

Pastoralism and climate change

Enabling adaptive capacity

The effects of climate change on the drylands of the Horn of Africa pose particular and difficult policy challenges. The arid climate together with the poverty faced by its inhabitants mean that the higher temperatures, intensifying rains and increasingly frequent extreme weather events that climate science projects for the region can only exacerbate the problems of development. However, the drylands have under-exploited development potential and the dominant land use system – pastoralism – has unique adaptive characteristics that, together with the right enabling policies, suggest that climate change can be adapted to, and development can be achieved.

The study on which this Synthesis Paper is based argues that, of all the natural resource-based land uses in the drylands, pastoralism functions best within the prevalent context of wide rainfall variability and unpredictability. With the right policies, investment and support, pastoralism presents a logical adaptation route in areas of increased climatic variability, and has an important role to play where other livelihoods are likely to fail. However, pastoralists are increasingly vulnerable to drought and other shocks as a result of policies at odds with the unique needs of the drylands, and years of poor and inadequate investment in the development of these areas. Pastoralists' resilience to drought and their adaptive capacity must be built upon and supported. Evidence suggests that, alongside improved drought preparedness planning, disaster management structures and risk reduction efforts, it would be more effective to enable and strengthen the inherent adaptive capacity of pastoralists, finding ways to encourage their autonomous adaptation, rather than providing adaptation strategies for them.

The untapped potential of the drylands

East Africa's drylands contribute significantly to national economies and to food security. They also possess considerable untapped opportunities. For example:

- Most of East Africa's livestock wealth is kept by

pastoralists in the drylands. The bulk of the meat, milk and other livestock products consumed in the Horn of Africa come from pastoral areas in the drylands. Global demand for meat and livestock products is rapidly increasing.

- National parks and other protected areas in the region fall predominantly within the drylands (92% of Kenya's protected areas are in pastoral lands). Tourism brings in annual returns of between \$900 million and \$1.2 billion to Tanzania's economy, and represents 13% of Kenya's GDP and over 9% of Uganda's.
- Grasslands store approximately 34% of the global stock of CO₂ – a service worth \$7 per hectare. African grasslands extend to 13m square kilometres and have vast carbon sequestration potential.

Despite these considerable contributions, the drylands receive very little investment. In turn, most dryland populations lag far behind the rest of the world in terms of human wellbeing and development indicators, and suffer from the poorest economic conditions in the world. Yet with appropriate investment drylands need not be poor – as has been shown in Argentina, Mexico and Israel.

Pastoralism: a rational use of the drylands

Pastoralism is a rational use of the drylands. Pastoralists respond to and use, even choose and profit from, variability. This allows for a vibrant and productive livelihood system in some of the harshest landscapes in the world.

Pastoralists use mobility to respond quickly to fluctuations in resource availability, dictated by the drylands' scarce and unpredictable rainfall. They also employ a number of highly specialised risk-spreading strategies to safeguard their herds against drought, floods, disease and social unrest. These strategies – including building up herd sizes as insurance against times of hardship, splitting herds across different locations to spread risk, keeping different species and breeds and loaning surplus animals to family and friends – ensure the



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rational use of the natural resource base and also develop and strengthen social relations as a form of social capital.

Pastoralism's contribution to the health of dryland ecosystems

Dryland ecosystems are healthier where mobile pastoralism continues to be practiced effectively. Grazing opens up pastures, stimulates vegetation growth, fertilises the soil and enhances its water infiltration capacity as hoof action breaks up the soil crust, aids in seed dispersal to maintain pasture diversity, prevents bush encroachment and enhances the cycling of nutrients through the ecosystem. In many areas in East Africa, the effects of too-little grazing can be clearly seen: bush encroachment has rendered large areas of the drylands unusable as a result of reduced numbers of grazing animals due to drought or conflict.

Pastoralism's contribution to national economies

The livestock sector represents 20% to 25% of agricultural GDP across Africa, and a significant portion of African livestock is found in pastoral areas. However, national accounts are incomplete. Examples of economic contributions from pastoralism not captured in national accounts include:

- The *nyama choma* (roast meat) industry in Tanzania, which is worth \$2.2m annually.
- In Ethiopia's Somali region, it is estimated that the actual value of cross-border livestock sales is three to six times that given in official figures for the whole country. Pastoralist animals also provide about 20% of draught power in Ethiopia, worth about \$155m annually.

Pastoralism's adaptive potential to climate change

The climate of the drylands is characterised by scarce and unreliable rainfall. High temperatures ensure that much of what does fall is lost in evaporation, and intense downpours ensure that water runs off in floods. There are also substantial and unpredictable differences in total rainfall between years, within years and between areas in one year, so that neighbouring villages can experience very different crop yields and harvest success.

The climate is changing

The climate of the Horn and East Africa is becoming more variable and less predictable, and trends towards future changes are emerging. Regional climate projections for East Africa over the next 40 years indicate that rainfall and rainfall intensity will increase, temperatures will rise, successive poor rains will become more common and the incidence of drought will increase. However, these projections are not as straightforward as they sound (see Box 1).

Downscaling climate projections

Downscaled climate projections, based on weather station data at Lodwar, Mandera, Marsabit and Wajir in northern Kenya, have been generated to obtain within-region information. Anticipated changes include:

- Significant increases in temperatures across months (in the range of +1.0–3.2°C).
- Increases in precipitation for most months. Agreement between models was strongest for wet season months, suggesting that there will be a general increase in wet season precipitation. This may be in the form of a longer wet season, or an increase in precipitation intensity. Projections indicate that the intensity of rainfall during the rainy season is expected to increase at all stations.

Box 1: Predicted increases in rainfall for the region, but...

Rainfall projections are not straightforward. Increased temperatures are likely to offset increases in rainfall, and climate change impacts will vary across different locations and at different times into the future. Soil types and landscape topography varies across the region. All of these factors will result in mosaics of climate change effects across the region. This has important implications for economic productivity and poverty reduction, and there is a need to better understand the ranges of likely effects in different locations.

- Changes in the onset and cessation of rainy seasons. However, it is difficult to draw robust conclusions, and a supplementary analysis using thresholds identifying that amount of rainfall that constitutes the start and end of rains for pastoralist groups would be useful.

Climate change and existing challenges facing the drylands

Climate alone is rarely the reason people fall into poverty; instead, it interacts with existing problems and makes them worse. For example, migration as a climate adaptation strategy increases population pressure and environmental degradation. Failed rainy seasons will result in reduced agricultural yields in already highly fragmented landscapes, and increased climatic shocks will fuel conflict over resources and access.

Managing the drylands to cope with climate change

With increasingly uncertain climatic conditions, and different impacts across the region, the drylands will need to be managed in a way that supports and promotes land uses that are more resilient to climatic variability.

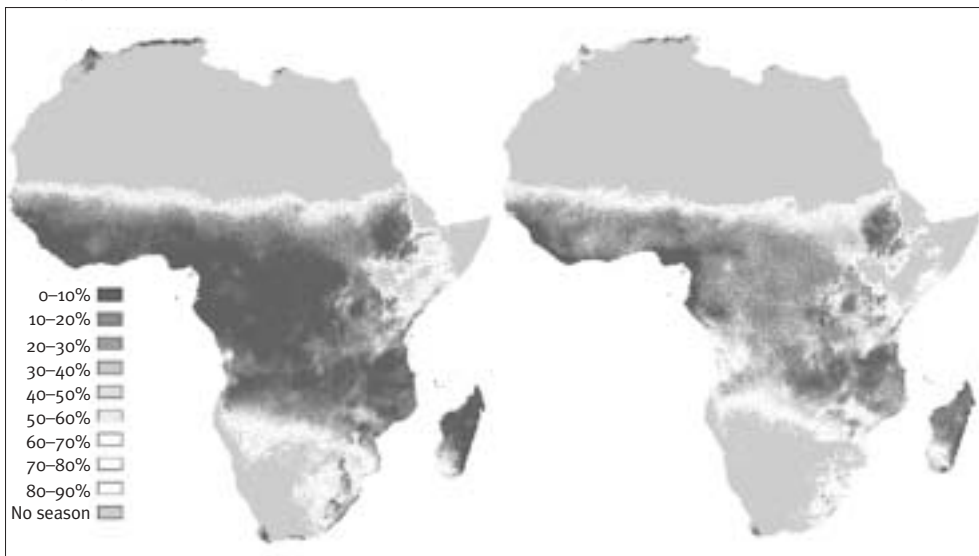
Of all the land uses in the drylands, pastoralism is best placed to adapt to increased climatic variability. Due to the advantage of mobility, pastoralism is less susceptible to changes in climate than more sedentary land uses, such as crop agriculture, livestock ranching and tourism. This in turn has implications for economic development and poverty alleviation. Pastoralism is a resilient, low-input land use option known to perform well in variable climates. It therefore presents a less risky and more robust investment opportunity because it has the potential to perform well where other livelihoods are likely to fail.

African agriculture is vulnerable to climate change. Significant reductions are predicted in the length of crop and forage growing periods across most of the Horn and East Africa (see Figure 1). This holds true even where climate models predict increases in absolute rainfall for the medium term, because increased evapotranspiration due to temperature rise and foreshortened rainy seasons counteracts the positive effects of increased rainfall. Up to 2030, most areas where crops are produced are unlikely to undergo significant changes, but over the longer term most areas where cultivation is currently taking place may experience moderate to severe reductions in the length of the crop-growing period.

The consequences of ignoring the challenges facing pastoralists

Increasing numbers of pastoralists are losing their livestock, forcing many to leave livestock-rearing altogether. The combination of increased climatic shocks, policies which hinder mobile pastoralism and a lack of other viable livelihood options is pushing more and more pastoralists out of the system. Whereas climatic shocks are essentially

Figure 1: Percentage of failed seasons, where growing periods will be insufficient to support harvest¹



¹ From P. K. Thornton et al., *Mapping Climate Vulnerability and Poverty in Africa*, Report to the Department for International Development, ILRI, 2006.

outside the realm of control, policies and the provision of livelihood alternatives are not. Pastoralists' inherent adaptive capacity, which has enabled them to cope with climatic variability for centuries, is increasingly being compromised by policies which aim to sedentarise and modernise their livelihood system, ignoring the vital need for mobility and resource access.

As climate change exacerbates stresses on the system, the rate of destitution among pastoralists is likely to increase unless policies are implemented which enable adaptation and a choice of livelihoods which allows people to maintain or improve their conditions independently of livestock-keeping.

Developing climate foresight to enable adaptation

The anticipated climatic changes in the drylands will require people in the region to adapt, while the drastic nature of these changes means that people may have to adapt to conditions beyond their ken. Adaptation usually occurs with regard to perceived changes in the conditions of local environments, but climate change means that people have to adapt to what they do not necessarily perceive as probable changes.

The state and development agencies have an important role to play, therefore, in facilitating what can be called 'climate foresight'. This means the ability to utilise climate projections – estimates of most likely climate changes – in the planning of activities and investments related to and affected by climate. In addition, local communities need to inform planning in the drylands, and therefore need to be equipped with information on climate change and its implications on a localised scale, as different communities will face different climatic effects in different places, and there is a need to understand what the ranges of likely climate change effects are going to be in different locations.

The least developed countries of the region – Eritrea, Ethiopia, Uganda and Tanzania – have prepared national adaptation plans of action (NAPAs) over the last four years. These identify and rank immediate and urgent adaptation needs. In Eritrea and Ethiopia, priorities for adaptation action relevant to pastoralists have been identified. In Uganda and Tanzania, few of the prioritised

adaptation actions have direct relevance to pastoralists, and mobility is seen as adding to the climate change challenge. NAPAs need to be reviewed from the perspective of how prioritised projects will contribute to pastoralists' adaptive capacity.

Enabling autonomous adaptation

Autonomous adaptation refers to the measures taken by people at local levels to prepare for, cope with and recover from the effects of increased climate variability and climate change. Since climate change impacts will vary across time and space, resulting in different impacts across zones and regions, it would therefore be more effective and cost-effective to enable and strengthen the inherent adaptive capacity of pastoralists and find ways to

encourage their autonomous adaptation, rather than providing adaptations for them.

Population is set to increase, and a healthy pastoral system depends on human and livestock numbers being commensurate. Pastoralists need the freedom to take action, whether they choose to remain in pastoralism or to diversify their livelihoods to ensure their economic well-being. Failure to enable adaptive capacity is likely to result in a continuation of current trends towards increasing poverty and, in turn, increasing reliance on outside assistance. Therefore, alongside improved drought preparedness planning, disaster management structures and risk reduction efforts, autonomous adaptation must be supported.

Three main areas of intervention to enable autonomous adaptation have been identified:

1. Governance

Land tenure and access rights. Recognising the need for pastoral mobility and communal land tenure, and valuing the contributions of customary institutions, will allow pastoral communities' inherent adaptive capacities to be expressed in order to cope effectively with increasing and more extreme climatic variability.

Increased representation and involvement of pastoralist groups. Strengthening pastoralist institutions' level of engagement, and their capacity and ability to speak on their own behalf, is critical. A skewed focus towards more 'visible' land users, such as farmers, results in biases against other groups who have less capacity to advocate for themselves. Climate change makes remedying this state of affairs more urgent.

2. Access to markets and enabling services

Infrastructure. Physical access is often a stumbling-block to market participation in dryland areas. Improved road networks and increased, more locally accessible livestock sales-points are needed. The need for infrastructure is made more urgent by current and

anticipated changes in climate, as pastoralists have to be able to make rapid decisions concerning the sale of their livestock.

Improved bargaining power and awareness of product value. The better pastoralists are compensated for their products to reflect their true value, the more incentive there is to participate effectively in markets. Improvements in product processing facilities, and increased knowledge of other market opportunities such as those in wild harvested products, are also needed.

Credit. Access to credit in the drylands needs to be improved, and the mechanisms of establishing credit need to be revised to suit the needs of the drylands. The mechanism for accessing loans at present is not appropriate for pastoralist areas. It promotes land fragmentation through the need for private tenure (for traceability), and the establishment of permanent structures, which are often required as collateral.

Insurance. Livestock insurance is important for pastoral development. According to Mortimore et al.: 'If assets are protected through droughts, investments can be cumulative, if not, then divestment in food emergencies frustrates growth'.²

Cash or asset-based assistance. Cash and asset-based assistance allows pastoral communities to autonomously adapt and lessens their dependence on food aid. It is cheaper for the state to provide this type of assistance than to provide emergency relief ex-post. Distributing cash to allow families to restock themselves is also cheaper than supplying animals, and is more effective as it allows households to make decisions according to their needs. This is particularly relevant in the context of changing climate, as some of the adaptation strategies among pastoralists include a shift in breed and type of livestock preference. As communities are best able to determine their priorities given environmental conditions, the option which allows flexibility in timing and type of purchase is more suitable.

3. Basic services – skills and education

Skills and education will increase adaptive capacity to climate change and options for diversification. They can also open up opportunities to sustain livelihoods which do not depend on the natural resource base. As climatic conditions become more severe, education allows pastoralists the freedom to supplement livestock-keeping with other livelihood options which may not be affected by extreme drought or flooding.

If these services are to be made more widely effective, improvements in the quality and accessibility of education are necessary. Education should not compromise mobility, but rather accommodate it so that one does not occur to the detriment of the other.

Conclusions and recommendations

Climate is set to become increasingly unpredictable and variable, and projected increases in temperature, shifts in rainy seasons and intense rains over much of East Africa will result in a variety of changing climate conditions, with serious implications for land use. By its very nature, mobile pastoralism adapts to climatic variability,

² M. Mortimore et al., *Drylands – An Economic Asset for Rural Livelihoods and Economic Growth*, Draft Report for the Dryland Challenge Paper Series of the Global Drylands Imperative, UNDP/DDC, 2008.

and has done so for millennia, allowing pastoralists to transform seeming 'wastelands' into productive assets. This fact, along with the fact that it is a low-input system with well-established traditional management institutions, makes pastoralism a practical and cost-effective land use option in the drylands. Supporting effective pastoralism will allow nations to make the most of areas receiving low and unpredictable rainfall, and hedge against the potential failure of other land uses which may not be as flexible in the face of increasingly variable climate. It will also enable East African governments to benefit from the global rise in demand for meat and other livestock products.

Policy recommendations for enabling climate adaptation include:

- The adaptive capacity of pastoralism and of different pastoralist groups to climate needs to be better understood and recognised. The external factors that hinder the expression of adaptive capacity need to be identified and removed.
- Climate foresight must be integrated into planning for pastoralist development. Better awareness of how to access and use climate projections is required at different levels of planning and implementation.
- Full socio-economic costs and benefits estimates should be calculated for different adaptation strategies involving pastoralists. The costs and benefits should consider livelihoods, ecosystems and wider economic contributions.
- The returns – in terms of enhanced adaptive capacity – on investments in pastoralism for income generation (through better market access), human and animal health, education and information provision, and empowerment of local adaptive decision-making, need to be assessed and factored into adaptation policy development.
- The National Adaptation Programmes of Action (NAPAs) for Tanzania, Ethiopia, Eritrea and Sudan need to be reviewed to assess how prioritised projects will contribute to pastoralist adaptive capacity. The learning from these exercises should be fed into the planning of the Kenya National Adaptation Plan and into developments arising from the Kenyan Climate Bill.
- Climate adaptation should be mainstreamed into dryland plans and strategies at national and local/district level and at sectoral levels, including disaster risk reduction, livestock development and agriculture.
- There should be a focus on water management at national, regional and local levels to reduce risks from flooding and capture rainfall for agricultural, livestock and ecosystem use, through a mix of micro- and larger-scale investments.
- Access of pastoralists and other dryland dwellers to markets for carbon finance, such as the CDM and Forest Carbon Finance Facility, should be improved.
- Successful pilot community-based adaptation projects with pastoralists and other vulnerable dryland communities should be scaled up, to ensure the documentation and rapid replication of these activities across communities.
- Action research is required to build and share knowledge on climate adaptation by pastoralists and to share and disseminate learning to key regional and national institutions.
- Regional cooperation must be advanced to help scale up successful initiatives and address pastoral development issues.
- Effective public information campaigns are needed to help people understand and respond to the climate change challenges faced in different regions and districts.