases, such as the Wildlife Lease Program south of Nairobi National Park, rely heavily on external payments for the services provided. One drawback of such schemes is the limited ability of land-based schemes to improve the incomes of women (and other landless groups) given that men control most land access. It is also difficult for the schemes to generate revenues that are competitive with other land uses, such as cropping. Furthermore, during droughts when grazing area is scarce, the pressure to move cattle into prohibited areas is difficult to resist.

There is increasing interest in the potential for delivery of climate regulation services, including sequestration or the reduction of emissions from carbon from

soils and aboveground biomass, and management of the incident light or radiation (albedo) reflected from the rangeland surface. For example, the Global Livestock Cooperative Research Program funded by United States Agency for International Development (USAID) has done extensive research in Central Asia and concluded that the Central Asian rangelands, if well managed, could sequester the equivalent of a 30 percent reduction in carbon emissions caused by humans in this area.³ But more research and piloting is needed in dryland regions of Africa to understand and identify: (i) how much carbon can potentially be sequestered in rangelands; (ii) the incentives necessary for pastoralists to change their management practices to sequester carbon; (iii) markets for carbon sequestration and mitigation of other greenhouse gases (GHG); and (iv) mechanisms for the distribution of benefits, as the land is collectively owned. Furthermore, pastoral people currently lack connections and skills to develop and tap into such markets. Pastoralists manage rangelands to optimize livestock performance, constantly monitoring forage and water conditions. While “co-managing” rangelands for greater carbon sequestration is likely to bring about healthier rangelands, the tradeoffs between providing carbon versus ensuring livestock productivity need to be assessed, especially given the tremendous spatial and temporal heterogeneity of vegetation in rangelands and the other drivers of change. Through the establishment of silvo-pastoral systems in Central America, PES for the contribution to carbon sequestration and enhancement of biodiversity has demonstrated the mutual benefits to farmers and the environment. There, a small payment in line with the international price of carbon was used to “tip the balance,” as it increased milk and meat production. This system is now scaled up in Colombia (Ibrahim et al. 2010).

In summary, the search for additional sources of income should be an integral part of any development investment. In this context, PES, although challenging to implement in collectively used rangelands, has the potential for major environmental and social benefits, fits perfectly in the vision of shifting future drylands’ use away from only meat and milk production, and deserves much more attention in drylands development than it is currently given.

Livelihood Diversification through Development of Alternative Income Sources Outside of Drylands

Pastoralists (particularly the poorest, who own fewer animals than the minimum needed to be able to regain their pastoral livelihood in the event of a shock) who leave the drylands and take up alternative forms of employment in more favored regions or in urban areas will reduce their exposure to shocks. Outmigration reduces sensitivity to shocks for those who stay as well, as it increases their resources. Outmigration also reduces the exposure of underemployed pastoral youth to criminal activities related to drug trade. This is politically sensitive, however, as central governments generally want to avoid massive migration to big urban conglomerates. However, with the structural poverty now prevailing for drylands livestock keepers (chapter 3), outmigration is unavoidable. To make it

more socially acceptable, it should be accompanied by skills development. Outmigration therefore must be facilitated through training and credit.

For pastoralists who are just at the minimum threshold herd level, livelihood diversification is a good strategy to reduce exposure and sensitivity to different types of shocks. This diversification has been described as increasing in several situations in Africa and elsewhere. For example in Senegal (Manoli et al. 2014), diversification consists of income from activities in trade, crop production, and services (human or veterinary health, salaried activities, or education, for example) but also from financial support from relatives living in urban areas. To improve access to this diversification, it is quite clear that state and local authorities can play an important role through development programs and incentives.

In summary, diversification of income sources must be a cornerstone of any drylands livestock development effort aimed at long-term sustainability and reduction of emergency aid dependence. Diversification is preferably sought within drylands, but in view of the magnitude of drylands livestock-keeping households' needs, it should also be promoted through skills development for those who migrate to urban areas.

All Drylands Livestock Systems

Given the increasing incidence and severity of conflicts and the increasing number of internal and international displacements (de Haan et al. 2014; Schrepfer and Caterina 2014), conflict resolution must be an integral part of drylands development. The focus should be on peacebuilding efforts at multiple levels, from local to regional, as a critical priority. For East Africa, a recent technical brief by Pavanello and Scott-Villiers (2013) discusses some promising examples, noting that the most effective efforts require multi-level action from both citizens and policy makers to create or enhance effective institutions, and demand lengthy processes requiring multiple agreements and actions. Some specific examples include:

- Supporting local or customary institutions, as many pastoral communities have long relied on traditional bodies, particularly councils of elders, to manage conflict. The erosion or the overriding of these traditional bodies by formal governments leaves a vacuum, as communities consider customary institutions by far the most legitimate form of governance. Local institutions are especially important for managing access to key grazing and water reserves during droughts. In 2009, a 6-year process initiated by customary leaders and backed by women and youth and the Kenyan and Ethiopian governments led to the reconciliation of Borana and Gabra communities in the cross-border area. A series of meetings combined state and customary approaches, focusing on more effective governance, ending divisive politics, and increasing social harmony (Scott-Villiers et al. 2011). Somaliland has remained peaceful in spite of ongoing conflict in Somalia through a political order that rests on a combination of customary pastoralist institutions and modern institutions, including councils of elders, which are important for conflict resolution (Boege et al. 2008).

- Focusing on cross-border conflicts, as pastoralists often move animals across ethnic, district, and national boundaries to bring them to market and to find water and grazing areas. Protecting mobility can be complicated by different governance arrangements and political interests on different sides of borders.
- Implementing information and warning systems. The Intergovernmental Authority on Development (IGAD) Conflict Early Warning and Response Mechanism (CEWARN) was established in 2000 with a mandate to receive and share information concerning the outbreak and escalation of violent conflicts in the region, including monitoring loss of life and livestock. A focus on cross-border pastoral conflict was agreed as an entry point. The CEWARN approach focuses on early response and networking and collaboration among all stakeholders. The Rapid Response Fund established in 2009 is intended to assist quick responses to conflicts (through local monitors) and to build local capacities and institutions. One positive reported outcome has been improved information flow, and in several cases information has helped to prompt both state and local responses (Kassa 2011). In 2012, CEWARN's mandate expanded to include political and administrative engagement, a welcome step towards resolving some of the deeper and more intractable drivers of conflict (Pavanello and Scott-Villiers 2013).

Ultimately national and regional policy must support long-term peace and stability. Few national policy examples exist in East Africa, although Kenya developed the National Policy on Peace Building and Conflict Management in 2009. While it offers a holistic framework for interventions and harmonization of policy areas and recognizes customary institutions, it falls short of making clear links to national legal frameworks (Pavanello and Scott-Villiers 2013). At the regional level, IGAD has a very important role in conflict management in pastoral areas, as does the African Union (AU), although interests of individual member states that override their commitment to the regional bodies hamper both. The AU Policy Framework for Pastoralism in Africa was adopted in 2011 and is widely heralded as an important initiative. The document takes a comprehensive approach to supporting peacebuilding in order to develop pastoralism by properly identifying sources of conflict, providing immediate response, supporting traditional conflict management mechanisms, and sensitizing national laws and regulations (AU 2010). A second important document is the AU Framework and Guidelines on Land Policy in Africa, adopted in 2010. This provides a foundation for engaging multiple partners to mobilize resources and capacity to develop and implement land policy (AU-ADB-ECA 2010).

In West Africa, Turner et al. (2011) highlighted the importance of conflict resolution at the local level, noting that the majority of conflicts are already resolved locally. Social networks are therefore very important. However, pastoralists often feel marginalized, torn between informal and formal governance (chapter 3), and have fewer opportunities for “forum shopping” (that is, selecting the most receptive channel for favorable resolution of their complaints) (de Haan et al. 2014). The same authors recommend combining (although not integrating)

pastoral development with enhanced security inputs to stem the increasing violence and criminality. They plead also for inclusive pastoral development, which reduces the mistrust now prevailing, so that pastoralists can become the “eyes and ears” of the authorities entrusted with the security.

In the place of large-scale resource access reform, policy makers need to concentrate on developing procedures for resolving land disputes and on specifying who is entitled to make legal judgments regarding land ownership, how they may legitimately go about doing so, and how these decisions can be enforced (Toulmin and Quan 2000). Support should be given to civil society groups in countries where it is possible to use the courts, national media, and political processes to represent pastoral interests and rural land rights. International forums and funding conditionality can be employed to support the land rights of rural communities when powerful interest groups genuinely obstruct the representation of their interests at national level.

In summary, conflict resolution mechanisms are an essential part of drylands development. They should focus on strengthening local formal and informal levels and seek to treat all actors equitably.

Reducing Sensitivity to Shocks

Grassland and Pastoral Systems

Improving Early Warning and Response Systems

Investments to better monitor the evolution and impacts of droughts have been used for well over two decades in East and West Africa. Their purpose is to track environmental and social indicators that alert governments, donors, and other aid agencies that a drought is unfolding, predict its likely impacts on livelihoods, and hence identify which early response can prevent the drought from becoming a disaster. Early warning systems (EWS) became popular in the 1990s and were noted for improving the quality and transparency of information about impending drought crises.

Problems remain, however, particularly with respect to the timeliness of responses. After each drought since 1999, analyses of why droughts led to crises have blamed the lack of a sufficiently early response and late interventions that focused on saving lives rather than (livestock-based) livelihoods (Aklilu and Wekesa 2002). Issues include: unclear usefulness for the pastoralist and government centered, with a bias toward food aid; monitoring of lagging indicators rather than true early warning; multiple EWSs used by different agencies; and a lack of trust by donors in national data collection. In 2004, the concept of Drought Cycle Management (DCM) became popular as it advised agencies to treat droughts as regular, cyclical events that could be managed with intervention throughout four stages: normal, alert, emergency, and recovery (IIRR/Acacia Consultants/Cordaid 2004). Such a concept was adopted by the World Bank-funded Arid Lands Project in Kenya. Most practitioners now refer to good practice as one that adopts a Disaster Risk Reduction (DRR) approach, and a number of international as well as regional initiatives are devoted to fostering approaches

such as the Hyogo process,⁴ a global and broadly focused DRR (although it is too early to assess its effectiveness in reducing pastoralist sensitivity to climate shocks). DRR is also the core of Regional Learning and Advocacy Program (REGLAP), a mainly European Union (EU)-funded project implemented by Oxfam that has a strong learning component.⁵

Some initiatives have shown promise. For example, the Kenya Food Security Steering Group under the World Bank Arid Lands Project, with participation of other donors such as the EU, established to harmonize across donors and agencies, was eventually institutionalized in the Kenya National Drought Management Authority, a public company. Its EWS is decentralized and community based, collecting human, livestock, and production and market (prices) indicators.⁶ Early response is prepared at the district level, with defined steps to be taken at each stage of the drought cycle (Swift 2000) and the Livestock Emergency Guidelines and Standards (LEGS).⁷ While Kenya's early response performance can certainly be improved, the Authority and its predecessor (the Food Security Steering Group) have improved the decision-making process.

The EWS in Ethiopia is implemented nationally under the Disaster Risk Management Food Security Sector, placed in the Ministry of Agriculture, and gets its livelihood-focused information from district-level task forces. This information is fed into decision-making processes to allocate relief to emergency-affected areas and districts and to help program the use of newly established contingency funds (Fitzgibbon and Crosskey 2013). The Food Security and Nutrition Analysis Unit (FSNAU) monitoring unit for Somalia has been running for 11 years and is known for its comprehensive and high-quality data.

In West Africa, the Information System on Pastoralism in the Sahel (SIPSA)⁸ was established in 2002 as a network of institutions and professional organizations (not as a project). SIPSA is technically supported by CILSS-Agrhymet, Food and Agriculture Organization of the United Nations (FAO), and Centre de coopération internationale en recherche agronomique pour le développement, France (CIRAD) and financially supported by regional and national programs. SIPSA provides EWS information and long-term analysis of trends to facilitate decision making (Toure et al. 2013). This network organization, based on existing regional and national programs and institutions, is relatively inexpensive to maintain (expenses total around US\$20,000 per year for the whole region) and enables continuity, but is constrained by heterogeneity of efficiency among partners.

In summary, the critical building blocks for an efficient EWS system are: (i) better involvement of communities in the design and implementation of EWS; and (ii) improved timeliness, quality, and sustainability of the early focus and scope of the response. EWSs are largely political and involve donor and government commitment.

Introducing Incentives and Institutions for Rapid Destocking and Restocking

One of the most important early response activities is to give pastoralists access to markets to sell their animals at the onset of a drought. This is still a relatively

new intervention, with limited experience in northern Kenya after the 1999/2000 drought (Aklilu and Wekesa 2002) and a well-documented experience in Ethiopia in 2006 (Abebe et al. 2008). The concept behind destocking interventions is that pastoralists can receive cash for their not yet completely emaciated animals early in the onset of drought, allowing them to purchase food and inputs to maintain their core herd. It is promoted as an intervention to save livelihood assets and to allow pastoralists to receive decent prices for their livestock, as prices always fall when weak animals flood the market. It requires the involvement of private traders, although support is often provided by nongovernmental organizations (NGOs) or governments and hence involves operational complexities. Slaughter destocking, whereby animals are killed and their meat distributed, is another option.

A comprehensive evaluation of the commercial destocking operation in southern Ethiopia in 2006 indicated that the scheme was successful because of carefully negotiated links between traders and pastoralists, as well as the availability of loans to traders for the advance purchase of animals (prior to selling them in the market). Approximately 20,000 animals were sold with a cost-benefit ratio of 1:41 due to subsidized transport mainly and revenue generated by savings from early destocked animals, as the animals sold for good prices. A subsequent livelihoods impact assessment indicated that the cash earned from the livestock sales was a high proportion of household income, used to purchase food for people as well as inputs to protect remaining livestock.

There is little experience with “restocking” of animals after droughts as part of the recovery phase. The LEGS recommend this as a potentially important intervention to kick-start production recovery. In an evaluation of the social impact of a livestock (cattle and small stock) restocking project in northern Kenya, Heffernan, Misturelli, and Nielsen (2001) found that the distribution of livestock often did not result in a return to a pastoral livelihood, but did have a positive effect on social indicators such as school enrollment and food security. Caution is suggested in ensuring that communities are consulted as to the most appropriate type of animals, and commercial restocking is suggested as a mechanism to support the traditional restocking mechanisms already used by pastoralists (LEGS). Targeting to ensure that the distributed stock is not captured by the wealthy is also a major issue. As this intervention is relatively expensive, ensuring adequate compensation for destocking and local markets and social networks for restocking are probably the best options.

In summary, externally supported destocking and restocking as a buffer against shocks can be effective in sustaining pastoral and agro-pastoral livelihoods through a drought. These are likely to be economically justifiable but operationally complex.

Diversifying Livestock Systems with Better-Adapted Species

Identifying species and breeds better adapted to drylands' harsh conditions has not received much formal attention, although this is a principal strategy used by pastoral

livestock producers to respond to pasture availability and market opportunities (Manoli et al. 2014). For example, as seen in chapter 3, the number of small ruminants, particularly goats, has grown much faster than cattle in both regions due to their drought resilience, faster reproductive rate, better adaptation to the increasing shrub encroachment, and booming market prospects for small ruminant meat. Limited empirical and widespread anecdotal evidence suggests that camel trade has become quite lucrative (Mahmoud personal communication), especially the live trade to the Middle East. Livestock survey numbers from Kenya (Said, personal communication) also suggest that the number of camels is increasing, and that camels are being raised in areas such as southern Kenya where previously they were not.

All Drylands Livestock Systems

Vaccination against contagious diseases is often regarded as a public good, because of the existence of spillover benefits (positive externalities) that are not captured by those who pay for vaccination services. This creates opportunities for free riding and leads to socially suboptimal levels of investment in vaccination services. If one herder vaccinates, the risk is reduced that his neighbor's herd will get the disease, so there is less incentive for the neighbor to vaccinate. Yet the consequences of free riding and underinvestment are severe, because an outbreak of the disease can jeopardize the entire sector through export bans (Nin Pratt et al. 2005; Umali, Feder, and de Haan 1992; World Bank 2009a). However, experience shows that government service providers cannot cost-effectively cover sparsely inhabited drylands areas. Outsourcing vaccination services to private service providers, including para-veterinarians who can be engaged at lower cost than fully accredited veterinarians, can increase coverage and drive down costs, as was demonstrated during the successful Rinderpest eradication campaign. This will require: policy dialogue on the distribution of responsibilities between the public and private sector to avoid unfair competition between public and private service providers; performance-based and well-controlled outsourcing contracts to private sector service providers; and facilitation of access to veterinary products through private and associative sector development.

In summary, high levels of immunity to contagious diseases reduce livestock-keeping households' sensitivity to disease shocks (and even drought shocks). Vaccination is a public sector responsibility but a close private-public partnership is needed for it to be efficiently implemented.

Enhancing the Capacity of Livestock-Keeping Households to Cope with Shocks

Introducing Weather IBLI

Livestock insurance recognizes that livestock loss due to droughts is a major risk that shapes the behavior as well as livelihoods of pastoral livestock producers, given that livestock are their main productive asset. Insurance is a mechanism for compensating livestock owners if the predicted livestock mortality or loss of for-

age from a drought threatens to diminish their herds below a critical threshold from which it is hard to regain herd productivity (10–15 TLU per household) (chapters 3 and 5). The insurance system now being tested in East Africa (Index-Based Livestock Insurance or IBLI) is based on the Normalized Difference Vegetation Index (NDVI). This is the best indicator of pasture conditions available across African drylands, and provides an objective means of determining whether drought has occurred, as it is based on a measure of vegetation “greenness.” The NDVI is linked to a model that predicts livestock mortality for a given area based on historical data. Beneficiaries receive a payout if the NDVI drops below a threshold that predicts a certain level of livestock mortality (say 15 percent). The insurance (hopefully) prevents households from falling into a “poverty trap” and from having to rely much more on non-livestock-based sources of income (Chantarat et al. 2013).

IBLI was first piloted in Marsabit district, Kenya, in 2010, in partnership with a Kenyan insurer and a local bank, using a product designed by International Livestock Research Institute (ILRI) and Cornell University. Payouts are made if the index predicts that on average more than 15 percent of insured livestock will die. The first payout was made in one division of Marsabit in October 2011, and two more in March of 2012 in different divisions. Coverage is currently being expanded to six districts in northern Kenya. IBLI was initiated in Ethiopia in mid-2012. The attractiveness of IBLI as a way to protect pastoralists is linked to the low transaction costs, as the use of an index makes costly verification of actual deaths unnecessary. Second, it allows for quick payouts and eliminates moral hazard and adverse behavior. Technical issues include the commonly erratic spatial distribution of rain, which, together with the mobility of herds, complicates the identification of beneficiaries, although this is handled by issuing contracts for specific locations. Challenges include the need for long-term historical data to calculate the index and the technical complexity of the product, which needs to be explained to insurers, financiers, and prospective clients. A major issue is the commercial viability of such a new product, coupled with the huge challenges in implementing sales of the product at sustainable levels. While impact assessment of IBLI to date is limited, early results indicate that clients who received payouts in 2011/12 were appreciative.⁹

In summary, the introduction of livestock insurance, although still faced with technical, commercial, and marketing challenges, is promising enough to scale up to larger areas and greater numbers of beneficiaries.

Enhancing Access to Domestic and Foreign Markets

This standard intervention is aimed mainly at domestic markets. Market infrastructure in drylands is often of poor quality, and investments (often from external donors) including improvements in loading ramps, pens for holding animals, weighing scales, etc. are often poorly maintained, and have shown to be unsustainable after external supports stops. In addition, they have often been associated with increased fees (Aklilu and Catley 2009). One of the main reasons for

the lack of sustainability is that municipalities often manage markets and rural slaughterhouses and divert their revenues to other municipal needs. One emerging model is the “co-management” of markets, whereby a formal partnership is established between communities and local councils, ensuring that improvements meet the needs of communities and that communities take responsibility for maintaining the infrastructure (Were 2012). Road improvements, especially along tertiary routes, do stimulate market activity, as transporting animals to markets and road conditions are a major issue for pastoralists, since lorries cannot move along poor roads. Intensification of production can make a difference as well, as shown in Senegal, where a network of big mechanized watering points in the pastoral area of Ferlo since the 1950s has increased human and livestock population density, stimulated the organization of marketing and transportation of goods, and facilitated access to services (Ickowicz et al. 2012a; Touré et al. 2013; Wane et al. 2009a).

There are limited abattoirs and cold storage facilities to enable trading in meat products, which is more profitable than live animals. The few located in Kenya and Ethiopia, for example, are located far away from either production sources or ports (Aklilu et al. 2013). Improving activity in secondary or “bush” markets can also improve access for poorer pastoralists, as well as provide a basis for enhancing value addition through the introduction of weight- or grade-based transactions (Aklilu et al. 2013). However, establishment of grades is a private good (no externalities involved) and should be market-driven and -monitored, otherwise it will become subject to rent-seeking by officials (World Bank 2009a).

For the important cross-border trade in both regions, policies should focus on improving security and reducing high transport costs and unfair market practices, as well as informal (illegal) taxes by government officials (COMESA 2009). However, excessive intervention in cross-border trade may result in it going further underground. Moreover the economic importance of the live animal trade (chapter 3) makes regulating these porous borders difficult, and administering these borders is challenging as well as risky (Mahmoud 2010). Stabilizing the borders and supporting livestock trade could have financial benefits, in particular if it would bring security. For example the “Cash against Commodity/Advance Payment” (CAC/AP) arrangement put in place by the Ethiopian government allows safe transit of animals across the border, and has increased camel and cattle trade by more than 400 percent across one corridor alone (FAO 2012). FAO (2012) also recommends a “drought-time” cross-border trade strategy, relaxing government controls and recognizing the flexibility provided by moving animals across borders in times of severe drought, including commercial destocking.

Sanitary and phytosanitary (SPS) standards remain an important barrier to engaging in export trade. The severe effects of an import ban from Saudi Arabia were described in chapter 3. Disease-free zones are not an economically and financially viable option for drylands, where mobility is so important (Aklilu 2008; Little et al. 2010). Another option is to improve compliance with SPS standards. However, this currently requires improvement of quarantine facilities,

as evidenced by recent Foot and Mouth Disease (FMD) related export through Djibouti to Arab Republic of Egypt, as private Saudi Arabian companies control the ports (Little et al. 2010). Joint vaccination campaigns, harmonization of standards, and facilitation of cross-border trade requirements are important regional policy issues already in the programs of regional organizations. For example, COMESA and the Economic Community of West African States (ECOWAS)/ West African Economic and Monetary Union (WAEMU) strongly support regional harmonization of SPS standards (Magalhães 2010), but this is constrained by national bureaucratic interests. The regional pastoral projects supported or in the pipeline for funding by the World Bank in East and West Africa, respectively, further support this harmonization. Other nontariff barriers to trade (fiscal policies and asymmetric information flows) are reviewed in the background paper on trade written for the Africa Drylands study.

Sanitary standards are based on keeping the entire country free of a disease, unlike phytosanitary standards, which are based on the safety of products. Towards the end of the last decade, a commodity-based approach was propagated, for example by COMESA and Department for International Development, UK (DfID), to allow trade for meat on the basis of product safety. This approach has, in principle, been accepted by the World Organization for Animal Health (OIE), but beyond some export of deboned beef from foot and mouth disease (FMD) areas, it has not (yet) led to a significant increase of beef from areas with main transboundary, high-risk animal diseases¹⁰ to remunerative markets, and with FMD, there is still uncertainty regarding the safety of the deboned product.

In summary, while some investment in infrastructure improvement for livestock marketing and processing of livestock is needed and useful if embedded in the appropriate institutional framework, most attention in trade development needs to be directed to trade facilitation, including harmonization of regulations.

Establishing Fodder and Feed Reserves

This intervention holds promise. Providing supplementary feed to breeding stock and weak animals is considered best practice (LEGS), and the few impact assessments that exist (Feinstein International Centre 2007) suggest that communities like practices that help save their animals, and pastoralists will spend their own income on fodder (Ickowicz et al. 2012b). Feed transport systems are emerging, in particular in the Sahel even combined with hay making, as in Burkina Faso, although most feed is directed to peri-urban livestock keepers, not pastoral populations. Challenges include: the lack of experience with growing and selling fodder in drylands areas; the lack of appropriate transport and storage; and the need to ensure that communities are involved in the design of fodder interventions. A similar initiative helps pastoral communities maintain the ability to protect and manage traditional dry season grazing areas, which are under threat from degradation, bush encroachment, and appropriation by elites (for example, Kinfe 2011).

Generally speaking, prospects for increasing primary production from rangelands are dim, partly because they are already so efficiently used (chapter 3). A

special approach to increase range productivity is advocated in holistic resource management (HRM), which reports beneficial effects of heavy animal hoof impact (such as provided by herds of wildlife) for a short duration (Keppel 2005). According to this approach, overgrazing is not so much a function of animal numbers, but more of the time the pasture is exposed to grazing. Private farms can easily apply HRM principles on their pastures. HRM methods have often proved unsuccessful in situations of open access of grazing areas, because as soon as a group of pastoralists leaves the grazing area so that it can recover, others herders may use it, hindering the recovery process or even degrading the land. HRM of common grazing areas is therefore only possible if strict and disciplined herding is monitored by a group of people who have secure communal land rights. Limited scientific and economic analysis is available on this approach. In addition, it would apply less to the arid/pastoral areas as the annual grasses of the Sahel and horn are less sensitive to continuous grazing pressure than the perennial grasses of the semi-arid zones.

Fodder production is an option in riverine or irrigation areas that could foster value addition for pastoral producers and provide highly needed income diversification, as well as improve grazing shortages during droughts. There is little documented experience with forage production in drylands, although several projects have worked on this in recent years, as many believe this intervention holds promise. One long-running project is the Rehabilitation of Arid Environments (RAE) trust in Baringo in northern Kenya.¹¹ RAE has worked in the area to reclaim degraded lands through grass reseeding and establishment of community-based and private grasslands. Some of these also sell grass as fodder to supplement their incomes (Mohammad Said ILRI personal communication). The Kenya Drylands Livestock Development Program (KDLDP) and the Kenya Rural Development Program (KRDP) also promote fodder production in drylands, but there is little solid evidence of the costs and benefits. Essential preconditions for fodder production are credit and a viable seed industry.

Fodder conservation (that is, making hay from high-quality, rainy season natural vegetation to be used as dry season (emergency) feed) is another important measure to enhance households' capacity to cope with shocks for a small part of the herd (lactating female, young cattle), as collective land and reciprocity make large-scale hay harvest difficult. Fodder conservation is becoming increasingly popular; for example, in Burkina Faso, the production of six million bales is foreseen in 2012.¹² Again, this intervention provides alternative income sources to livestock keepers. The provision of (micro)-credit and advice are important components needed to support this activity.

In summary, growing or conserving fodder and improved range management have a place in drylands, although mostly in favorable niches in the landscape.

Strengthening Clinical Veterinary Services

Better clinical veterinary care becomes particularly important after a shock has hit, as reducing mortality among young stock can play a critical role in reducing

losses and ensuring rapid recovery in herd numbers. Mortality in young stock can be reduced through the provision of accessible and affordable clinical veterinary services. Most clinical veterinary services have the attributes of private goods; preferably they are supplied through a network of private veterinarians and para-veterinarians. Community animal health workers (CAHW) should operate with formal recognition, as they are the main providers of services to pastoral populations (Aklilu 2008), and providing services to remote areas is expensive if it relies on fixed point veterinary services (Catley et al. 2004). Ethiopia has legitimized the role of CAHWs (including publishing the “Minimum Standards and Guidelines for CAHW System in Ethiopia”) and created private veterinary pharmacies, resulting in improved service provision. CAHWs were important in eliminating Rinderpest from Afar and South Sudan (Leyland et al. 2014). Good progress has been made in West Africa, as reported, for example for Senegal in a special edition of the OIE Technical and Scientific Review (Niang 2004).

Tradeoffs

The interventions described in this chapter are likely to involve number of tradeoffs, especially with regard to efficiency versus equity. For example:

- *Stratification* will favor large herd owners, who can better provide the uniformity and volume of feeder animals, but might further crowd out small livestock keepers.
- *Product differentiation* will benefit larger herd owners who are better equipped to make the investments to meet the stricter standards.
- *Skills enhancement leading to outmigration* will benefit the poorer parts of society, who depend for a larger part on remittances, but it could cause increases in labor costs for larger producers.
- *PES schemes* will particularly benefit larger agro-pastoral households because of the economies of scale involved in the measurement.

Challenges

Efforts to reduce the vulnerability and increase the resilience of livestock keepers will have to overcome a series of challenges. Three prominent ones are described next.

Maintaining Equity

Evidence is accumulating that livestock ownership both in the Sahel Region and in the Horn of Africa is becoming increasingly concentrated. In East Africa, wealthy traders have been increasing their purchases of animals and consolidating stock into large herds (Catley et al. 2004), in the process crowding out many of the small herders who traditionally accounted for the largest share of the market. Absentee ownership by government officials and traders, who manage

their herds with the help of hired herders, has also become more common in the Sahel. Within each of the major systems, worrisome trends have also emerged in gender roles. Both in the Sahel and the Horn of Africa, women have traditionally played an important role in livestock management and have correspondingly benefited from certain dedicated revenue streams. Interventions designed to improve productivity and ensure the sustainability of livestock production systems therefore need to be designed in ways that do not jeopardize the benefits that have traditionally flowed to women. Chapter 5 provides an assessment of the impact of policies to redress equity (that is, preferential allocation of grazing rights to collectives of smallholders, progressive grazing and watering fees, taxation, etc.).

Improving Governance

Design of effective policies and programs to reduce vulnerability and increase resilience among livestock keepers in the drylands of Africa will be challenged in many countries by the lack of voice of many livestock keepers in the national policy discourse. A relationship of mutual respect and trust needs to be reestablished between many of the groups living in drylands and national governments. Positive signs have been observed in recent months of a renewed willingness to engage in constructive dialogue, as reflected in the commitments expressed in the N'djamena and Nouakchott Declarations. Following up on these important documents with concrete actions will be critical for developing more resilient and stable drylands livestock economies. Of particular importance will be implementation of the “Codes” in West Africa (Toure et al. 2013), now lagging behind due to bureaucracy, and in East Africa the preparation of legislation that better safeguards pastoralists’ rights. Some progress has been made with group ranches in Kenya, to be redefined in the new Constitution, Land Policy, and the upcoming Community Land Bill, and more comprehensive progress is under way in Uganda and Tanzania (box 4.2).

Box 4.2 Providing Access Rights to Rangeland Resources in Tanzania

Tanzania provides the most progressive policy and legislation in East Africa, as its Village Land Act (VLA) 1999 requires villages to allocate village land between individual and communal categories, as well as set aside some lands for future use (*akiba*). The first step is for a village to confirm and secure its boundaries by obtaining a village land certificate. Certificates of Rights of Occupancy (customary or granted) are then issued to land users, and land use planning is carried out. In addition, legislation states that villages should produce a “village resource management sector plan” to provide for sharing of resources and movement across administrative boundaries. This can provide a useful tool for legitimizing shared rangeland resources such as grazing areas. Challenges include low awareness and inadequate institu-

box continues next page

Box 4.2 Providing Access Rights to Rangeland Resources in Tanzania *(continued)*

tionalization of the process, conflicts over village boundaries and resources, budget constraints, reluctance amongst district officials to relinquish their own power over land, excessive bureaucracy, and poor skills levels. In addition, pastoralists can often be left out of decision-making bodies and processes, and it remains difficult to control access and use of grazing lands. A provision in the Grazing Land and Animal Feed Resources Act (No. 10, 17(23), 2010) states that grazing land should be protected and secured for pastoralists—providing a set of steps follow including the formation of a Pastoralist Association to whom a defined grazing area can be registered. Regrettably, no data are available on how well the pastoral grazing rights have been respected.

To register village land and produce a village land use plan (VLUP) costs between 12 and 20 million Tanzanian shillings (US\$4,000–12,000) per village, or more if there are conflicts over boundaries. This is one of the factors limiting implementation of the VLUP process; only about 1,000 villages of a total of around 8,800 in the country have completed the process. However, a number of ways exist in which costs can be reduced and the efficiency of the process increased, for example, by sharing resources and surveying several villages simultaneously. Though it may not be appropriate to replicate the entire Tanzania process described above, the case provides important experiences upon which other countries can build.

Source: Flintan (personal communication).

Financing Recurrent Costs

Most of the “best bet” interventions described in this chapter (pastoral water resource development, PES, EWSs, animal health services) require recurrent funding that, as experience has shown, cannot be assured in many African countries. To ensure that financial support is sustained over the longer term, development partners will have to be convinced of the international public good character of these investments. While the resources needed to implement the interventions described here may seem significant, the amounts are certainly much smaller than the economic losses caused by drought and civil conflict, combined with the cost of emergency aid spent in the region. Chapter 5 gives a summary of the costs involved.

Notes

1. Several good overviews are available on pastoral development issues in the drylands. For example, the Livestock Emergency Guidelines (LEGS) are an excellent example of up-to-date information and decision tools on livestock-related emergency aid. See <http://www.livestock-emergency.net/about-legs/>
2. Some studies are underway; for example, see McPeak (2004) for a study in the Senegal River valley (crsps.net/wp-content/uploads/2013/07/McPeak-Syracuse-U-Integrating-Animals-Legumes.pdf)

3. <http://crsps.net/wp-content/downloads/Global%20Livestock/Inventoried%208.15/2-1998-3-266.pdf>. This comes from a popular piece from the University of California –Davis.
4. <http://www.preventionweb.net/english/hyogo/framework/?pid:507&pil:1>
5. <http://policy-practice.oxfam.org.uk/our-work/food-livelihoods/reglap>
6. www.ndma.go.ke
7. <http://www.disasterriskreduction.net/drought-online0/documents/detail/en/c/3464/>
8. <http://www.fao.org/agriculture/lead/themes0/drylands/information0/les-composantes-du-sipsa/fr/>
9. More information, with several case studies on: <https://livestockinsurance.wordpress.com/category/about-ibli/>.
10. The following diseases are in the former list A and their occurrence can preclude import in the countries free of these diseases: Foot and Mouth Disease (FMD), bovine spongiform encephalopathy (BSE), Rift Valley Fever (RVF), contagious bovine pleuro-pneumonia (CBPP), lumpy skin disease (LSD), and bluetongue.
11. www.raetrust.org.
12. <http://www.irinnews.org/report/96663/burkina-faso-preventing-conflict-between-farmers-and-herders>.