Food and Agriculture Organization of the United Nations

Pastoralism in Africa's drylands

Reducing risks, addressing vulnerability and enhancing resilience

Pastoralism in Africa's drylands

Reducing risks, addressing vulnerability and enhancing resilience

Food and Agriculture Organization of the United Nations
Rome, 2018

REQUIRED CITATION

FAO. 2018. *Pastoralism in Africa's drylands.* Rome. 52 pp. Licence: CC BY-NC-SA 3.0 IGO.

ISBN 978-92-5-130898-1

Photo cover: ©FAO/Albert Gonzalez Farran

Contents

Foreword

Stretching across Africa's drylands, from the Sahelian West to the rangelands of Eastern Africa and the Horn and the nomadic populations of Southern Africa, pastoralism is the main livelihood of an estimated 268 million people. It represents one of the most viable – and sometimes the only suitable – livelihood options in the drylands and makes enormous contributions to social, environmental and economic wellbeing in dryland areas and beyond. Pastoralism has a unique ability to add value and convert scarce natural resources into meat, milk, income, and livelihoods.

Pastoralist populations are increasingly vulnerable to malnutrition and food insecurity as their capacity to adapt to and recover from crises declines in the face of recurrent and often overlapping shocks.

Yet pastoral livelihoods have been severely undermined by decades of neglect (with as low as 1 percent of government budget allocation), violence and displacement, insecure land rights and access, deteriorating natural resources, climate variability and change, and a growing risk of animal and zoonotic diseases. The pastoral system and mode of production is increasingly threatened despite demonstrated remarkable resilience. Pastoralist populations are increasingly vulnerable to malnutrition and food insecurity as their capacity to adapt to and recover from crises declines in the face of recurrent and often overlapping shocks. This was starkly illustrated in 2017 as Somalia veered towards famine, with pastoral populations facing the worst of the drought and resulting hunger. Conflict and instability have also constrained pastoralists' movement. In April 2018, ministers of the West African states of the Economic Community of West African States (ECOWAS) met to consider tightening further crossborder transhumance as a means of curbing concerns over growing insecurity in the Sahel, with frequent incursions from terrorist groups and conflicts between herders and farmers.

Many of the protracted and recurrent crises in Africa today are in pastoral areas, demonstrating that not enough is being done to sustainably address the vulnerability of these populations. Responses to crises in pastoralist areas are often late and inadequate, and humanitarian interventions are insufficiently linked to longer-term development. Longer-term investments are either disruptive to the pastoral way of life or tend to be sectoral, for instance focusing on water or on livestock rather than on the whole pastoral livelihood system. Therefore a shift to a more systemic livelihood approach would provide a more holistic framework, with challenges are tackled in a sustainable manner.

The Food and Agriculture Organization of the United Nations (FAO) has therefore prepared this paper to explore the mounting challenges faced by the pastoral system and indicate opportunities and options to strengthen the resilience of pastoral livelihoods. Ultimately, this requires a deliberate mix of short-, medium- and long-term actions undertaken in tandem across the humanitarian-development-peace nexus.

Pastoralists are key actors and an integral part of a lasting solution to ensure the stability of Africa's drylands.

Pastoralists are key actors and an integral part of a lasting solution to ensure the stability of Africa's drylands. FAO's recommendations therefore include engaging pastoralists in policy- and decision-making processes through improving capacity, accountability and responsiveness in governance institutions; engaging local, national and regional partners to address the cross-border dimension of pastoralism; ensuring stronger links between local and higher-level peace initiatives; developing livelihoods-based information and monitoring systems (from rainfall to forages, water points, feed, mobility and beyond) in order to provide critical early warning that triggers early action; supporting adaptive capacities through the linking to markets and trade and the introduction of diversified income sources and new practices and techniques; and ensuring adequate preparedness for timely response if and when a shock strikes. The development of an enabling policy environment in pastoral and agropastoral areas should also consider longer-term sustainability including incentives for the private sector to flourish.

Continued investments in innovation and technologies are also critical to enable pastoral communities to use otherwise marginal and fragile ecosystems. For example, in the Horn of Africa, FAO is working with the relevant governments to undertake feed assessments to establish feed balance and avert massive livestock deaths with major implications for livelihoods and human nutrition.

Pastoralism is well adapted to manage the risks and uncertainties faced in Africa's drylands. With pastoralists facing an increasing threat of hunger, FAO is advocating for enhanced efforts and stronger partnerships among all actors to build the resilience of pastoral livelihoods.

Daniel Gustafson
Deputy Director-General (Programmes)

Maria Helena Semedo
Deputy Director-General (Climate and Natural Resources)

Acknowledgements

This document has been prepared by Abdal Monium K. Osman, Emmanuella Olesambu and Camille Balfroid with contributions from Luca Russo, Shukri Ahmed, Patrick Jacqueson, Stephan Baas and Alexa Caesar of FAO Strategic Programme on Resilience (SP5), Gregorio Velasco Gil and Natasha Maru of the FAO Pastoralists Knowledge Hub and Vivian Onyango of Plant Production and Protection division.

The document reflects valuable inputs from discussions with colleagues working for the implementation of SP5, based in country offices as well as at headquarters. Elements of the document were further discussed during two workshops, organized by the FAO Resilience hubs in Nairobi, Kenya and Dakar, Senegal in February and March 2018 respectively. These gathered experts and partners working on pastoralism at regional level. Participants shared several examples of interventions enhancing resilience of pastoral livelihood and how they can be programmed and implemented on the field in order to contribute to the discussion and the improvement of the document.

©FAO/Carl de Souza

©FAO/Issouf Sanogo

Executive summary

Pastoralism is the main livelihood of an estimated 268 million people. It represents one of the most viable – and sometimes the only suitable – livelihood options in the drylands.

Pastoral livestock production is crucial to the livelihoods and the economy of Africa's drylands. It developed 7 000 years ago in response to long-term climate change. It spread throughout Northern Africa as an adaptation to the rapidly changing and increasingly unpredictable arid climate. It is practised in an area representing 43 percent of Africa's land mass in the different regions of Africa. In some regions it represents the dominant livelihoods system. It covers 36 countries, stretching from the Sahelian West to the rangelands of Eastern Africa and the Horn and the nomadic populations of Southern Africa, with an estimate of 268 million pastoralists.

The mobility of pastoralists exploiting the animal feed resources along different ecological zones represents a flexible response to a dry and increasingly variable environment. It allows pastoral herds to use the drier areas during the wet season and more humid areas during the dry season. It ensures that pastoral livestock access sufficient high-quality grazing and create economic value.

The objectives of this paper are twofold.

- First, to investigate the current situation of pastoralism and the vulnerability context in which it functions.
- Second, to outline the policy, the programming and the research areas of intervention to enhance the resilience of pastoral livelihood systems.

Scholarly views of pastoralism's ecological impact have grown more positive since the early 1990s, when a new understanding of dryland dynamics led to the so-called new rangeland paradigm. The new rangeland paradigm represents a shift in the wider discourse on pastoralism from the earlier debates based on the "tragedy of the commons." The new rangeland paradigm has provided a more comprehensive understanding of the drylands and shown that mobility is an appropriate strategy to sustainably exploit the natural resources in these areas. In recent decades, the adaptability and mobility of pastoralists in relation to resource variability have been undermined by factors that are embedded in the institutional and policy environments which shape a context where pastoralists are vulnerable.

The paper analyses factors that undermine the pastoral livelihoods resilience and the implications of these factors for the viability of pastoralism. These factors include:

- neglect and exclusion of pastoralists
- violence, displacement and militarisation of pastoral livelihood systems
- insecure land rights and natural resource management

- diminishing forage base and increasing trend toward nutritional vulnerability
- increasing risk of animal and zoonotic diseases
- climate variability and climate change

On the basis of the analysis of the uncertainty and insecurity contexts that shape pastoralism and the vulnerability of pastoralists' communities, this paper identifies interventions for increasing pastoral resilience. These interventions are categorised in the following priority areas:

- improving capacity, accountability and responsiveness in governance institutions
- addressing the cross-border and regional dimension of pastoralism
- developing and using a livelihoods-based information and monitoring system
- ensuring stronger linkages between local and higher-level peace initiatives
- reducing vulnerability by supporting livelihoods resilience programming
- ensuring a timely livelihoods-based livestock emergency response when a crisis threatens

Despite their weakening capacity, pastoral communities remain highly resilient and make enormous contributions to social, environmental and economic wellbeing in the dryland areas. Strengthening pastoralism's capacity to operate in more sustainable pathways requires a more in-depth understanding of the dynamics of the socioecological challenges and opportunities in the different regions of Africa's drylands. It also requires long-term engagement and broad partnership among the diverse actors involved at the local, regional and international levels.

Introduction

Africa's drylands are home to pastoral communities who depend on extensive livestock production, mainly cattle, camels, sheep and goats, as their most important source of livelihood, food security, nutrition, income and well-being. Pastoral livestock production involves varying degrees of seasonal movement to access natural resources on a communally managed or open-access system. It is practised in an area representing 43 percent of Africa's land mass in the different regions of Africa. In some regions it represents the dominant livelihoods system. Table 1 illustrates the geographical and ecological distribution of pastoralists in the continent. It covers 36 countries, stretching from the Sahelian West to the rangelands of Eastern Africa and the Horn and the nomadic populations of Southern Africa, with an estimate of 268 million pastoralists (African Union, 2010; Blench, 2001). This production system depends largely on its human population, livestock and natural resources. The maintenance of sustainable equilibrium among these elements is critical for the entire system's viability and its capacity to absorb, adapt and recover from shocks.

Pastoralism plays an important role in the national and regional economies of Africa. It supplies millions of animals to both domestic and international markets through substantial livestock trade networks that link local and cross-border markets to neighbouring countries and international markets. In general, pastoralism contributes 10 percent to 44 percent of the gross domestic product (GDP) of African countries (African Union, 2010). In East Africa, countries such as the Sudan, Somalia and Ethiopia are major livestock exporters to the Gulf States. In West Africa, the livestock sector contributes 5 percent to 44 percent to the agricultural GDP, and in Algeria it contributes 50 percent. In addition to the export sector, pastoral livestock contributes to the household consumption

Pastoral areas are increasingly becoming vulnerable to food insecurity and famine. As a result, these regions have become heavily dependent on external food. Many of these areas are experiencing high rates of wide-scale global acute malnutrition (GAM).

of livestock products and provides transport, ploughing and manures for both agriculture and fuel. As such, pastoral livestock production remains the predominant system in Africa's drylands , making significant contributions to both rural livelihoods and the wider national economies of the continent.

For the last three decades, pastoralism has experienced processes of change that reflect the weakening capacity of pastoral systems in different regions to absorb shocks and adapt to changes. There have been growing social differentiation and inequalities within the pastoral communities as a result of increasing poverty. The poor fall out of pastoralism and become destitute, while the wealthier stay in pastoralism and adopt more commercialised approaches (Catley and Aklilu, 2013). At the same time, the pastoralist population is growing at an estimated rate of 2.5 percent to 3 percent per year. Therefore, people have to move away from pastoralism because they cannot be sustained or absorbed in pastoral areas (African Union, 2010). These changes widen the asset gap between wealthy and poor groups and make it more difficult for the latter to return to pastoralism (Catley, 2017; Aklilu *et al.*, 2016; Catley and Aklilu, 2013; Little *et al.*, 2008; Hogg, 1986). The increasing destitution and impoverishment take place against a backdrop of lack of infrastructure, poor education and health service, and deteriorating security situations. Such a situation has serious implications for the viability, adaptive capacity and resilience of the pastoral livelihoods system.

Pastoral areas are increasingly becoming vulnerable to food insecurity and famine. As a result, these regions have become heavily dependent on external food. Many of these areas are experiencing high rates of wide-scale global acute malnutrition (GAM). In addition, children in pastoral settings are vulnerable to seasonal malnutrition during the lean season. According to Young and Marshak's (2018) report *Persistent global acute malnutrition*, "The widespread scale and long-lasting nature of 'persistent GAM' means that it is a policy and programming priority" (p. 7). For the last two years, pastoral areas in South Sudan, Somalia, Nigeria and other areas in the Sahel have been at risk of famine (Food Security Information System, 2018). Valerie Julliand, the regional head of the United Nations Office for the Coordination of Humanitarian Affairs, described the current situation in the Horn of Africa as a "complex livelihood crisis." She added, "And it is a crisis that is also affecting the non-pastoralists in the region who depend on pastoralism for meat and milk" (IRIN, 2006). The cumulative effect of multiple risks and the weakening absorptive and adaptive capacity of the pastoral livelihoods seem to drive the chronic food insecurity and persistent malnutrition among the different pastoral communities in the continent.

In light of the above, the objectives of this paper are twofold. The first objective is to investigate the current situation of pastoralism and the vulnerability context in which pastoralism currently functions. The second is to outline the policy, programming and research areas of intervention to enhance the resilience of pastoral livelihoods systems.

Table 1. The geographical and ecological distribution of Africa's pastoral areas

Natural zone	Pastoral areas	Countries
Mediterranean and Saharan zone in North Africa	High-altitude mountains	Algeria, Morocco
	Coastal Mediterranean	Algeria, Egypt, Libya, Mauritania, Morocco, Tunisia
	Saharan desert	Algeria, Egypt, Libya, Mauritania, Morocco, Tunisia
Sub-Saharan tropical and equatorial zone	Saharan super-arid pastoral area	Chad, Eritrea, Mauritania, Mali, Niger, Sudan
	Sahelian arid pastoral area	Burkina Faso, Cabo Verde, Chad, Ethiopia, Mauritania, Mali, Niger, Senegal, Somalia, Sudan
	Sudano-Sahelian semiarid pastoral area	Benin, Burkina Faso, Cameroon, Chad, Djibouti, Ethiopia, Mali, Niger, Senegal, Somalia, Sudan, Togo
	Sudan and Sudano-Guinean subhumid pastoral area	Southern Burkina Faso, northern Cameroon, northern Central African Republic, southern Chad, Côte d'Ivoire, southern Ethiopia, Gambia, Guinea, northern Kenya, southern Mali, central Nigeria, Senegal, central Somalia, South Sudan
	Guinea humid pastoral area	Adamawa Plateau and Western Highlands of Cameroon
	High-altitude, humid forest pastoral area	Burundi, Democratic Republic of the Congo, Rwanda
Southern zone	Arid grassland	Northwestern South Africa
	Arid savanna	Botswana, Namibia, western parts of South Africa, Zimbabwe
	Semiarid rangelands	Botswana, Namibia, South Africa, Zimbabwe

Adapted from African Union, 2010; Blench, 2001.

Pastoralism and mobility: Current issues and discourse

Pastoral livestock production is a crucial element in the livelihoods and economies of Africa's drylands. The land's physical characteristics, climatic conditions and plant communities are well suited for mobile livestock production (Scoones, 1995; Dong *et al.*, 2011; Sidahmed, 2018; Krätli *et al.*, 2018). Because the semiarid regions experience highly variable rainfall and drought, fodder availability fluctuates widely through time and space (Oba and Lusigi, 1987). Exploiting these environments requires mobility and flexibility to match available feed resources with the animal numbers and water at a site (Behnke, Scoones and Kerven, 1993). Pastoral livelihoods in these areas have historically depended on negotiated, non-exclusive access to water and reciprocal land use agreements among pastoralists and between pastoralists and agriculturalists (Brooks, 2006). This traditional system, which is flexible and responds quickly to changing environmental conditions, is well suited to the ecological and sociological conditions of the Sahel (Jarvis, 1993; Marshall and Hildebrand, 2002).

The mobility of pastoralists exploiting the animal feed resources along different ecological zones represents a flexible response to a dry and increasingly variable environment. It allows pastoral herds to use the drier areas during the wet season and more humid areas during the dry season. As a result, pastoral livestock are ensured sufficient high-quality grazing. Mobility also allows pastoralists to mitigate the effect of unforeseen events, such as disease outbreaks (Niamir-Fuller, 1998, 1999; Scoones, 1995). These strategies allow pastoralists to survive in difficult environments and create economic value out of otherwise fragile ecosystems. Therefore, constraints on pastoral mobility, such as changes in land use, tenure regulations and borders, can undermine the whole pastoral system.

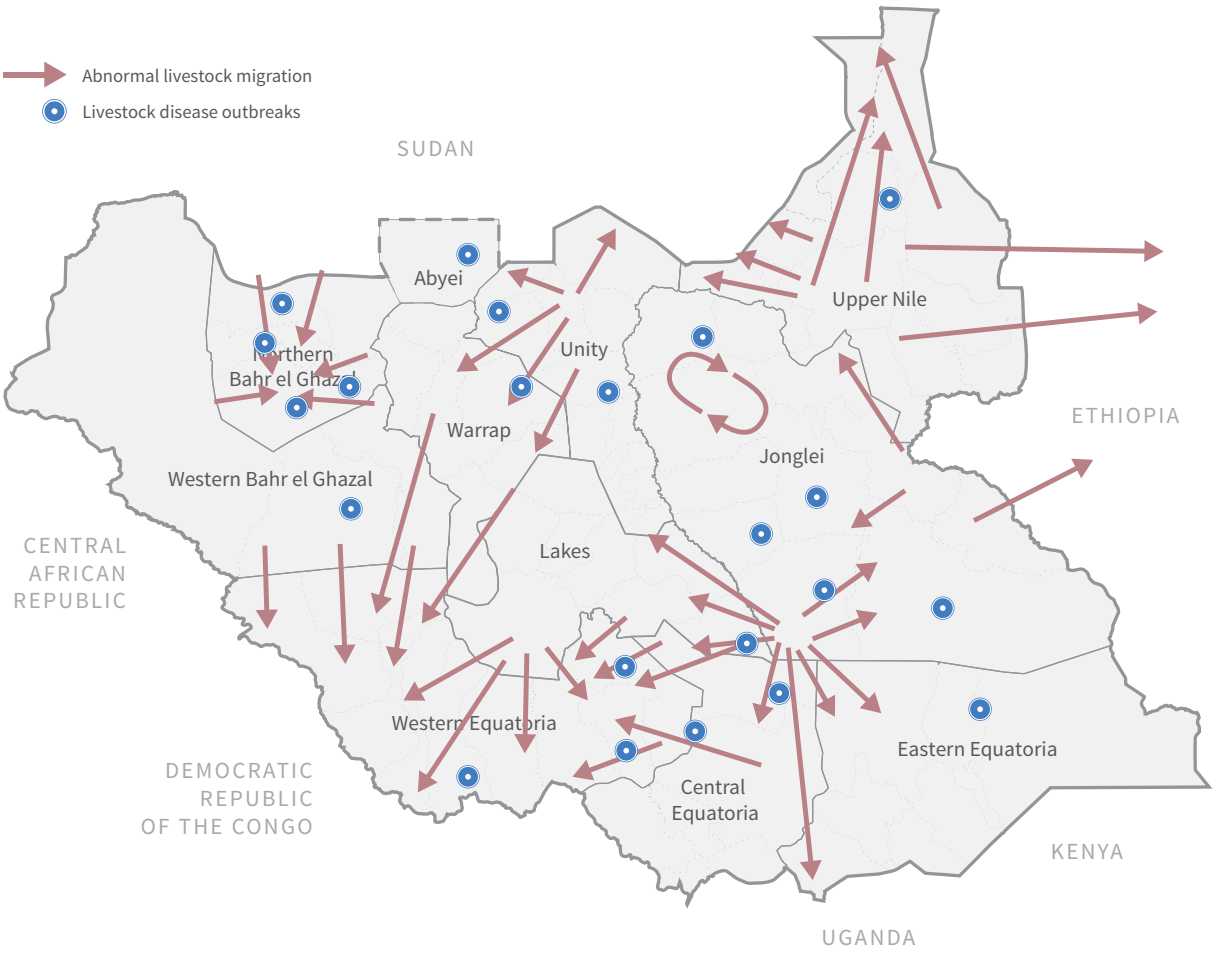
The adaptability and mobility of pastoralism in relation to resource variability have been undermined by factors including climate change, environmental degradation and pressures to increase agricultural production to feed a rapidly growing population. The low mean rainfall of the late twentieth century, combined with the technocratic approaches to development, has increasingly marginalised the traditional approaches to resource management and food security (Ahmed, Sanders and Nell, 2000; Brooks, 2006). The expansion of cultivation into marginal areas of the Sahel with the abandonment of the traditional fallow system has led to deterioration of the land resources (Kandji, Verchot and Mackensen, 2006). The extended droughts of the 1970s and 1980s triggered famines across the Sahel. These famines were exacerbated by inappropriate development practices (de Bruijn and van Dijk, 1999; Warren, 2005). These factors resulted in rapid changes in land use and land control and compression of pastoralists' livelihood space. As a result, social conflicts between agriculturalists and pastoralists have increased, along with the problems associated with overgrazing and land resource deterioration. These changes have left many pastoralists living in a "world of insecurity, war, famine and drought" (Baxter, 1993).

The mobility of pastoralists exploiting the animal feed resources along different ecological zones represents a flexible response to a dry and increasingly variable environment. Therefore, constraints on pastoral mobility, such as changes in land use, tenure regulations and borders, can undermine the whole pastoral system.

To understand pastoral mobility – its rationale and its consequences in protracted political crisis – it is necessary to address not only the ecological but also the political, military, social and economic contexts.

Scholarly views of pastoralism's ecological impact have grown more positive since the early 1990s, when a new understanding of dryland dynamics led to the so-called new rangeland paradigm (Behnke, Scoones and Kerven, 1993; Niamir-Fuller, 1999; Scoones, 1995). According to this paradigm, pastoralism has developed out of the need to adapt to the extreme climatic conditions and marginal landscapes of the drylands, and it is the most productive and sustainable use of these remote areas. The new rangeland paradigm represents a shift in the wider discourse on pastoralism from the earlier debates based on ecologist Garrett Hardin's (1968) "tragedy of the commons." The tragedy of the commons has an inherent bias against pastoralism, misunderstanding the rationale of pastoralism as a production system. It also blames pastoralists for desertification (Hardin, 1968). The new discourse has inspired many institutions and advocacy programmes to promote change in practice and policy, encouraging interventions to support pastoral livelihoods in the Horn and East Africa.

Figure 1. The abnormal migration of livestock in South Sudan, 2014



Source: FAO South Sudan, 2014.

The new rangeland paradigm has provided a more comprehensive understanding of the drylands and shown that mobility is an appropriate strategy to exploit the natural resource base in these areas. However, the model reflects the scientific understanding of the drylands and not the local knowledge of pastoralists. It does not take into account the perceptions of African pastoralists regarding mobility and its socioeconomic and political context (Adriansen, 2008; Adriansen and Nielsen, 2005). In protracted violent situations, those elements of the local context shape pastoralists' ability to access natural resources.
Figure 1 illustrates the abnormal livestock migration in South Sudan following the conflict that erupted in December 2013. Mobility in these situations remains strategic not only for accessing and optimally utilising water and grazing resources as driven by climatic variability but, more so, for saving livelihoods to save lives. A situation of protracted conflict involves an intricate web of political, economic, military and social forces, engaged in violence that deliberately targets civilians and their production systems. Accordingly, the assets on which livelihood systems are constructed in peaceful times become a source of vulnerability (Lautze, 2010). Livestock assets, the foundation of a pastoralist's livelihood, could become liabilities in a context of violent appropriation of assets (Duffield, 1993; Keen, 1994). To understand pastoral mobility – its rationale and its consequences in protracted political crisis – it is necessary to address not only the ecological but also the political, military, social and economic contexts.


©FAO/Abdelkader Abakar

The context of pastoral vulnerability

Pastoralism in Africa's drylands currently functions within a context of increasing vulnerability, driven by mounting uncertainties and risks. The system's adaptive capacity to withstand and recover from shocks and hazards is eroding. The increasing vulnerability of the pastoral system in these areas is an outcome of a complex combination of political, economic and social processes (Cervigni and Morris, eds, 2016; Morton, 2008; Kirkbride and Grahn, 2008; World Institute for Sustainable Pastoralism, 2008). These processes are embedded in the prevailing institutions and policies that govern pastoralist livelihoods. They pose a myriad of climatic, political, economic and biotic challenges, all of which undermine the resilience of the pastoralist system. These challenges include (a) neglect and exclusion of pastoralist communities; (b) violence, displacement and militarisation of pastoral livelihood systems; (c) insecure land rights and natural resource management; (d) increasing risk of animal and zoonotic diseases; and (e) climate change and climate variability.

Neglect and exclusion

The relationship between pastoralists and the state during the precolonial, colonial and postcolonial eras has been characterised by tensions and exclusion from the national political, economic and social life. The creation of international state boundaries, the emergence of new states, and the continuous redrawing of interstate boundaries in the colonial and postcolonial eras have restricted pastoralists' mobility and access to grazing areas. In addition, the geographical locations where pastoralism is practised are marginal areas that have experienced processes of continuous marginalisation. These marginalisation processes have combined with a history of passive and active neglect of pastoralism and pastoralist groups (Catley, 2017; Fratkin and McCabe, 1999; Holt, 1958; Humanitarian Policy Group, 2006; United Nations Children's Fund/ United Nations Sudano-Sahelian Office, 1992). This long history of tense relationships between pastoralists and the state has contributed to the exclusion of pastoralists from power and limited their access to resources and services. It has also created a growing sense of grievances that have contributed to centre–periphery warfare, violent conflicts, impoverishment and forced migration.

Part of the process of pastoralist marginalisation is the neglect of the governmental institutions whose mandate should be addressing pastoral development. The institutions dealing with animal health, range and pasture, and rural water development have always been fragmented, sidelined and poorly resourced. As such, they have deprived pastoralists of an integrated policy and programme approach. Development interventions such as sedentarisation and education, when they are implemented, are weakly coordinated and represent a top-down approach that pastoralists have never bought into. Furthermore, these interventions seek to provide alternatives to pastoralism rather than support pastoral livelihoods. Likewise, pastoralists have remained invisible to international organizations, which have failed pastoralist communities in terms of their project focus and delivery.

Pastoralist civic organizational and customary institutions, and their inclusion in formal systems of governance, have been significantly weakened. During the 1990s, many civil society groups emerged to advocate for the interest of the pastoralist communities and for sustainable development. These included pastoralists' unions in Chad and the Sudan; pastoral parliamentary groups in Kenya, Ethiopia and Uganda; and the Nomads Development Council in the Sudan (Hesse and Odhiambo, 2006; Morton, 2005; Pavanello, 2009; Wario, 2004). Yet these organizations generally have limited capacity to address pastoralists' interests; they are weak due to limited financial resources and poor management and technical skills. More importantly, they are co-opted by the powerful urban elite and have failed to provide frameworks to represent pastoralists or further their development (Hogg, 1990; Pavanello, 2009; World Bank Operations Evaluations Department, 1999). The weakness of these civic groups is coupled with the erosion of the customary institutions that manage access to natural resources and address related conflicts. Therefore, the representation of pastoralist communities is limited, if it exists at all, and their ability to advocate for pastoral interests is curtailed. There is no credible institution, formal or informal, that is capable of advocating for pastoralists' interests and effectively managing pastoral resources.

Violence, displacement and militarisation of pastoral livelihood systems

For the last three decades, pastoral areas across Africa have been experiencing endemic conflicts and violence. The nature of these conflicts is complex and continuously changing. In Eastern and Central Africa, they expand over a broad geographical band from the Kenya–Somalia border to the north into Ethiopia and northwest to encompass regions of Uganda, South Sudan, the Sudan, the Democratic Republic of the Congo and the Central African Republic. In West Africa, they engulf the region from the western states of Senegal and Mauritania to the Chad–Central African Republic–Sudan border triangle in the east (Bevan, 2007a, 2007b; Reda, 2015). Some of these conflicts are protracted and, as such, have national and regional dimensions, as in South Sudan, Somalia, northern Nigeria and the Central African Republic. Others are conflicts over local resources caused by intensified competition for water, land and/or pasture. Both types of conflicts have become increasingly destructive and beyond the control of formal and informal local governance.

Conflict and insecurity have had devastating immediate and long-term impacts on pastoral livelihoods systems. They destroy pastoral livelihoods in three ways: systematic direct impacts, systemic indirect impacts and governance impacts.

Systematic direct impacts include direct and intentional targeting or physical destruction of lives and livelihoods of the pastoralist system.

They are visible and cause acute risks and damage. In fact, the intentional targeting of lives and livelihoods is part of the livelihood asset-stripping process, which is a common feature of violence and insecurity in Africa's drylands (Lautze and Raven-Roberts, 2006; Duffield, 1993). In these situations, pastoralists are targeted and become exposed to violence and the process of stripping assets such as livestock, grazing and water resources, and their lives ultimately threatened or lost because of age, gender or ethnicity. In this respect, scorched earth tactics are usually applied to deprive pastoralists of their livelihoods by burning grazing resources or using landmines to block access to strategic water and grazing resources.

More pernicious but less apparent is the systemic indirect impact. It is made up of the gradual erosion of livelihood assets and is brought about as a result of conflict-related policies, processes and institutions. They restrict mobility and constrict the pastoralists' domain, disrupting livestock movements, local grazing patterns and trade routes, including transboundary movement. They displace pastoralists and alter livestock migration, creating pockets of unused rangelands as in northern Kenya and western Sudan. These conflicts have resulted in serious animal disease outbreaks, livestock raiding and decimation of livestock herds. They have driven pastoralists into food insecurity, malnutrition and adoption of maladaptive strategies (Young and Jacobsen, 2013). The exploitation of forest species, cutting the acacia species on the rangelands to make charcoal in Somalia, is an example of maladaptive strategies that are linked to illegal trade and regional markets. This resulted in depletion of the forest cover from 62 percent in 1980 to 10 percent in 2015 (World Bank Group and FAO, 2018). These maladaptive strategies, such as intimidation and violence, to access and control resources are of an illicit nature and depend heavily on war economies.

One of the long-term impacts of these conflicts is that they undermine the governance of the pastoral resource base. This includes customary resource management institutions and practices that are responsible for their overall management, including but not limited to allocation and coordination of resource use at the local level. In the majority of conflicts, access and control over and transfer of these resources take place through violent means. This therefore undermines the legitimacy of the traditional governance system, including the mechanism of dispute resolution (Osman *et al.*, 2013). Moreover, population displacement within and out of the area disrupts these institutions, diminishes their management and coordination capacity and makes them illegitimate. The leaders and resource custodians who make up these local institutions are particularly at risk, as they are targeted by militant groups (Young *et al.*, 2005). As a result, the governance space is dominated by violent appropriation of assets linked to war economies.

Pastoralist livelihoods systems have increasingly become militarised. Pastoralists have become heavily armed to protect their herds as well as their communities as they move their livestock across insecure dry

landscapes to access limited natural resources. At the core of this change are the youth – the pastoralists' workforce – who make up different armed groups to acquire power and wealth. Such a phenomenon is happening at a time of increasing levels of impoverishment and destitution (Catley, 2017; Little *et al.*, 2008; Hogg, 1986). Within this context, violence is a key element in the dynamic of survival, power and wealth. This is especially so when these dynamics are embedded in war economies and networks serving national and regional black markets (Nordstrom, 1997; Richards, 1996; United Nations Office for the Coordination of Humanitarian Affairs, Regional Officer for Central and East Africa, 2008). In such situations, international media represent pastoralists as evil forces or as plundering militia (Sanders, 2007). This militarisation process, coupled with the dependence on war economy, the control of resources through violence and the constriction of pastoralist domain, has deepened the vulnerability of pastoralists.

The central role of natural resources in financing and fuelling conflicts in Africa's drylands and elsewhere has become a key feature of the conflicts in recent decades. This includes both high-value resources, such as oil, gold, timber and diamond, and low-value resources, such as charcoal (Kawamoto, 2012; Taylor and Davis, 2016). These resources are used to fund and sustain conflicts and as a source of personal gains. The conflict in the Democratic Republic of the Congo, for instance, has been sustained in part by the international trade in extractive resources such as gold and timber (Global Witness, 2010). Similarly, the charcoal, also known as "black gold," in Somalia has financed conflict through illegal and illicit regional trade (World Bank Group and FAO, 2018).

Moreover, the exploitation of these resources in many areas has taken over significant lands and grazing areas, impacted water resources and generated toxic wastes. These impacts have resulted in environmental pollution and ecosystem degradation with serious health risks, endangering lives and livelihoods. Some examples of these areas include oil pollution in the Niger Delta of Nigeria and gold mining pollution in places such as the Democratic Republic of the Congo, the Sudan and South Sudan (Mähler, 2012; Patey, 2012). Consequently, pastoral communities have become concerned with loss of access to grazing, water and income from non-timber forest products for livelihoods. Pastoralists also feel that they are not sufficiently compensated for the negative impacts of the exploitation of these resources. These environmental, economic and social impacts have generated grievances that escalate and exacerbate violent conflicts and undermine post-conflict peacebuilding and recovery.

> The evolution of individual land use and land control has severely restricted pastoralists' mobility and access to natural resources.

The conflict dimension of natural resources governance has triggered growing awareness. It has informed many of the Security Council resolutions, such as Resolution 2036, which called for international cooperation to stem the illegal export trade in charcoal from Somalia

Access to natural resources is based on systems of negotiated access. This flexible rule of access to land and natural resources has been disrupted in many parts of the Sahel, resulting in violent conflicts and contributing to the increasing vulnerability of pastoralists.

(United Nations Security Council, 2012). It has also initiated the development of norms governing the management of natural resources for countries emerging from or at risk of conflict. An example of the initiatives is the development of the Extractive Industries Transparency Initiative.

Insecure land rights and natural resource management

Multiple interacting institutional and policy processes affect pastoralists' access to and control over land and natural resources. These processes reinforce each other, undermine access to critical pastoralist resources and increase the vulnerability of the pastoralist livelihoods system to shocks.

In many pastoral areas, control of and access to land rights and natural resource management have evolved toward individual, exclusive land ownership. The evolution of individual land use and land control has severely restricted pastoralists' mobility and access to natural resources. Historically, in Africa's drylands, pastoralism and other livelihood systems are based on flexibility, mobility and low-intensity use of natural resources. A common feature of agriculture in these areas is that multiple land users share on a seasonal basis the natural resources available throughout the year on the same area of land. The land control and land use system does not assign exclusive rights (Osman *et al.*, 2013; Platteau, 1996). Access to natural resources is based on systems of negotiated access. This flexible rule of access to land and natural resources has been disrupted in many parts of the Sahel, resulting in violent conflicts and contributing to the increasing vulnerability of pastoralists. Rangeland enclosures in Ethiopian and Sudanese pastoral areas, for example, have emerged as a form of exclusive ownership of rangelands, limiting grazing access to the owners of the enclosed area (Napier and Desta, 2011; Osman *et al.*, 2013).

Alongside the evolution of an exclusionary land control and land use system, the overall pastoral domain, within which pastoral groups move between the wet and dry season grazing areas, has constricted across the region. This could partly be attributed to loss of communal grazing land due to increased farming activities, resulting from local and international land investment and land grabs and extension of traditional farming, as well as an increase in extractive industries which put additional pressure on the region's fragile natural resource base, pushing it in some cases beyond its regenerative capacity (Cervigni and Morris, eds, 2016). In the Sudan, the expansion of rain-fed cropping in the eastern and western parts of the country at the expense of grazing land has resulted in the constriction of pastoral domain and rising conflicts between farmers and herders (Babiker, 2013; Shazali and Ahmed, 1999; United Nations Environment Programme, 2007). In Kenya, investors have targeted the Tana Delta, the largest wetland in the country and a vital drought-grazing land for pastoralists (Nunow, 2013). Moreover, insecurity and instability

in the region have restricted the movement of livestock herds to many range areas and limited their access to specific range areas, leading to overgrazing of some areas and under-grazing of others. The removal of grazing areas from the pastoral domain can weaken the capacity of the pastoral system to absorb and recover from even slight shocks.

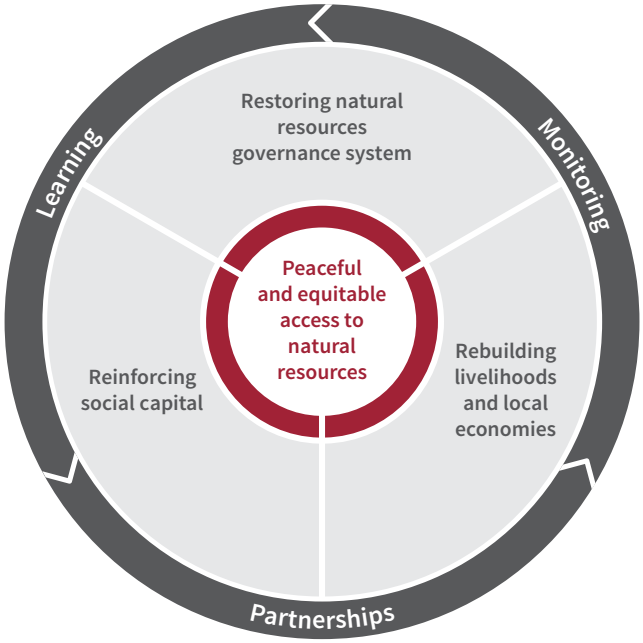
Natural grass degradation has further undermined pastoralism. Rangelands have changed over time due to the encroachment of farming into rangeland, the conversion of forestland into grassland, the conversion of rangeland into cropland and the replacement of abandoned rangeland with forests (Laiolo *et al.*, 2004). These factors have implications for the biodiversity of the rangelands, which has dramatically decreased and is predicted to continue decreasing for the foreseeable future (Alkemade *et al.*, 2013). The changes in rangeland quality and quantity create a decline in availability of animal feed resources, especially at times of critical need, such as drought. These changes undermine the basis of pastoralists' livelihoods, weaken their resilience to shocks and become a source of growing grievances and a contributing cause of the conflicts in many parts of Africa's drylands.

At the local level, scarcity of natural resources is thus increasingly contributing to insecurity and the escalation of violence in the pastoral areas of Africa's drylands. Yet common interests over access to these resources can also provide a window of opportunity to foster dialogue and re-establish trust. Production systems in drylands are usually interdependent, requiring that different communities cooperate and peacefully interact to ensure shared access, use and management of natural resources for mutual benefit. The FAO peacebuilding intervention in South Sudan is an instructive example of an approach that builds on such common interests and mutual interdependence (FAO, 2017; FAO South Sudan, 2013). FAO relied on a livelihoods approach to assess the situation and design interventions to promote peacebuilding and equitable access to natural resources among the users. Figure 2 illustrates the dimensions of the peacebuilding which shaped that intervention. It includes three components. The first component is rebuilding the livelihoods of the communities competing over the same resources. The second component is reinforcing the local natural resources governance system including to strengthen the capacity of the traditional local institutions that managed these resources. The third component is reinforcing the social capital to rebuild trust and confidence and to promote communication, peaceful interactions and cooperation among antagonist stakeholders and communities.

Yet, in situations of protracted political crises, conflicts over natural resources are embedded in wider power struggles that go beyond the local level. Because of these linkages, higher-level peace processes need to grasp the local dimension of violence in order to strengthen the resilience of pastoral production systems. Otherwise, top-down driven peace processes risk undermining both the resilience of the pastoral production system and the peaceful coexistence among the different resource users at

the community level. It is therefore critical that local peace processes feed into wider peace and policymaking efforts and dynamics.

Figure 2. The components of peaceful and equitable access to natural resources



Diminishing forage base and increasing trend toward nutritional vulnerability

The constriction of the pastoral domain and increasing restriction on access to pasture have implications for the performance of the pastoral herds and the food security and nutrition of the pastoral household. This is particularly the case in protracted conflict and recurrent drought settings in which the emergency threshold of 15 percent GAM reflects the severity of humanitarian crisis (Integrated Food Security Phase Classification Global Partners, 2012). Recent studies reveal that persistent GAM is widespread and reported in Africa's drylands of the Sahel and the Horn of Africa. These high GAM levels may persist in areas that experience humanitarian crisis and others that are more stable (Young and Marshak, 2018). Such situations demonstrate the increasing levels of nutritional vulnerability in the dryland areas of Africa and the critical need to understand the drivers of persistent malnutrition. A firm understanding of these underlying drivers and causes of nutritional vulnerability is vital to inform not only humanitarian response but also resilience building and policymaking.

In recent years, there has been a growing awareness of the linkages between livestock and pastoral household food security and nutrition. Studies have revealed that, for pastoral communities, the "hungry" or

The productivity of livestock is critical for the overall health and well-being of pastoral households, especially for children under five years of age, lactating mothers and pregnant women.

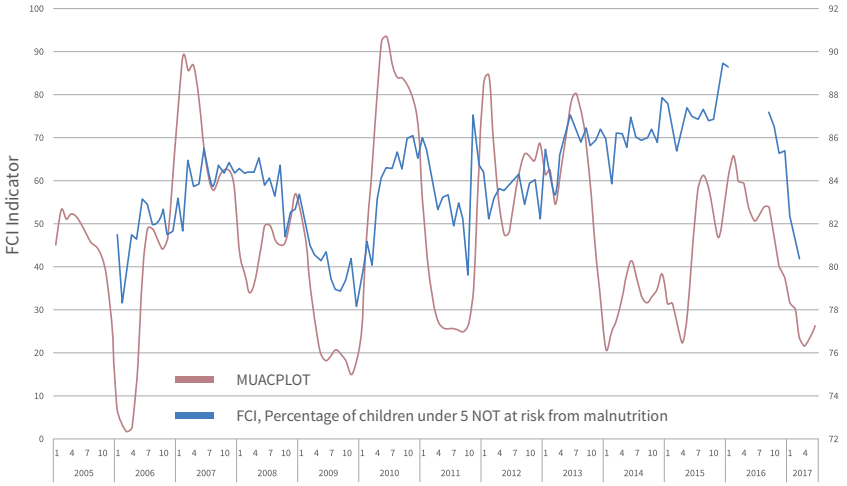
"lean" season they face is not a result of a cereal gap (as with agrarian communities) but is linked to the dry season and a reduction in the availability of pasture. A reduction in pasture availability affects animal body conditions and subsequently milk production and income as livestock. Eventually it can lead to the death of animals, which results in partial or total asset loss. The effects of the declining forage base on pastoral livelihoods therefore include rising levels of acute malnutrition for all household members.

FAO's Predictive Livestock Early Warning System was developed to analyse long-term forage conditions in Kenya and predict changes according to climatic forecasting among other factors. FAO's preliminary analysis on long-term trends indicates a significant correlation between adverse change in forage availability and nutrition outcomes among children (measured using mid-upper arm circumference) under five years of age. Figure 3 shows that when forage conditions, measured in term of forage coefficient index, are low, malnutrition rates are high (FAO, 2017). That means livelihoods in general and livestock in particular, as a foundation of pastoral production system and its products, impact the underlying causes of malnutrition and chronic undernutrition. Yet both conditions, child nutrition status and fodder conditions, are highly seasonal, and it is likely that seasonal climate variability is contributing to both. This seasonal aspect points to the need for empirical studies on the seasonality of the underlying causes of malnutrition, on seasonal patterns of livestock management and production and on the gender dimension of both.

Animal products – such as milk, meat and blood – are pastoralists' essential food source for a healthy diet and good nutrition. Animal-sourced food has a highly valuable macro- and micronutrient profile and high protein quality. There is ultimately convincing evidence that dairy protein has specific stimulating effects on linear growth. It is also effective in promoting weight gain in children with malnutrition (Michaelsen, 2013; Hoppe, Mølgaard and Michaelsen, 2006; Hoppe *et al., 2008*). Michaelsen *et al.* (2009) suggest that 25 percent to 33 percent of the protein content of the foods to give to a malnourished child should come from dairy protein.

Many scholars have documented the role of milk and other animal products in the diet of pastoralist communities, specifically children and pregnant or lactating women. In some pastoral communities, children obtain up to two-thirds of their daily energy intake from milk (Sadler *et al.*, 2012; Sellen, 1996; Galvin, 1992). In countries such as South Sudan, children, lactating mothers and pregnant women rely on milk as their main source of nutrition. Therefore, they accompany the moving herds during both dry and wet seasons to ensure their continuous access to milk and other animal products. Livestock production is also a main source of income generation, and livestock-related activities can influence the food security and nutritional status of the community through multiple impact pathways. The productivity of livestock is therefore critical for the overall health and well-being of pastoral households, especially for children under five years of age, lactating mothers and pregnant women.

Figure 3. Forage conditions and child malnutrition in Kenya's arid and semiarid counties



Source: NDMA for MUAC data and PLEWS for FCI data

Increasing risk of animal and zoonotic diseases

The introduction of modern veterinary services, the growth of veterinary technology, the internationally organized campaigns against epizootics, and the improvements in animal health services to pastoralist communities using community animal outreach have resulted in remarkable achievements in disease prevention and control in the Sahel. In mid-2011, both FAO and the World Organisation for Animal Health (OIE) proclaimed the world free from rinderpest. Progressive control pathways and regional road maps are being designed to counter the spread of foot-and-mouth disease, *peste des petits ruminants* (PPR – pest of small ruminants), African swine fever and trypanosomiasis.

However, disease prevention and control in the drylands are facing new challenges that require new policies and resources for disease prevention and control. Climate change has resulted in changing weather patterns, including more frequent extreme events, increasing temperatures and changing rainfall amount and distribution. These changes result in more variable water availability and thus in more variable pasture quality and availability. This variability, in turn, leads to changes in mobility, grazing patterns and herd dynamics. Taken together, these changes render pastoral herds more vulnerable to disease.

Climate change affects disease ecology and transmission and causes unexpected increases in disease incidence. Further, it might contribute to the spread and emergence of animal diseases, including zoonotic diseases. In East Africa, FMDV SAT3, a serotype of foot-and-mouth disease that was limited to South Africa territories, has now moved into East Africa, where it established itself in Kenya, Uganda and South Sudan (Dhikusooka *et al.*, 2015; OIE, 2014; Osere, 2014; Vosloo *et al.*, 2002). Similarly, blue tongue disease and the African swine fever virus, which were limited to Central Africa

The regional dimension of animal health, like other cross-border issues affecting pastoralism, requires harmonisation of animal health services and policies across international borders and calls for coordination and joint cross-border disease surveillance and programming in disease prevention and control.

and the woodlands of South Africa respectively, have now moved to Europe (Epstein and Mills, 2005; Lubroth, 2012; Slenning, 2010). The shifting pattern in disease distribution has implications for livestock in Africa and beyond.

The impact of climate change on animal health is exacerbated in conflict-affected areas. The conflict-driven disruption of livestock routes and movement leads to the concentration of large herds in restricted grazing areas. This changes the grazing patterns, gathering and intermingling large numbers of livestock of different species and age groups, and creating ideal situations for disease outbreaks. The Soba Veterinary Laboratory in Eastern Sudan confirmed an outbreak of PPR in camels, and in Darfur, antibodies against the PPR virus have already been found in the sera of camels (Saeed *et al.*, 2004; Young *et al.*, 2005). In South Sudan, from September to December 2014, there were about 25 reports of livestock disease outbreak. The main diseases reported include foot-and-mouth disease, East Coast fever, and trypanosomiasis. This contrasts with the same period of the previous year, when there were no outbreaks reported for any of these diseases (Aklilu *et al.*, 2016; FAO South Sudan, 2014).

Cross-border movement is a key livelihood strategy for pastoralist groups, allowing them to follow the changing availability of natural resources and trade livestock to access better services. This creates emerging risks in animal diseases and zoonotic diseases with a cross-border dimension. Transboundary animal diseases such as foot-and-mouth disease and PPR can seriously affect livestock health and livestock trade in the region and beyond. This regional dimension of animal health, like other cross-border issues affecting pastoralism, requires harmonisation of animal health services and policies across international borders and calls for coordination and joint cross-border disease surveillance and programming in disease prevention and control.

Human health and animal health are linked to each other and to the environment. The recent global spread and outbreaks of zoonotic diseases have highlighted the increasing effects of zoonotic disease on human and animal health (FAO, 2011; Taylor *et al.*, 2001). Pastoralists are at high risk of zoonotic diseases due to multiple factors. First, pastoral areas are experiencing ecological, political, economic and social forces. These forces are operating at local, national and regional levels, as discussed before. They provide conditions that allow for zoonotic disease emergence (Daszak *et al.*, 2013; Institute of Medicine and National Research Council, 2009; Woolhouse and Gowtage-Sequeria, 2005). Second, pastoralists are in close contact with their livestock and consume raw milk, which favours zoonotic infections (Diguimbaye-Djaibeet *et al.*, 2006; Schelling *et al.*, 2003). Third, pastoralists, and especially pastoralist women, have poor access to health services (Both, Etsub and Moyer, 2013; Zinsstag, Ould Taleb and Craig, 2006). Finally, whereas most pastoralists have good knowledge of animal diseases, their knowledge and perception of the connection between human and animal health is not well understood (Munch, 2012; Swai, Schoonman, and Daborn, 2010). The relationship between animal and human health is closely intertwined,

with serious implications for livelihoods, lives, food security and trade. Therefore, they should not be viewed separately, and one holistic approach to safeguard both human and animal health is appropriate.

Climate change and climate variability

Pastoralists in the African drylands have always dealt with and/managed climatic variability. Pastoralism in Africa developed 5 000 years ago in response to long-term climate change. It spread throughout Northern Africa as an adaptation to the rapidly changing and increasingly unpredictable arid climate (Brooks, 2006; Marshall and Hildebrand, 2002). Africa's drylands are characterised by decadal, seasonal and inter-annual climatic variability. This makes the succession of dry and wet years and prolonged drought or floods a typical feature of the climate of these lands. The decadal variability resulted in the Sahelian desiccation from the 1970s to the mid-1990s, with droughts that caused massive loss of life and livestock, destroyed communities and livelihood systems, and resulted in societal disruption and starvation across the region. Recurrent droughts led to shortages of water and animal feed. These droughts reduced rangeland production and affected the nutritional quality and species diversity of trees and shrubs, devastating the pastoral system.

Before the dry decades of the 1970s and 1980s, the wet decades of the 1950s and 1960s witnessed a shift from subsistence to commercialisation in the Sahel. This shift, which marked an expansion of crop farming beyond the farming belt of the dry areas and a shift to agro-pastoralism, pressed pastoralists into more marginal regions (Brooks, 2006), making the pastoral livelihoods more vulnerable to drought and the dry decades of 1970s and 1980s. To address this vulnerability in the context of climatic variability, policies should aim at supporting pastoralism, as it is well adapted to the climate of drylands. In this regard, increasing the flexibility of livelihoods systems by supporting pastoral mobility would enhance their ability to respond to a rapidly changing, increasingly unpredictable environment (Marshall and Hildebrand, 2002). As such development and policy trends that have marginalised pastoralists need to be revised, policymakers must adopt a long-term perspective immediately.

Drought is occurring more often than in the past and with increasing magnitude, which weakens the coping capacity of the pastoral household. Following a severe drought, it takes livestock-dependent households about five years to recover.

While rainfall variability is a major characteristic of Africa's drylands, climate change has resulted in increasing trends in climate and weather extremes and shocks, such as drought and dryness, heavy precipitation and flooding, and increasing temperature, during the last few decades. These extremes are increasing in terms of frequency, intensity and magnitude. Drought is occurring more often than in the past and with increasing magnitude, which weakens the coping capacity of the pastoral household. Following a severe drought, it takes livestock-dependent households about five years to recover. That means any additional loss within this five-year period is likely to have an immediate impact on household food security and livelihoods capacity to recover from environmental stresses and adapt to potential environmental shocks.


©FAO/Andrew Esiebo

Enhancing the resilience of the pastoralist system: The way forward

The pastoralist system has been progressively weakening. In this context, it is imperative for humanitarian and development actors to focus on preventing disruptive shocks and strengthening the pastoral livelihoods system's capacity to absorb the impact of and recover from such shocks. At the same time, these actors must work to secure consistent transformative gains to strengthen resilience. According to FAO, resilience develops as the result of interaction between three capacities: anticipatory/absorptive, adaptive and transformative. This section provides an outline of the main salient agenda of strengthening the resilience of the pastoral livelihoods system.

Policy and governance

Marginalisation and neglect of pastoralists are related to policy and governance as reflected in three main areas. The first area is the failure of the policymaking process to bring pastoralists into the centre stage of policy dialogue and debate. The second area is the lack of coordination, among ministries concerned with pastoral issues, to formulate and deliver coordinated pastoral development and policies grounded in local realities. The third area is the weak capacity of pastoralists' institutions and pastoralist civil society organizations to organize themselves around the sustained collective action required to utilise political leverage in policy circles.

To address these problems, it is important to build the capacity of key governance institutions addressing pastoralism through improving accountability, transparency and responsiveness. The first aspect of this capacity building is strengthening the capacity of pastoral customary institutions to manage natural resources and to coordinate the access and control of these resources. An important part of the capacity building of these institutions is strengthening their link with the formal institutions at both national and regional levels, to enable pastoralists to influence the policymaking process for their interest. A second important aspect of addressing pastoralists' marginalisation is strengthening the capacity of the pastoral civil society organizations to lobby for policy development to the advantage of pastoralism. A third aspect is building the capacities of the pastoralist institutions and civil societies to seek ways to ensure that within the government there is a body that coordinates and supervises integrated development interventions and places pastoralists and their institution in the centre stage of policymaking. Currently, within the national and regional governments, pastoralist issues are scattered among and within different ministries, departments and other bodies. This leaves little room, if any, for governments to coordinate and address pastoralist issues and to formulate and implement integrated policy and development.

The cross-border and regional dimension

Because pastoralism spans the boundaries of nation states, it has a cross-border and regional dimension. This cross-border and regional dimension necessitates harmonising policies that affect all aspects of pastoralism and forging regional approaches, cooperation and implementation of cross-border initiatives. These initiatives include regional trade, promotion of peace and reconciliation initiatives, animal health, and development of infrastructure to enhance pastoralists' resilience in the Sahel and the Horn of Africa. The African Union Policy Framework for Pastoralism in Africa and the currently drafted Inter-Governmental Authority on Development (IGAD) Protocol on Transhumance and the Permanent Interstate Committee Against Drought in the Sahel (CILSS), current work on strengthening the regional animal markets and coordination of regional livestock movement, are encouraging steps forward. Both documents recognise pastoralists' economic, social and cultural contributions, both historically and in the future. They call for national and regional processes that empower pastoralists and that involve pastoralists and their institutions in policymaking, securing and protecting their livelihoods, and strengthening the pastoral economy.

Pastoral livelihoods-based monitoring and information system

Pastoralism in Africa functions in context of multiple risks and hazards. These risks and hazards reinforce each other to erode the adaptive capacity and resilience of the pastoral livelihoods system. In this context, regular monitoring of livelihoods would be a primary means of understanding the pastoral livelihoods system and of managing predictable risks in pastoral areas. As such, early warning systems and contingency planning "should not be seen as emergency instruments, but rather as a means of managing predictable risks in pastoral areas and ensuring the protection of livelihoods" (Overseas Development Institute [ODI], 2009). This points out the need to promote the development and utilisation of a livelihoods-based information system. The development of such a system could benefit and build on the livelihood-based early warning systems that the Food Security Analysis Unit has used in Somalia (ODI, 2009).

Early warning information systems in the Sahel and the Horn of Africa have been designed to provide warnings of the impending drought. Most of them are focused on monitoring rainfall and crop production, and only a small degree of attention is paid to the production determinants of the pastoral economy (Sommer, 1998). However, drought is not the only hazard, and it is not drought as such that makes pastoralists vulnerable,

but the growing inability of pastoralists to cope with it. Other factors, such as conflicts, animal health and access to natural resources, also contribute to the erosion of the coping capacity. Therefore, there is a need for a holistic/integrated pastoral livelihoodsbased information system that would collect and analyse a range of indicators on various factors, such as environment, livestock production, human welfare and conflict, to detect threats to livelihoods. Such a system would elicit an early action to save livelihoods before they are destroyed and before the final slide to destitution, high malnutrition rates and loss of life.

Ensuring stronger linkages between local and higher-level peace processes

The violent conflicts and protracted crisis in the Sahel and Horn of Africa are multifaceted, with wider conflict dynamics that include national and regional dimensions, linked to intercommunal violence at local levels over livelihoods. The local-level conflicts are usually fought over control and access to livelihoods assets, such as natural resources. However, they are intimately linked to the wider aspects of the crisis fought over political and economic power at both national and regional levels. These linkages elicit the need to promote equitable and peaceful management of livelihoods resources to enhance peaceful coexistence at the local level. Equally, they elicit the need to ensure that higher-level peace processes grasp the local dimension of violence in order to strengthen the resilience of the pastoral production system. Otherwise, these peace processes risk undermining both the resilience of the pastoral production system and the peaceful coexistence among the different resource users at community levels.

Reducing vulnerability through supporting livelihoods resilience programming

Pastoralist communities in Africa are facing multiple shocks that progressively erode their adaptive capacity, increasing their vulnerability to further shocks and weakening their livelihood system. Within such a context, livelihoods programming that strengthens pastoralists' capacity to manage risks, addresses their vulnerability and enhances their resilience represents an appropriate approach. In other words, "saving livelihoods saves lives" (Humanitarian Policy Group, 2006). A livelihoods approach contributes to protect and enhance livelihoods assets, strategies and outcomes or improve the governance structures that influence them. As such, livelihoods interventions have the potential to safeguard pastoral households from the severe deprivation and suffering they could slide into when a crisis hits. At the same time, they protect the long-term livelihoods of the pastoral households. Such an approach is in fact embedded in the overall system of pastoralists' risk management.

Livelihoods interventions have the potential to safeguard pastoral households from the severe deprivation and suffering they could slide into when a crisis hits.

A successful approach to livelihoods programming is context specific, is based on an in-depth livelihood analysis, seeks to establish strategic partnership among the different actors involved in pastoralism, including the private sector and employment of appropriate cutting edge technologies and innovations. Apart from supporting livestock production and marketing, other areas of support include:

- diversified and alternative livelihoods, especially alternative livelihoods options for youth and women;
- social protection programmes that boost pastoral livelihoods and options in order to build capacity of vulnerable pastoral households get out of vulnerability and poverty; while maintaining flexibility to provide humanitarian assistance during crises;
- development of the animal feed resources, including agro-industrial by-products such as molasses, bagasse and haymaking;
- development of pastoral natural resources and natural resources governances, including water and animal feed resources;
- livestock marketing and trade and livestock product value chain interventions;
- pastoral education combining literacy and numeracy education with livelihoods skills and training, as in the agro-pastoral field schools and junior farmer field schools;
- animal disease control and prevention.

Ensuring a timely livelihoods-based livestock emergency response when a crisis threatens

Livelihoods emergency response to shocks is an integral part of livelihoods resilience programming. It is meant to absorb the immediate impact of the shock and to save livelihoods. As such, it should build on long-term livelihoods resilience programming, especially in the early and recovery phases. Table 2 illustrates the different types of livelihoods-based emergency interventions: (1) livestock offtake interventions, (2) livestock production and health, and (3) herd reconstitution. A body of both experience and knowledge with good best practices has now accumulated. Yet two areas of intervention merit particular attention, as they are yet to be developed.

Table 2. Types of emergency animal interventions

No.	Type of intervention	Remarks
I	**Livestock offtake**	
1	Destocking	Early offtake in time of drought and other shocks. It (a) provides a fair price to the pastoralists, **(b) provides a high-protein food as animals are slaughtered** and the meat is provided to the drought-affected communities and (c) injects cash into the local economy.
2	Transport subsidies to livestock traders	Supports the offtake of large numbers of animals from drought-stricken areas to markets and injects cash into the local economy.
II	**Livestock production and health**	
3	Livestock feed distribution	This includes distribution of concentrates, fodders, and/or nutrient blocks that would provide energy, nitrogen, and micronutrients to enable the animals to survive until pasture conditions improve. It is more cost-effective than restocking or buying fresh animals after a drought. **It could improve milk production and thus ensure the supply of high-protein food to the household, especially children and women.**
4	Provision of water	Access to water could be established in different ways, such as establishing new water sources or rehabilitation of existing water sources, providing storage or transport facilities (e.g. water trucking) and providing subsidised fuel and pumps.
5	Veterinary programmes	These include mass treatment and vaccination, disease surveillance and investigation to protect livestock.
III	**Herd reconstitution**	
6	Restocking	This supports people to rebuild their livelihoods, and **it could provide a high-protein food such as milk or eggs.**

Source: FAO, 2016; Livestock Emergency Guidelines and Standards, 2014; ODI, 2009.

Livestock offtake involves different interventions that provide direct or indirect access to highly nutritious food for the drought-affected communities. As such, they affect human nutrition, especially for children and women, through the consumption of milk produced by herd animals and of meat from those animals that are destocked and slaughtered. This consumption is affected by livestock production and health, and it can be improved by herd reconstitution interventions. Milk and other animal products contribute a significant role in the diet of pastoralist communities, specifically children and pregnant or lactating women, as discussed earlier. Therefore, there is an urgent need to create an evidence base on the link between human nutrition and livestock in the different contexts of pastoral areas in the drylands. This would inform more effective food security and nutrition programming and the development of guidelines for the design and implementation of nutrition-sensitive livestock programmes in pastoral settings.

The second area of intervention that merits further attention is emergency animal feeding. Animal feeding interventions ensure feed supplies in emergency situations. They involve distribution of animal fodder or of

Responding to immediate animal feed shortages in situations of crisis requires a developed base of animal feed resources to replenish feed reserves and meet the immediate high demand in emergency situations.

nutrient blocks such as urea-molasses or other minerals. The objectives of this type of intervention are usually to protect and rebuild the key livestock assets of crisis-affected communities when feed is in short supply due to lack of rainfall or when pasture is inaccessible due to insecurity (FAO, 2016; Livestock Emergency Guidelines and Standards, 2014). Equally important is that keeping this stock alive contributes to the immediate household food and nutrition, particularly for children and women. Because animal feeding interventions have a positive impact on milk production and household consumption, animal feed supplies in crisis situations could contribute to saving livelihoods and lives.

Responding to immediate animal feed shortages in situations of crisis requires a developed base of animal feed resources to replenish feed reserves and meet the immediate high demand in emergency situations. Obviously, this is not the case in most of the countries in the Sahel and the Greater Horn of Africa. Moreover, in the countries where the animal feed resource base, particularly of agro-industrial by-products, is fairly developed, it is not linked to emergency response preparedness or


©FAO/Albert Gonzalez Farran

contingency planning. That means the efforts to respond to the animal feed shortages in emergency situations have to take into account the enhancement of livestock feed production for medium- and long-term needs as part of increasing the resilience of the pastoral livelihoods system.

The overall objective of the development of the animal feed resources is to enhance the resilience of the pastoral livelihoods system in the mid and long term, and to allow for more surplus to meet the emergency need when feeds are in short supply, such as in drought. Apart from increasing feed supplies from available land and pasture, the other area is expanding the utilisation of the agro-industrial by-products and non-conventional feeds. The utilisation of the latter has three dimensions: (1) the nutritional and technical aspects involving the choice of technology and innovations, (2) the institutional and resource support that can provide for the application of the technology, and (3) the policy and regulatory aspects (Shamsi *et al.*, 2012; Devendra, 1987). As far as these dimensions are concerned, the different countries in Africa are in different phases of the process and the utilisation of the agro-industrial by-products.

©FAO/Giulio Napolitano

Conclusion

Pastoral livestock production is the main production system in Africa's drylands. It involves varying degrees of seasonal movements as a basis for pastoralists to utilise the extensive, mostly dry grasslands for livestock husbandry. Pastoralism is the main source of livelihood, food security and wellbeing in 43 percent of Africa's land mass. In addition, pastoralism plays an important role in the national and regional economies of Africa. It supplies millions of animals to both domestic and international markets through substantial livestock trade networks that link local and cross-border markets to neighbouring countries and international markets.

Pastoralism is a viable and sustainable livelihood system in the dryland areas of Africa. It is well adapted to manage the uncertainty and risks of these areas. Moreover, pastoralism makes a major contribution to maintaining the health of the ecosystem because it is a rational, adaptable production system uniquely resilient to the climatic variabilities of the drylands.

In recent decades, pastoralism is facing ever-increasing challenges in the forms of increasingly variable and unpredictable climate, rising insecurity and violence, increasing risk of animal and zoonotic diseases, and insecure land rights and natural resources management. These changes are taking place in a context of neglect and exclusion. These challenges are eroding the capacity of pastoral systems in the different regions of the drylands to absorb shocks and adapt to changes. As such, they have implications for the viability and resilience of the pastoral livelihoods system. If the current trends continue unabated, the already fragile natural resource base will be pushed beyond its regenerative capacity and the ability of institutions manage the impacts of the multiple and colliding shocks. In this context, building resilience to droughts and other shocks is timely and of paramount importance.

Despite the weakening capacity of the pastoral communities, they are highly resilient, with an impressive capacity to sustain in the dynamic social-ecological spaces of the drylands. They make an enormous contribution to social, environmental and economic wellbeing at the regional, national and local levels. There is a critical need to strengthen the capacity of pastoralism to operate in more sustainable pathways. Such a task requires in-depth understanding of the socioecological challenges and opportunities in Africa's drylands. It also requires long-term engagement and broad partnership among the diverse actors involved in the drylands at the local, regional and international levels.

Pastoralism is a viable and sustainable livelihood system in Africa's drylands. It is well adapted to manage the uncertainty and risks of these areas.

References

Adriansen, H. K. 2008. Understanding pastoral mobility: The case of Senegalese Fulani. *Geographical Journal,* 174: 207–222.

Adriansen, H., & Nielsen, T. 2005. The geography of pastoral mobility: A spatio-temporal analysis of GP5 data from Sahelian Senegal. *GeoJournal,* 64: 177–188.

African Union. 2010. *Policy framework for pastoralism in Africa: Securing, protecting and improving the lives, livelihoods and rights of pastoral communities, Addis Ababa.* [Cited 11 July 2018]. au.int/sites/default/files/documents/30240-doc-policy_framework_for_pastoralism.pdf

Ahmed, M. M., Sanders, J. H., & Nell, W. T. 2000. New sorghum and millet cultivar introduction in Sub-Saharan Africa: Impacts and research agenda. *Agricultural Systems,* 64: 55–65.

Aklilu, Y., Lemma, G., Deng, L., & Abdullahi, S. 2016. *The impact of conflict on the livestock sector in South Sudan.* Juba, South Sudan: Food and Agriculture Organization of the United Nations.

Alkemade, R., Reid, R. S., van den Berg, M., de Leeuw, J., & Jeuken, M. 2013. Assessing the impacts of livestock production on biodiversity in rangeland ecosystems. *Proceedings of the National Academy of Sciences of the United States of America,* 110: 20900–20905.

Babiker, M. 2013. Mobile pastoralism and land grabbing in Sudan: Impacts and responses. In A. Catley, J. Lind, & I. Scoones, eds. *Pastoralism and development in Africa: Dynamic change at the margins,* pp. 177–185. New York, NY: Routledge.

Baxter, P. T. W. 1993. The "new" East African pastoralist: An overview. In J. Markahis, ed. *Conflict and the decline of pastoralism in the Horn of Africa,* pp. 145–146. London, United Kingdom: Macmillan.

Behnke, R. H., Scoones, I., & Kerven, C., eds. 1993. *Range ecology at disequilibrium: New models of natural variability and pastoral adaptation in African savannas.* Nottingham, United Kingdom: Overseas Development Institute.

Bevan, J. 2007a. *Between a rock and hard places: Armed violence in African pastoral communities.* Conference background paper. Geneva, Switzerland: Small Arms Survey.

Bevan, J. 2007b. *Fear and loathing in Karamoja: An assessment of armed violence and the failure of disarmament in Uganda's most deprived region.* Working paper. Geneva, Switzerland: Small Arms Survey.

Blench, R. 2001. *You can't go home again: Pastoralism in the new millennium.* London, United Kingdom: Overseas Development Institute.

Both, R., Etsub, E., & Moyer, E. 2013. 'They were about to take out their guns on us': Accessing rural Afar communities in Ethiopia with HIV-related interventions. *Health and Sexuality,* 15: S338–S350.

Brooks, N. 2006. Climate change, drought and pastoralism in the Sahel. Discussion note for the World Initiative on Sustainable Pastoralism. Gland, Switzerland: International Union for Conservation of Nature. [Cited 11 July 2018]. cmsdata.iucn.org/downloads/e_conference_discussion_note_for_the_world_initiative_on_sustainable_pastoralism_.pdf

Catley, A. 2017. *Pathways to resilience in pastoralist areas: A synthesis of research in the Horn of Africa.* Boston, MA: Feinstein International Center, Tufts University.

Catley, A., & Aklilu, Y. 2013. Moving up or moving out? Commercialization, growth and destitution in pastoralist areas. In A. Catley, J. Lind, & I. Scoones, eds. *Pastoralism and development in Africa: Dynamic change at the margins,* pp. 85–97. Abingdon, United Kingdom, and New York, NY: Routledge.

Cervigni, R., & Morris, M., eds. 2016. Confronting Drought in Africa's Drylands: Opportunities for Enhancing Resilience. Africa Development Forum series. Washington, DC: World Bank. doi:10.1596/978-1-4648-0817-3. License: Creative Commons Attribution CC BY 3.0 IGO

Daszak, P., Zambrana-Torrelio, C., Bogich, T. L., Fernandez, M., Epstein, J. H., & Murray, K. A. 2013. Interdisciplinary approaches to understanding disease emergence: The past, present, and future drivers of Nipah virus emergence. *Proceedings of the National Academy of Sciences of the United States of America,* 110: 3681–3688.

de Bruijn, M. E., & van Dijk, H. J. W. M. 1999. Insecurity and pastoral development in the Sahel. *Development and Change,* 30: 115–139.

Devendra, C. 1987. *Expanding the utilization of agro-industrial by-products and non-conventional feed resources in Asia.* Paper presented at the Symposium of Animal Feed Resources, Asian Productivity Organization, 24–29 August 1987, Tokyo, Japan.

Dhikusooka, M. T., Tjørnehøj, K., Ayebazibwe, C., Namatovu, A., Ruhweza, S., Siegismund, H., & Belsham, G. J. 2015. Foot-and-mouth disease virus serotype SAT 3 in long-horned Ankole calf, Uganda. *Emerging Infectious Diseases,* 21: 111–114.

Diguimbaye-Djaibe, C., Hilty, M., Ngandolo, R., Mahamat, H. H., Pfyffer, G. E., & Baggi, F. 2006. *Mycobacterium bovis* isolates from tuberculous lesions in Chadian zebu carcasses. *Emerging Infectious Diseases,* 12: 769–771.

Dong, S., Wen, L., Liu, S., Zhang, X., Lassoie, J. P., Yi, S., & Li, Y. 2011. Vulnerability of worldwide pastoralism to global changes and interdisciplinary strategies for sustainable pastoralism. *Ecology and Society,* 16(2): 10.

Duffield, M. 1993. NGOs, disaster relief and asset transfer in the Horn: Political survival in a permanent emergency. *Development and Change,* 24: 131–157.

Epstein, P. R., & Mills, E., eds. 2005. *Climate change futures: Health, ecological and economic dimensions.* N.p.: Center for Health and the Global Environment, Harvard Medical School.

FAO. 2011. *Sustainable animal health and contained animal-related human health risks – in support of the emerging One-Health agenda.* 106th Programme Committee Session, Item 3. [Cited 11 July 2018]. www.fao.org/docrep/meeting/021/ma145e.pdf

FAO. 2016. Livestock-related interventions during emergencies – the how-to-do-it manual. Edited by Philippe Ankers, Suzan Bishop, Simon Mack, & Klaas Dietze. *FAO Animal Production and Health Manual No. 18* Rome, Italy: Author.

FAO. 2017. *Linking community-based animal health services with natural resource conflict mitigation in the Abyei Administrative Area: Building resilience through dialogue and negotiation in a contested area between Sudan and South Sudan, A resilience promising practice.* Rome, Italy: Author.

FAO. 2018. *Livestock programming for nutritional improvements in children under 5 years.* Unpublished FAO report. Rome, Italy.

FAO South Sudan. 2013. *Abyei project proposal: Improving livelihoods, social peace and stability in the Abyei area.* Unpublished document, Juba, South Sudan.

FAO South Sudan. 2014. *Livestock alert.* Juba, South Sudan: Author.

Food Security Information System. 2018. *Global Report on Food Crises 2017.* Rome, Italy: Food and Agriculture Organization of the United Nations.

Fratkin, E., & McCabe, J. T. 1999. East African pastoralism at the crossroads: An introduction. *Nomadic Peoples,* 3(2): 5–15.

Galvin, K. A. 1992. Nutritional ecology of pastoralists in dry tropical Africa. *American Journal of Human Biology,* 4: 209–221.

Global Witness. 2010. *The hill belongs to them: The need for international action on Congo's conflict minerals trade.* [Cited 11 July 2018]. www.globalwitness.org/sites/default/files/library/The%20hill%20belongs%20to%20them141210.pdf

Hardin, G. 1968. The tragedy of the commons. *Science,* 162: 1243–1248.

Hesse, C., & Odhiambo, M. 2006. *Strengthening pastoralists' voice in shaping policies for sustainable poverty reduction in ASAL regions of East Africa.* Paper presented at the Conference on Pastoralism and Poverty Reduction in East Africa, 27–28 June 2006, Nairobi, Kenya.

Hogg, R. 1986. The new pastoralism: Poverty and dependency in Northen Kenya. *Africa,* 56: 319–333.

Hogg, R. S. 1990. *An institutional approach to pastoral development: An example from Ethiopia.* London, United Kingdom: ODI Pastoral Development Network, Overseas Development Institute.

Holt, P. M. 1958. *The Mahadist State in the Sudan 1881–1898: A study of its origins, development and overthrow.* London, United Kingdom: Oxford University Press.

Hoppe, C., Andersen, G. S., Jacobsen, S., Mølgaard, C., Friis, H., Sangild, P. T., & Michaelsen, K. F. 2008. The use of whey or skimmed milk powder in fortified blended foods for vulnerable groups. *Journal of Nutrition,* 138: 145S–161S.

Hoppe, C., Mølgaard, C., & Michaelsen, K. F. 2006. Cow's milk and linear growth in industrialized and developing countries. *Annual Review of Nutrition,* 26: 131–173.

Humanitarian Policy Group (HPG). 2006. *Saving lives through livelihoods: Critical gaps in the response to the drought in the Greater Horn of Africa.* HPG Briefing Note. London, United Kingdom: Overseas Development Institute.

Institute of Medicine & National Research Council. 2009. Sustaining global surveillance and response to emerging zoonotic diseases. Washington, DC: National Academies Press.

Integrated Food Security Phase Classification Global Partners. 2012. *Evidence and standards for better food security decisions.* Technical manual version 2.0. Rome, Italy: Food and Agriculture Organization of the United Nations.

IRIN. 2006. Pastoralist crisis will not be solved with food aid – UN officials. [Cited 11 July 2018]. www.irinnews.org/fr/node/225961

Jarvis, L. S. 1993. Overgrazing and range degradation in Africa: Is there need and scope for government control of livestock numbers? *East Africa Economic Review,* 7: 95–116.

Kandji, S. T., Verchot, L., & Mackensen, J. 2006. *Climate change and variability in the Sahel region: Impacts and adaptation strategies in the agricultural sector.* Nairobi, Kenya: United Nations Environment Programme and World Agroforestry Centre.

Kawamoto, K. 2012. Diamonds in war, diamonds for peace: Diamond sector management and kimberlite mining in Sierra Leone. In P. Lujala & S. A. Rustand, eds. *High-value natural resources and post-conflict peacebuilding.* London, United Kingdom: Earthscan.

Keen, D. 1994. *The benefits of famine: A political economy of famine and relief in southwestern Sudan, 1983–1989.* Princeton, NJ: Princeton University Press.

Kirkbride, M., & Grahn, R. 2008. *Survival of the fittest. Pastoralism and climate change in East Africa.* Oxfam Briefing Paper 116. N.p.: Oxfam International.

Krätli, S., Sougnabé, P., Staro, F., & Young. H. 2018. Pastoral systems in Dar Sila Chad: A background paper for Concern Worldwide. Boston, MA: Feinstein International Center, Tufts University.

Laiolo, P., Dondero, F., Ciliento, E., & Rolando, A. 2004. Consequences of pastoral abandonment for the structure and diversity of the alpine avifauna. *Journal of Applied Ecology,* 41: 294–304.

Lautze, S. 2010. *Militarized livelihoods in Uganda* (Doctoral thesis). Oxford University, Oxford, United Kingdom.

Lautze, S., & Raven-Roberts, A. 2006. Violence and complex humanitarian emergencies: Implications for livelihoods models. *Disasters,* 30: 383–401.

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

Livestock Emergency Guidelines and Standards. 2014. *Livestock emergency guidelines and standards* (2nd edition). Rugby, United Kingdom: Practical Action.

Lubroth, J. 2012. *Climate change and animal health.* Presentation at the FAO/OECD Workshop on Building Resilience for Adaptation to Climate Change in the Agriculture Sector, 23–24 April 2012, Rome, Italy.

Mähler, A. 2012. An inescapable curse? Resource management, violent conflict, and peacebuilding in the Niger Delta. In P. Lujala and S. A. Rustad, eds. *High-value natural resources and post-conflict peacebuilding.* London, United Kingdom: Earthscan.

Marshall, F., & Hildebrand, E. 2002. Cattle before crops: The beginnings of food production in Africa. *Journal of World Prehistory,* 16: 99–143.

Michaelsen, K. F. 2013. Cow's milk in the prevention and treatment of stunting and wasting. *Food and Nutrition Bulletin,* 34: 249–251.

Michaelsen, K. F., Hoppe, C., Roos, N., Kaestel, P., Stougaard, M., Lauritzen, L., Mølgaard, C., Girma, T., & Friis, H. 2009. Choice of foods and ingredients for moderately malnourished children 6 months to 5 years of age. *Food and Nutrition Bulletin,* 30: S343–S404.

Morton, J. 2005. *Legislators and livestock: A comparative analysis of pastoralist parliamentary groups in Ethiopia, Kenya and Uganda.* Final report for the NRI/PENHA Research Project on Pastoralist Parliamentary Groups. [Cited 11 July 2018]. www.gov.uk/dfid-research-outputs/legislators-and-livestock-a-comparative-analysis-of-pastoralist-parliamentary-groups-in-ethiopia-kenya-and-uganda-final-report-of-the-nri-penha-research-project#citation

Morton, J. 2008. *DFID's current and potential engagement with pastoralism: A scoping study.* Greenwich, United Kingdom: Natural Resources Institute.

Munch, A. K. 2012. *Nomadic women's health practice: Islamic belief and medical care among Kel Alhafra Tuareg in Mali.* Basel, Switzerland: Schwabe.

Napier, A., & Desta, S. 2011. *Review of pastoral rangeland enclosures in Ethiopia.* Pastoralist Livelihoods Initiative Policy Project. [Cited 11 July 2018]. fic.tufts.edu/assets/Tufts-Range-Enclosure-Review-PLI.pdf

Niamir-Fuller, M. 1998. The resilience of pastoral herding in Sahelian Africa. In F. Berkes & C. Folke, eds. *Linking social and ecological systems: Management practices for building resilience,* pp. 250–284. Cambridge, United Kingdom: Cambridge University Press.

Niamir-Fuller, M. 1999. *Managing mobility in African rangelands: The legitimization of transhumance.* London, United Kingdom: Intermediate Technology.

Nordstrom, C. 1997. *A different kind of war story.* Philadelphia: University of Pennsylvania Press.

Nunow, A. A. 2013. Land deals and the changing political economy of livelihoods in the Tana Delta, Kenya. In A. Catley, J. Lind, & I. Scoones, eds. *Pastoralism and development in Africa: Dynamic change at the margins.* New York, NY: Routledge.

Oba, G., & Lusigi, W. 1987. A*n overview of drought strategies and land use in African pastoral systems.* ODI Paper 23a. London, United Kingdom: Overseas Development Institute.

Osere, E. 2014. Kenya: Teso livestock quarantined to curb foot and mouth disease. AllAfrica*, The Star Report.* [Cited 11 July 2018]. allafrica.com/stories/201412110670.html

Osman, A. K., Young, H., Houser, R., & Coates, J. C. 2013. *Agricultural change, land, and violence in protracted political crisis: An examination of Darfur.* Oxfam America Research Backgrounder Series. Boston, MA: Oxfam America.

Overseas Development Institute (ODI). *2009. Getting it right: Understanding livelihoods to reduce the vulnerability of pastoral communities.* Humanitarian Policy Group synthesis paper. London, United Kingdom: ODI.

Patey, L. A. 2012. Lurking beneath the surface: Oil, environmental degradation, and armed conflict in Sudan. In P. Lujala & S. A. Rustad, eds. *High-value natural resources and post-conflict peacebuilding.* London, United Kingdom: Earthscan.

Pavanello, S. 2009. *Pastoralists' vulnerability in the Horn of Africa: Exploring political marginalization, donors' policies and cross-border issues – literature review.* London, United Kingdom: Humanitarian Policy Group, Overseas Development Institute.

Platteau, J.-P. 1996. The evolutionary theory of land rights as applied to Sub-Saharan Africa: A critical assessment. *Development and Change,* 27: 29–86.

Reda, K. T. 2015. Natural resource degradation and conflict in the East African pastoral drylands: Is blaming the victim a solution? *African Security Review,* 24: 270–278.

Richards, P. 1996. *Fighting for the rainforest: War, youth and resources in Sierra Leone.* Portsmouth, NH: Heinemann Press.

Sadler, K., Mitchard, E., Abdi, A., Shiferaw, Y., Bekele, G., & Catley, A. 2012. *Milk matters: The impact of dry season livestock support on milk supply and child nutrition, Somali Region, Ethiopia.* Addis Ababa, Ethiopia: Feinstein International Center, Tufts University, and Save the Children.

Saeed, I. K., Ali, Y. H., Khalafalla, A. I., & Mahasin, E. A. 2004. Current situation of Peste des petits ruminants (PPR) in the Sudan. *Tropical Animal Health and Production,* 42: 89–93.

Sanders, E. 2007. In Darfur, another obstacle to peace. *Los Angeles Times.* [Cited 11 July 2018]. www.latimes.com/world/africa/la-fg-resettle12aug12-story.html

Schelling, E., Diguimbaye, C., Daoud, S., Nicolet, J., Boerlin, P., Tanner, M., & Zinsstag, J. 2003. Brucellosis and Q-fever seroprevalences of nomadic pastoralists and their livestock in Chad. *Preventive Veterinary Medicine,* 61: 279–293.

Scoones, I., ed. 1995. *Living with uncertainty: New directions in pastoral development in Africa.* London, United Kingdom: Intermediate Technology.

Sellen, D. W. 1996. Nutritional status of Sub-Saharan African pastoralists: A review of the literature. *Nomadic Peoples,* 39: 107–134.

Shamsi, I. H., Hussain, N., & Jiang, L. 2012. Agro-industrial by-products utilization in animal Nutrition. In S. Gupta, ed. *Technological innovations in major world oil crops,* Vol. 2, pp. 209–220. New York, NY: Springer.

Shazali, S., & Ahmed, A. G. M. 1999. *Pastoral land tenure and agricultural expansion: Sudan and the Horn of Africa.* Issue Paper No. 85. London, United Kingdom: International Institute for Environment and Development.

Sidahmed, A., E. 2018. Recent trends in drylands and future scope for advancement. In M.K. Gaur & V.R. Squires, eds. Climate variability impacts on land use and livelihoods in drylands, pp 21-57. Switzerland, Springer International Publishing, AG.

Slenning, B. D. 2010. Global climate change and implications for disease emergence. *Veterinary Pathology,* 47: 28–33.

Sommer, F. 1998. *Pastoralism, drought early warning and response.* London, United Kingdom: ODI–Pastoral Development Network.

Swai, S. E. S., Schoonman, L., & Daborn, C. J. 2010. Knowledge and attitude towards zoonoses among animal health workers and livestock keepers in Arusha and Tanga, Tanzania. *Tanzania Journal of Health Research,* 12: 282–288.

Taylor, L. H., Latham, S. M., & Woolhouse, M. E. 2001. Risk factors for human disease emergence. *Philosophical Transactions of the Royal Society B: Biological Sciences,* 356: 983–989.

Taylor, M. B., & Davis, M. 2016. Taking the gun out of extraction: UN responses to the role of natural resources in conflicts. In C. Bruch, C. Muffett, & S. S. Nichols, eds. *Governance, natural resources, and post-conflict peacebuilding,* pp. 249–276. New York, NY, and Abingdon, United Kingdom: Routledge.

United Nations Children's Fund (UNICEF)/United Nations Sudano-Sahelian Office (UNSO). 1992. *Pastoralists at a crossroads: Survival and development issues in African pastoralism.* Nairobi, Kenya: UNICEF/UNSO Project for Nomadic Pastoralists in Africa.

United Nations Environment Programme. 2007. *Sudan post-conflict environmental assessment.* [Cited 11 July 2018]. postconflict.unep.ch/publications/UNEP_Sudan.pdf

United Nations Office for the Coordination of Humanitarian Affairs, Regional Officer for Central and East Africa. 2008. Cattle rustling, violence and food insecurities in Eastern Africa: Regional implications and solutions. *Pastoralist Voices,* 1(6): 1–4.

United Nations Security Council. 2012. *Resolution 2036: The situation in Somalia.* [Cited 11 July 2018]. unscr.com/en/resolutions/2036

Vosloo, W., Bastos, A. D. S., Sangare, O., Hargreaves, S. K., & Thomson, G. R. 2002. Review of the status and control of foot and mouth disease in sub-Saharan Africa. *Scientific and Technical Review,* 21: 437–447.

Wario A. 2004. *Promotion of pastoral development in Kenya: Perspectives from the Kenya Pastoral Parliamentary Group (KPPG).* PARIMA Research Brief 04-02.

Warren, A. 2005. The policy implications of Sahelian change. *Journal of Arid Environments,* 63: 660–670.

Woolhouse, M. E., & Gowtage-Sequeria, S. 2005. Host range and emerging and reemerging pathogens. *Emerging Infectious Diseases,* 7: 1842–1847.

World Bank Group & Food and Agriculture Organization of the United Nations. 2018. *Rebuilding resilient and sustainable agriculture in Somalia* (Vol. 1). Washington, DC: World Bank.

World Bank Operations Evaluations Department. 1999. *Grassroots pastoral organizations in Mauritania.* Précis 181. Washington, DC: World Bank.

World Institute for Sustainable Pastoralism. 2008. *Policies that work for pastoral environments. A six-country review of positive policy impacts on pastoral environments.* Nairobi, Kenya: Author.

World Organisation for Animal Health (OIE). 2014. *Foot and mouth disease, Uganda.* [Cited 11 July 2018]. www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?reportid=15859

Young, H., & Jacobsen, K. 2013. No way back? Adaptation and urbanization of IDP livelihoods in the Darfur Region of Sudan. Development and Change, 44: 125–145.

Young, H., & Marshak, A. 2018. *Persistent global acute malnutrition.* Boston, MA: Feinstein International Center, Tufts University.

Young, H., Osman, A. M., Aklilu, Y., Dale, R., Badri, B., & Fuddle, A. J. A. 2005. *Darfur – livelihoods under siege.* Medford, MA: Feinstein International Famine Center, Tufts University.

Zinsstag, J., Ould Taleb, M., & Craig, P. S. 2006. Health of nomadic pastoralists: New approaches towards equity effectiveness. *Tropical Medicine and International Health,* 11: 565–568.

©FAO/Luis Tato

Saving livelihoods saves lives

Contact

Dominique Burgeon

Director, Emergency and Rehabilitation Division and
Strategic Programme Leader – Resilience
Rome, Italy
TCE-Director@fao.org

Food and Agriculture Organization of the United Nations

www.fao.org/resilience

ISBN 978-92-5-130898-1

9 789251 308981

CA1312EN/1/09.18