

# Adapting to climate change in transitioning pastoral systems: Understanding opportunities and constraints to benefit from diversification

Edwige Marty, Todd A. Crane, Renee Bullock, Matthew Cashmore and Siri Eriksen



## Background

Estimates of climate change impacts on pastoral production systems suggest higher rainfall intensity and variability, as well as temperature increases. These changes can affect pasture growth, water availability, lead to heat-stress, and cause livestock diseases. These stressors reduce milk and meat production and increase livestock mortality rates. Some of these impacts are already being felt by pastoralists in Kenya, notably because of the increased frequency of extreme events such as droughts that have been recorded in the last 10 years. Diversification of livelihoods is posited both in the literature and in policies as a climate change adaptation strategy to reduce exposure to climatic risks and diversify income sources.

However, increased climatic stressors are far from being the only pressures weighing on pastoral livelihoods. Historically, policies and development initiatives for the Kenyan drylands have often underestimated the contribution of the pastoral livestock keeping sector to the national economy. The initiatives have also often misunderstood the sector's modes of functioning, in which different forms of mobility, including livestock migration, are used to access resources across vast landscapes at different times of the year (Odhiambo 2014). Increased diversification among pastoralists thus also responds to restricted mobility and land fragmentation. This originates from a long-standing bias towards more sedentary, intensive, and market-oriented types of production and land use.

## Key messages:

- **Increased diversification of livelihoods in the southern Kenyan rangelands is reshaping land use, access to key productive resources and patterns of production.** While diversification is promoted as a climate change adaptation strategy, the trend has multiple environmental, political, and economic drivers.
- **Differences in resource access, labour roles and decision-making power, generate opportunities and constraints to benefit from diversification.** Age, gender, and formal education levels intersect and shape patterns of engagement in diversification while the ability to mobilize sufficient labour and financial resources increases the potential to realize long-term benefits for pastoral adaptation.
- **Inclusive climate change adaptation strategies will require policymakers to address trade-offs linked to diversification processes.** Specifically, poorer pastoralists' access to communal grazing spaces and water points is threatened by increased rates of land clearing for cultivation and settlements. This leads to an increase in socio-economic stratification through more individualized and market-based adaptation practices.

Yet, diversification also reflects changing cultural values and socio-economic aspirations among pastoralists both out of necessity and as a choice (Lenaiyasa et al. 2020). Higher formal education levels and improvements in infrastructure in the drylands create new socio-economic opportunities for some pastoralists (Little 2021).

Understanding the multiple forms that diversification takes – and how different social groups living in the drylands are affected by these livelihood changes – is crucial for inclusive development. Pastoral communities are not homogenous and there is high differentiation in resource access, labour roles and decision-making power between and within pastoral households. These differences affect people's abilities to join in and realize long-term benefits from diversification in pastoral systems. Some forms of diversification are also based on shifting the use and access to key productive resources for pastoral livestock keeping. Different types of engagement alter patterns of burdens and benefits in the face of a changing climate. For instance, converting land to farming or gardening decreases the availability of pastoralists' key grazing grounds.

## Understanding diversification in a transitioning pastoral system in southern Kenya

### Characteristics and social differences in diversification practices

Diversification is often viewed by the Maasai pastoralists as a strategy to maintain pastoral livelihoods and earn income to pay for household needs, such as school fees. The Maasai in Olkiramatian community land are diversifying in multiple ways, sometimes combining different activities, and alternating flexibly between activities across the year. Diversification practices can be characterized into livestock and livelihood-based types of diversification. Livestock diversification

practices refer to changing herd and breed composition and/or sometimes integrating poultry, while livelihood-based types of diversification refer to wage employment, crop farming, small business, or small-scale fishing.

Household members engage in diversification in differing ways. Educated younger men are better placed and prefer to look for formal wage employment opportunities, both within the communal land and beyond. However, formal employment opportunities are limited and highly competitive while paying for higher education is reserved for well-to-do households. Young men often become middlemen in livestock or crop trade while some engage in small businesses, such as providing motorcycle transportation services. Older and younger women often concentrate on informal small businesses, such as milk sales, selling food commodities or household equipment. Educated younger women who reside near town centres have more diverse business or employment opportunities. Less well-off household members, either men or women, are more likely to engage in daily casual labour. Older and younger women also provide significant labour in crop farming and small ruminant herding activities, especially as children are occupied in school.

### Different abilities to access and decide on key diversification resources

With pastoral livelihoods increasingly diversifying, accessing a different array of socio-environmental resources is gaining importance in the face of combined climatic and non-climatic stressors. Rules and norms of access to key productive resources such as crop farming lands, irrigation water or town plots are formalizing with significant consequences to the social distribution of positive and negative effects of diversification. Under the Group Ranch Act, only heads of households, mostly elder Maasai men, were registered as members and thus as communal landowners. With more permanent settlements and interest in the crop farming area, the allocation of farmlands follows the pre-existing membership list which was closed for new registrations in the late 1990s.



Most young men and women are not directly allocated farmlands but often work on the farms of family and community members. Accessing farmland through one's social relations builds on long-standing ties essential to pastoral livestock keeping and is central to these groups' resilience. Other diversification resources, such as newer livestock breeds, are also based on mobilizing one's social connections to borrow a bull for instance. However, some forms of indirect access are based on rental arrangements, notably for farmlands and town plots. These patterns of access to resources that are necessary to diversify can mean access is negotiated on a short-term basis, thus constraining long-term investments.

Decision-making on land use and access to key resources for diversification are made through institutions operating at different scales, for instance, the group ranch management committee, chiefs, and village elders. However, formal governance institutions, such as the group ranch management committee, are increasingly assuming more authority in these decisions. Formal education levels, coming with literacy and English and Kiswahili language, are often prerequisites to assume leadership roles in these institutions. Younger educated men thus often have more leadership opportunities than elders, who customarily held these leadership positions.

Intrahousehold decision-making in married households also shapes one's abilities to engage in and benefit from diversification. Married men often make decisions about financial resources, including livestock, and family members' labour allocations. Meanwhile, women are more likely to manage and control profits from livelihoods-based diversification practices they engage in, including crop sales and the operation of small businesses such as tea sales. However, married women's income may result in lower financial contributions from husbands, thereby shifting more earning responsibilities to women in households.

## Realizing long-term benefits from diversification for pastoral adaptation

While diversification offers selected opportunities for income generation, improved drought resilience and food security, pastoralists' abilities to engage in diversification activities over time are challenged by labour and financial constraints in the face of recurring shocks. For instance, balancing childcare, livestock keeping, and other activities is a challenge reported by many pastoral women. During dry seasons, many pastoralists abandon their small businesses to focus on maintaining the herd, facilitating its access to adequate pastures and grazing points. Wealthier households can hire herders, but it is often children of poorer households who take on these positions. Less mobile households with insufficient labour access must increasingly pay to get water delivered, with poorer households engaging in casual labour.

Many types of diversification also rest on increased market engagement, but insufficient infrastructure such as tarmacked roads and recurrent climatic and political-economic shocks lead to unstable markets often generating significant losses. Milk and tea sales are, for instance, unlikely to be a viable business option for most pastoral women during intense dry seasons, but sales of vegetables by more established businesswomen near emerging town centres become more lucrative.

Opportunities for cash crops and increased investments in the designated farming area also seems to have accelerated pressure for subdivision and attempts by the elite to secure privatized access to cultivable lands, reducing access to dry season grazing space. Pastoralists increasingly report paying for grazing access on the farmlands or purchasing maize stalks, a phenomenon also reported in the wider Kajiado area. The above dynamics are likely to accelerate existing patterns of social differentiation, notably gendered and wealth inequalities, due to unequal resource access.

## Conclusions

Diversification of pastoral livelihoods as an adaptation strategy provides certain opportunities, notably income generation, risk spreading and added food security. However, capacities to realize the long-term benefits of adaptation are unevenly distributed. Age, gender, and education levels were found to be crucial in shaping engagement and patterns of benefits from diversification given their influence on decision-making processes, labour roles and resource access. The ongoing changes in land use and tenure systems, some of them closely linked to diversification processes, risk marginalizing poorer pastoralists from the communal resources on which they rely. Moreover, difficulties in mobilizing sufficient capital and labour across seasons significantly limits the capacity of diversification to be relied on in times of increased climatic stress, such as droughts. For more information and a deeper analysis of the issues see Marty et al. (2022).

## Emerging recommendations

1. National policies and development strategies should advocate for diversification practices that can complement pastoral livestock keeping, given pastoralism's proven high resilience in the face of climatic stressors in dryland environments. Trade-offs associated with diversification processes must be considered, including between short-term economic benefits for some and the longer-term strengthening of adaptive capacities for climate resilience. New livelihood opportunities should not come at the cost of reducing other local resource users' adaptive capacities, for instance by restricting further access to key grazing and water points or displacing risk through dependence on unstable markets.
2. New policy and development interventions at the county level should anticipate and address the various ways that different pastoralists engage in diversification and the multiple factors that shape the social distribution of burdens and benefits of diversification at the local level. Understanding how markers of differences such as age, gender, education, or wealth, intersect to shape capacities is critical to ensure that responses match the rapidly changing needs and social aspirations in transitioning pastoral systems. 'One size fits all' types of diversification solutions should be avoided given the vast social differences within pastoral communities.
3. Donors' support for livelihood diversification practices should account for the non-material dimensions of new practices, such as the underlying labour and financial demands. This is critical in supporting actionable adaptation strategies that can be effectively scaled up to strengthen the resilience of pastoralists in the face of a changing climate.

## References

Lenaiyasa, M. L., Bruyere, B. L., Salerno, J. and Pickering, T. 2020. Pastoralists' use of income diversification as a strategy for adapting to social-ecological change in Samburu, Kenya. *Regional Environmental Change* 20 (1). doi:10.1007/s10113-020-01612-x.

Little, P. D. 2021. Does livelihood and asset diversification contribute to pastoralist resilience?: The case of Il Chamus, Baringo County, Kenya, 1980–2018. *Nomadic Peoples* 25 (2): 181–205. doi:10.3197/np.2021.250202.

Marty, E., Bullock, R., Cashmore, M., Crane, T. and Eriksen, S. 2022. Adapting to climate change among transitioning Maasai pastoralists in southern Kenya: An intersectional analysis of differentiated abilities to benefit from diversification processes. *The Journal of Peasant Studies*. <https://doi.org/10.1080/03066150.2022.2121918>.

Odhambo, M. O. 2014. The unrelenting persistence of certain narratives: An analysis of changing policy narrative about ASALS in Kenya. London.



### Contact

Edwige Marty  
ILRI, Nairobi  
[E.Marty@cgiar.org](mailto:E.Marty@cgiar.org)

### Authors

Edwige Marty works at the International Livestock Research Institute (ILRI) and the Norwegian University of Life Sciences, Todd Crane and Renee Bullock work for ILRI, Matthew Cashmore and Siri Eriksen work for the Norwegian University of Life Sciences.

### Photo credit

Page 1 (left): ILRI/Edwige Marty  
Page 1 (right): ILRI/Edwige Marty  
Page 2: ILRI/Edwige Marty  
Page 4: ILRI/Edwige Marty

ILRI thanks all donors and organizations that support its work through their contributions to the [CGIAR Trust Fund](#). The research presented above was conducted with financial support from the One CG Livestock and Climate Initiative and the German Federal Ministry for Economic Cooperation and Development (BMZ) issued through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under the Program for Climate Smart Livestock (PCSL). We also thank all research participants for taking part in the research. All views and possible errors remain our own.



The International Livestock Research Institute (ILRI) is a non-profit institution helping people in low- and middle-income countries to improve their lives, livelihoods and lands through the animals that remain the backbone of small-scale agriculture and enterprise across the developing world. ILRI belongs to CGIAR, a global research for development partnership working for a food-secure future. ILRI's funders through the CGIAR Trust Fund, and its many partners, make ILRI's work possible and its mission a reality. Australian animal scientist and Nobel Laureate Peter Doherty serves as ILRI's patron.

You are free to use and share this material under the Creative Commons Attribution 4.0 International Licence © ⓘ.

*better lives  
through  
livestock*

[ilri.org](http://ilri.org)