

Supporting adaptation to climate change in Africa's Livestock Sector

Background

Livestock production is increasing throughout Africa, driven by human population growth, improving living standards and urbanization. Seventy percent of the rural poor own livestock and over 200 million people rely on livestock for income. Livestock provide both food and income, and for many small-holder farmers livestock provide draught animal power, transportation and manure for fertilizing croplands. Livestock is also socially and culturally important in Africa for payment of dowry, celebrations and gifts to family members, and also as a source of savings that is often safer, despite diseases and drought, than banking systems and easier to manage for remote farmers.



Although the global livestock sector has recently been criticized as a major contributor to climate change, these allegations have recently been put into perspective. Africa's livestock sector contributes negligibly to global output of green house gases whereas the most extensive livestock systems can even contribute environmental benefits such as maintaining rangeland biodiversity and ecosystem health. Sustainable development of the livestock sector is of great importance for the adaptive capacity of many of the world's poorest people, and in some cases may also represent an opportunity for mitigating climate change.

Adaptive capacities and strategies

Climate change in Africa will likely be characterized by increasing climate uncertainty, including an increase in the frequency and intensity of extreme weather events such as hot spells, droughts and floods. Africa's livestock sector will be affected by climate changes through more frequent catastrophic events, reduced water availability, changes in the pattern and quantity of rainfall, an increase in temperature, changes in seasonality, a decrease in feed and fodder production, changing patterns and distribution of disease and altered markets and commodity prices.

Adaptation by peri-urban pastoralists in Cameroon

The Logone floodplain in Northern Cameroon is one of the most important dry season grazing lands in the Chad Basin and each November pastoralists from Cameroon, Nigeria and Niger trek to Logone to exploit the excellent quantity and quality of the rangelands. However, increasing population and urbanization has led to an expansion of agriculture and villagers have lost access to rangeland pastures. To adapt to this natural resource constraint, peri-urban pastoralists firstly entrust part of their herd to nomadic pastoralists or paid herders who are permanently in transhumance between the Logone floodplain and the Mindif-Moulvoudaye region. Secondly, in the dry season, they feed the remaining animals in the village with cotton seed cakes, bran and sorghum stalks. In the rainy season, these animals are also sent on transhumance to the Mindif-Moulvoudaye region. Thus, peri-urban pastoralists pursue both intensive and extensive strategies to cope with the disappearance of grazing lands in the peri-urban area.

Many livestock keepers have traditionally been capable of adapting to threats to their livelihood. Indeed, one of the most widespread livestock systems in Africa, pastoralism, has often been defined by its capacity to adapt to climatic uncertainty and other hazards. For other farmers, livestock keeping is itself an adaptation to risk. However, it is important to recognize that the outcomes of climate change are uncertain and that the way livestock keepers adapt will vary from location to location and person to person.

In some of Africa's drier areas, pastoral communities are following the tried-and-tested adaptation strategy of shifting from less resilient (but more marketable) cattle and sheep into the more resilient camels and goats. Some pastoral areas that have not traditionally farmed camels are adopting this species as a means of adapting to less predictable access to water. Meanwhile many non-livestock farmers are investing in livestock as an adaptation strategy, usually starting with small stock and often feeding them crop residues or household waste. Some West African farmers have begun to embrace novel types of livestock such as cane rats and snails, exploiting niche markets or local production opportunities.



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Poultry production provides an important survival strategy for many Africa farmers because it is fast-producing at low cost, uses locally adapted breeds and has low veterinary costs with inexpensive vaccines available for the most prevalent diseases. Poultry production increases food security and household resilience for many Africans by providing readily harvestable animal protein to rural and peri-urban households in addition to a steady source of income.

Supporting adaptive capacities

Whilst it is desirable to strengthen the capacity of the livestock industry to adapt to the threat of climate change, it is important to understand that a much wider range of threats influences livestock keepers' impoverishment. Many livestock keepers identify climate change as just the latest in a series of threats to which adaptation has become increasingly difficult. Other threats include population growth and resource pressure, shifting power relations and a changing social, political and economic context.

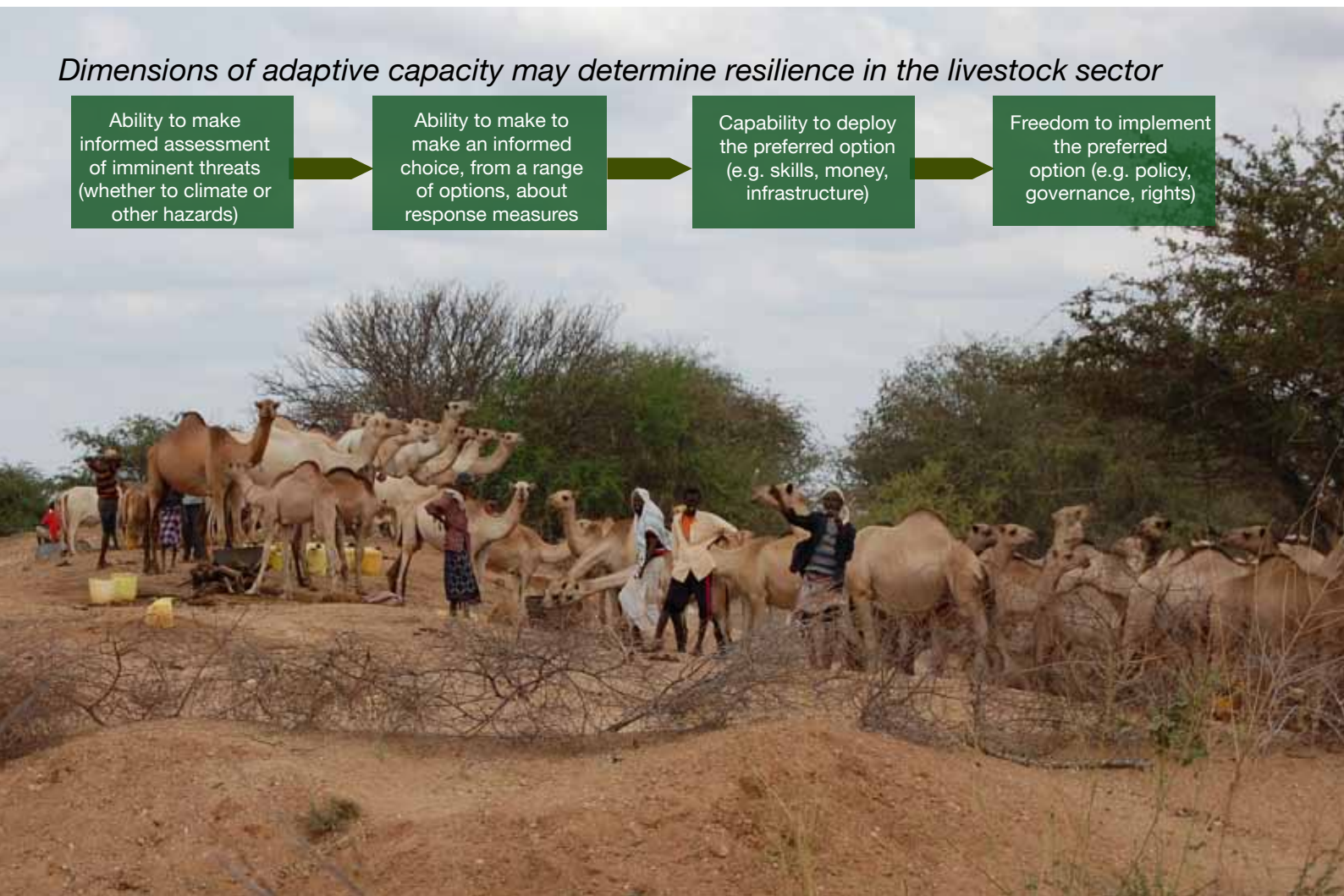
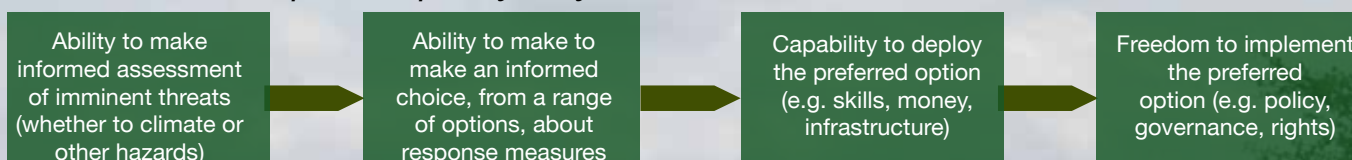
Adaptive capacity, at individual, community or national levels, is poorly understood. However, there are risks inherent in externally-driven determination of risks and opportunities for adaptation. Top-down and externally driven approaches have often been harmful to development in the past and it is critical to develop a broader understanding of the determinants of adaptive capacity. The ability to adapt may consist of a number of fundamental attributes that are relevant across a range of threats.

Livelihood threats confronted by livestock keepers

- Population pressure, from both external encroachers and internal demographic growth
- Market failures and entry barriers
- Inequity in global livestock trade (subsidies and concessions) undercutting local markets
- Poor access to foreign markets
- Insecure tenure and weakening or breakdown of customary governance institutions
- Loss of land, and in particular key resource pockets
- Restriction of transhumance and loss of access to key resources
- Sedentarization policies leading to land degradation and severely reduced carrying capacity
- Conflicts between pastoral groups as well as with crop farmers (linked to weakening governance above)

Improving the assessment of threats can enable farmers and planners to react appropriately and rapidly. This requires better access to information and greater capacity to interpret information and understand the implications of a given threat. At a local level this requires training and awareness raising, improved understanding between farmers and extension workers, and investment in information infrastructure. At the national level, greater investment may be required to improve meteorological data collection and dissemination so that information is available regularly and reliably.

Dimensions of adaptive capacity may determine resilience in the livestock sector



Developing the use of adapted breeds

N'Dama cattle, West African dwarf goats, and the Djallonke sheep and goats in Central Africa are all breeds with a proven ability to survive in areas with high risk of trypanosomiasis. It has also been reported that trypanotolerant cattle, especially the N'Dama breed, show superior heat tolerance than zebu cattle and metabolize water with greater economy, making them better adapted to the hot and water-stressed regions of Africa. As climate change leads to a change in the range of the trypanosome-carrying tsetse fly, along with increases in temperature and water stress, the advantage of these indigenous breeds is obvious.

However, the comparatively small size of N'Dama cattle has led herders to cross the breed with zebu cattle to improve their body-mass and walking capacity. This production strategy – arguably an adaptation to market forces and current ecological conditions – may constitute a threat to the long-term survival of a breed that could play a vital role in future adaptations of Africa's livestock industry. This threat is addressed by projects such as that of The International Trypanotolerance Centre, based in The Gambia, which is developing the breed to increase its productivity in order to maintain its popularity and promote its use.

Enabling informed choice of livestock keepers and advisors/planners does not necessarily require the development of new choices. Many adaptation options are already known and it is important to ensure that farmers and planners can make both sense and use of the options available to them. This requires the building human capabilities through education and improved extension services and through better access to information sources. Collaborative research is required where adaptation options still need to be developed, to ensure that both endogenous and exogenous knowledge is considered.

Index-based insurance in Kenya

Index-based insurance (IBI) against climatic hazards are designed to share risks amongst a group of resource users, insurance companies and government. IBI is typically designed so that small losses are borne by the client that do not significantly affect their enterprise, whilst larger losses are transferred to the private insurance industry (market insurance through a Base Insurance Product). Based on historical data, an index is defined linking climate to economic impact. Climatic thresholds are determined accordingly and payouts are made when a threshold is passed in a given location, rather than on the basis of individual losses. In Kenya, a model is under development by FSD Kenya and the International Livestock Research Institute, with support from DFID, Rockefeller and the World Bank. FSD partners with the Kenya Meteorological Department to install automated weather stations for contract monitoring and insurance payouts.

Capability to adopt the chosen strategy relies to a large extent on the core livelihood assets: human, social, physical, financial and natural capital. In more practical terms, to be capable of deploying a preferred adaptation option, people need particular skills, resources and infrastructure. Many of the basic capabilities of livestock keepers are weak, leading to their underdevelopment and contributing to their vulnerability to climate change and other threats. Training is important to develop these capabilities, as is access to financial services and markets.

Freedom to implement the chosen strategy cuts across policy, governance and rights. At a local level, farmers need secure property rights, strong and equitable local institutions, and functioning legal systems. They also need government to put in place supportive policies, to relax policy disincentives, and to effectively implement key policies. Important policy gaps include market development, natural resource governance and tenure, women's rights, legitimizing local organizations, and the regulation and protection of transhumance routes. Freedom to adapt can also be constrained by cultural and societal norms, which must be taken into consideration by adopting appropriately participative and empowering approaches to adaptive development.

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Mitigation and carbon sequestration

Although the African livestock sector does not contribute significantly to global climate change, there are nevertheless options for mitigation of climate change that may provide other incentives for improved livestock production. Options for mitigating climate change include a range of methods for reducing rumen emissions, improving waste management, improving carbon capture by rangelands and complementary activities such as silvo-pastoralism.

Carbon sequestration in rangelands may provide an option to capitalize on the existing environmental management practices of livestock keepers and capture additional incentives for more effective management. Most global attention is focused on forests as a terrestrial carbon sink, but whilst forests may add only about 10% to their total weight each year, savannas can reproduce 150% of their weight annually, and tropical savannas have a greater potential to store carbon below ground (in roots and soils) than any other ecosystem. Since effective herd management has been shown to increase primary productivity of the rangelands, and given the scale of rangelands in Africa, it is evident that livestock production could play a role in mitigation of climate change.

Carbon stocks have been found to reduce when drylands are converted from pasture to either plantation or arable land, whilst in some cases increases in carbon stocks are seen when native forests or croplands are converted to pasture. Carbon capture is increased with improved grazing management of rangelands, and high-diversity perennial grassland species have 5–6 times greater soil carbon and nitrogen than monocultures. The added advantage of improving carbon capture through improved rangeland management is that such practices can also contribute significantly to improving the local and household economy.

Specific recommendations for livestock research and development

- Strengthen forecasting capacities in the livestock sector
- Promote breed development that is relevant to local environmental conditions
- Strengthen understanding of appropriate pasture management that accommodates climatic flux
- Increase participatory research into the roles of women in the livestock sector
- Develop financial products that are adapted to the production cycle of rural livestock enterprises
- Strengthen access to appropriate veterinary services, including Community Animal Health Workers
- Further develop relevant fodder production and conservation technologies
- Strengthen understanding of the shifting relationship between the crop and livestock sectors
- Identify ecologically and socially sound options for improving water availability
- Strengthen natural resource tenure and governance
- Explore the options and benefits for mitigation strategies in the livestock sector

