

Changes in the drylands of Eastern Africa: a review of evidence and data and their implications for efforts to strengthening resilience

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Executive Summary

Introduction

While there is increasing conceptual clarity on the meaning of resilience, translating this into appropriate and practical policy and programming approaches and interventions has been challenging. Operationalizing ‘resilience’ is made more difficult in contexts of dynamic change, in which the levels and combinations of capacities needed to underpin resilience may themselves shift markedly in response to volatility or rupture happening in wider systems – ecological, economic, political, and security. A *longitudinal perspective* to uncover extended periods of poverty, vulnerability and wealth, and a *focus on systems* to map the connectivity of different actors and variables across scales, will facilitate the next critical step from resilience theorising to observing and measuring real change.

This report examines the implications of studying change over time on resilience programming in the eastern Africa drylands, a region defined here to include South Sudan, Ethiopia, Somalia, Kenya and Uganda. More specifically, it presents evidence and data of important changes that have occurred over different timeframes (both long-term and rapid changes), as well as a conceptual model (*Pastoralist Livelihood Systems Analysis*) to understanding longer-term pathways for pastoral livelihoods and their consequences and impact on poverty, vulnerability and resilience. The report focuses on dynamics of change that have occurred since 2000, when a severe drought greatly affected the region’s pastoral areas. It draws upon a review of more than 400 scholarly and ‘grey literature’ documents, and more than 100 data sets to identify trends and changes happening in the region and their implications for how pastoralists make a living.

The report adopts a focus on *pastoralist systems*. These **refer to a production system centred on the rearing, marketing and trade of livestock and animal products**. Pastoralist systems encapsulate a far wider range of non-livestock livelihoods and productive activities in dryland areas, which are also associated with pastoralism through a variety of social and economic relationships. A wide range of livestock-based production systems have emerged in different political-economic and socio-ecological settings in this region, underlining the importance of understanding **trajectories – or changes over time** – in particular places. Today, varieties of pastoralism include commercialised forms of livestock-keeping oriented to large domestic and regional export markets; smaller-scale livestock-keeping for subsistence and local marketing combined with farming and other rural activities; the maintenance of very few small-stock in and close to towns alongside the pursuit of various tasks-for-cash; and customary pastoralism based on long distance movements, key resource use, and maintaining a network of bond friendships through which to exchange livestock and labour as the basis for mitigating risk.

This report focuses on five pastoralist systems: the **Maasai** system in Kenya's South Rift Valley, the **Somali** region of Ethiopia, **Borana** Plateau in southern Ethiopia, **Karamoja** in northern Uganda, and the **Northern Bahr el Ghazal** region in South Sudan. These systems were purposely selected to reflect the very different trajectories of pastoralism in the region, which in turn relate to varying degrees of access to markets and resources, and the nesting of these within diverse political economies, and ecological and socio-cultural systems. Detailed case studies of these systems are covered in the accompanying report **Changes in the drylands of eastern Africa: case studies of pastoralist systems in the region**.

Drivers of change over time

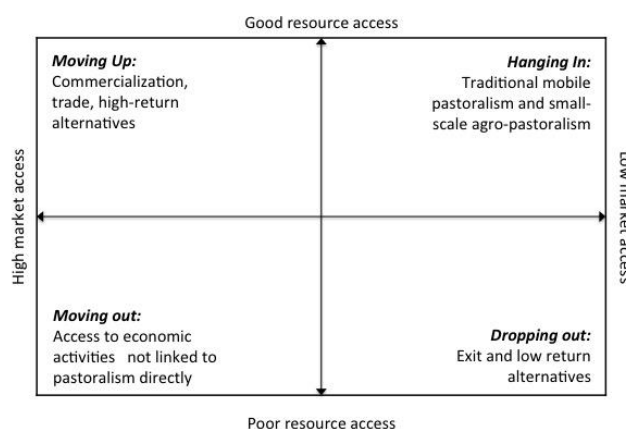
According to this review, arguably the most significant trend redefining pastoralism in eastern Africa is the fragmentation of rangelands through processes of excision, privatisation (often taking the form of enclosures) and commodification of rangeland resources. Rangeland fragmentation directly threatens adaptive processes in customary pastoralist systems, as it becomes more difficult to move livestock across the land and key resource areas are fenced off and set aside for non-livestock uses. Rangelands have been carved up through the establishment of private enclosures; water points and cisterns; ‘farmlands’ excised from large riverine areas for irrigation schemes; ranches and conservation areas. A related trend, which is also contributing to fragmentation, is sedentarisation and the uptake of land and resource dependent activities such as dryland farming, charcoal burning and harvesting wood for fuel.

Indigenous capital and state investment have also encouraged more dynamic growth in dryland towns. Food insecurity and famine have precipitated large-scale settlement in and around relief distribution centres in many parts of the region. Sedentarisation has occasioned a greater need for basic services and markets for trade and exchange, helping to fuel the growth of small towns. Improvements in roads and concomitantly in transport services (ranging from public buses to lorries and motorbikes) are making markets and basic services more accessible for dryland populations, while also supporting the penetration of outside capital. Infrastructural upgrades and extensions in the drylands are helping to power further expansion of formal livestock exports, particularly from Ethiopia, which has experienced unprecedented growth in exports over the past decade.

Diverse livelihood pathways

The trends highlighted in this review – rangeland fragmentation, sedentarisation, small town growth, commercialisation, and infrastructural investment, among others – are reshaping access to resources (to support herds) and markets (for livestock and other goods). This, in turn, is driving decisions about livelihood choices and creating new livelihood pathways for the region’s dryland populations.

Areas and people with good natural resource access and access to markets, are **moving up**, because they are able to maintain and sell livestock as a successful business enterprise, commercialising the milk and livestock trade, selling in high export zones, creating private abattoirs and finding lucrative opportunities along the livestock value chain. Areas and people with good access to natural



resources, to rangeland and water sources in particular, but who do not have a high level of market access are **hanging in**, practicing customary forms of pastoralism based on high mobility, extended social ties for trade, and opportunistic use of key resource patches within the wider landscape. But rangeland fragmentation is constraining traditional mobile pastoralism because pastoralists are less able to

access the key resources that are needed to manage uncertainty.

When a livestock herd is no longer viable due to lack of good resource access, the household exits pastoralism, or ***drops out***, at which point its members seek productive activities not directly linked to their own herds. Others elect to pursue economic activities that are not linked to pastoralism directly but have good market access, ***moving out***. The opportunity to step out of pastoralism into 'value added diversification' is limited to those able to take advantage of resources that add a high return to their activities. Still, small town expansion, better connections with larger centres and the younger generation's acceptance of non-traditional livelihoods are enabling those relatively few people to earn a living from activities in the pastoral economy that are not directly linked to pastoralism.

Poverty and vulnerability

In recent decades, people have lost access to rangeland and water resources, concentrating wealth with those who are able to acquire and exploit these resources in successful trade, and creating a larger group of people who have exited and are engaged in low return activities, often in small towns. A sizeable and growing proportion of the population in pastoral areas is chronically vulnerable and lacks clear alternative livelihoods. Per capita livestock holdings have dropped sharply in most parts of dryland eastern Africa, to a point at which holdings now fall far short of subsistence requirements for a large proportion of pastoralist populations.

High livestock losses have changed the distribution of poverty, as seen in a downward shift in the income of different households, with growing numbers of people becoming destitute, or living in poor or middle income households, and fewer classed as wealthy. With livestock poverty deepening for many pastoralists over a long period, there has also been a shift towards keeping livestock in smaller herds that can be easily disposed of to meet cash needs. However having a small herd is disadvantageous, as small herds milked intensively experience lower calf growth and survival when pasture is scarce, also making difficult for pastoralists to 'build back' herds in the future. In contrast, wealthier households are able to leave more milk for livestock to consume, resulting in better calf health and more resilient herds. These dynamics are often echoed in household nutrition status. Even if households are able to build up a small herd, sustaining a nomadic way of life in the drylands is becoming increasingly difficult as land is fenced off, privatised and fragmented. These changes to the drylands are complicating pathways out of poverty, with opportunities for building back herds and finding land to graze livestock becoming ever more constrained.

Significant numbers of pastoralists are destitute and survive by knitting together meagre amounts of income and livelihood derived from various tasks-for-cash, informal social support and occasional relief assistance, usually in expanding towns and urban areas. Evidence points to increased impoverishment, malnutrition and destitution of pastoralists who settle. People in this group experience the highest levels of poverty and greatest resilience challenges. Their dependence on insecure low return activities connected to pastoral systems that are vulnerable to shocks that interrupt money and market flows, constrains what few opportunities are available, and undermines efforts to build sustainable livelihoods outside pastoralism.

Measuring change over time in drylands

This report uses a new framework and approach - **Pastoralist Livelihood Systems Analysis** - to analyse the dynamics and impacts of change over time in pastoralist systems. Specifically, this framework provides a method for: i) mapping a system in a holistic way that draws on and combines

internal and external meta-level influences as well as livelihood profiles at intra-system (group and household) level and; ii) identifying changes and understanding resilience trajectories for livelihood groups within the system. This is a crucial step towards future efforts to map and understand change in dryland eastern Africa, and subsequently to provide appropriate support to policy, markets and provision to pastoralist systems in these areas.

The Pastoralist Livelihoods Systems Analysis consists of three layers of evidence, data gathering and analysis, as detailed in section V. The first layer proposes methods to map the system context and broad trajectory of development over time using textured evidence as well as meta-level data. The second layer draws on evidence and literature to categorise the livelihoods of individuals and groups within a system. The third layer proposes the use of household level data to map livelihood trajectories over time and resilience to shocks. While analysis at layer three is compromised by the limited data availability and gaps in data collection, it has been possible to identify specific data sets containing indicators related to herd size, cash income, income sources, and assets that can be compared over time to measure change and resilience. See the [Technical Note on the Evidence Synthesis and Data Mapping](#) for more information on available data.

Recommendations:

- **Adopt a systems-approach to data collection and analysis** in order to better understand dynamic change in eastern Africa. One such approach is the **Pastoralist Livelihood Systems Analysis**, requiring data appropriate to different layers of the system to build up a picture of the trajectories of change of the system, as well as the influences on and within the system and livelihoods.
- Data collection and analysis should strive for a longitudinal perspective of **change over time** – panel or long-term research methods should be used where specific indicators are comparable across datasets and time. Focus on efforts to measure resilience using panel data to test income and livestock indicators over time in recovery periods (post-drought)
- All large-scale data collection efforts that claim to represent drylands must ensure that samples **adequately represent the full diversity of livelihoods found in these areas, include definitions of pastoralists and questions that are appropriate to pastoralist lives and livelihoods.**
- **Donors, governments and development actors** should support further empirical analysis on understanding change and resilience in the drylands, following the method described in Layer 3 of the **Pastoralist Livelihood Systems Analysis**. Empirical analysis should compare data on indicators related to herd size and type, cash income, income sources, and assets over time to measure change and resilience. Specific data sets and methodology for this are further detailed in the **Technical Note on the Evidence Synthesis and the Data Mapping** accompanying this report.
- **Data sets should be shared publicly and cross-posted** to make sure that it is both accessible as well as to avoid possible duplication in efforts.
- **More efforts are required to stimulate research demand from within pastoral societies,** to better reflect their priorities, aspirations and ways of understanding change.
- **Investments in research should address these relatively underexplored themes:** urbanisation and small town growth, demographic change including population and migration, education and services, and internal social dynamics around gender and young people.

Contents

Acknowledgements	2
Executive Summary	3
Introduction.....	3
Drivers of change over time	4
Diverse livelihood pathways	4
Poverty and vulnerability	5
Measuring change over time in drylands	5
Acronyms	9
List of maps, tables and figures	10
Maps	10
Figures	10
Tables	10
I. Introduction	11
II. Methodology.....	14
III. Change over time: pastoral systems past and present	14
Customary pastoral systems in eastern Africa	17
Trends shaping eastern African pastoralism	18
Diverging pathways and prospects for east African pastoralists	24
The turn to resilience	27
Summary	28
V. Pastoralist Livelihood Systems Analysis: a conceptual model to understand change over time in pastoral drylands	28
Layer 1: System/context analysis	28
Layer 2: Mapping livelihoods of households and individuals within a system.....	32
Layer 3: Developing categories to model livelihood change and resilience over time	33
Summary	36
V. Conclusion and recommendations	36
References	39

Acronyms

DFID – Department for International Development

DHS – Demographic household survey

EB – Ethiopian Birr

FAO – Food and Agriculture Organisation

GDP – Gross Domestic Product

GIS – Geographical information system

ha – hectare

IBLI – Index-Based Livestock Insurance

IGAD – Intergovernmental Authority on Development

ILRI – The International Livestock Research Institute

LAPSSET – Lamu-Port-South Sudan Ethiopia Transport Corridor

MDG – Millenium Development Goals

MSF – Médecins Sans Frontières

PARIMA – Pastoral Risk Management in Southern Ethiopia

PRIME – Ethiopia Pastoralist Areas Resilience Improvement and Market Expansion Project

TLU – Tropical livestock units

UNDP – United Nations Development Programme

USD – United States Dollars

List of maps, tables and figures

Maps

Map 1. Pastoralist systems covered by the study and livestock flows in eastern Africa

Figures

Figure 1. Pastoralist livelihood pathways in eastern Africa

Figure 2. Type of method informing literature, by pastoralist system

Figure 3. Coverage of themes in the evidence synthesis

Figure 4. Example of timeline analysis to be performed on pastoralist systems

Figure 5: Pastoralist livelihood pathways in eastern Africa distinguished by resource and market access

Figure 6: Mapping livelihood and economic activities of different households and individuals

Tables

Table 1. Livelihood categories for resilience analysis

Table 2: Measuring recovery and resilience

I. Introduction

In recent years, resilience has become a critical concept for thinking, designing and implementing policy and programming approaches to support and strengthen the livelihoods of people living in the arid and semi-arid lands (or 'drylands') of eastern Africa. At its most basic, resilience refers to the ability or the capacity of individuals, groups of people, organisations, institutions, or systems to deal effectively with shocks and stressors (Béné et al., 2015: p.11). Recent thinking on resilience further distinguishes between different, interlinked capacities – absorptive, anticipatory, adaptive and transformative – that enable people to function well and to successfully manage shocks and stresses (Bahadur, 2015). It is also increasingly recognised that resilience is less about the final programming outcome than the process by which improved wellbeing and livelihood security is supported (Béné et al., 2015). Thus, strengthening resilience involves expanding competencies at all levels to manage change, and with clear benefits for individual and collective wellbeing.

Although there has been increasing clarity on the meaning of 'resilience' in recent years, translating this into appropriate and practical policy and programming approaches and interventions has been far more challenging. The very nature of resilience implies that it is inter-sectorial, requiring coordinated planning and interventions across multiple levels of governance, and over time. Operationalizing resilience is made more difficult in contexts of dynamic change, in which the levels and combinations of capacities needed to facilitate resilience may themselves shift markedly in response to volatility or rupture happening in wider systems – ecological, economic, political, security. The tendency to focus on recent trends and current conditions can also obscure a clearer understanding of longer-term dynamics influencing what is needed to strengthen resilience. New, grounded insights are necessary to turn resilience thinking into practical action. There is a need for a *longitudinal perspective* to uncover extended patterns in poverty, vulnerability and wealth, and a *focus on systems* to map the connectivity of variables across scales to make the critical step from a theoretical perspective of resilience to observing and measuring real change.

In light of the above, this report examines the implications for resilience programming of change processes that have happened over different timeframes in the eastern Africa drylands, with a specific focus on pastoralism. This is important because it enables a clearer understanding of constraints on resilience to emerge from understanding longer patterns of change, adjustment and transformation. It presents evidence and data related to these periods of change, as well as a conceptual model (**Pastoralist Livelihood Systems Analysis**) for understanding longer-term pathways for pastoral livelihoods and their consequences for poverty, vulnerability and resilience. Specifically, the report focuses on dynamics of change occurring since 2000, when a severe drought greatly affected the region's pastoral areas. Since then, different pastoral areas of eastern Africa have experienced further droughts as well as other shocks, including the 2011 regional drought crisis that tipped many into a situation of deep food insecurity. The crisis prompted renewed efforts by governments in the region, and their development partners, to identify approaches to more effectively address poverty and vulnerability, and strengthen resilience in pastoral areas. Since then, a re-focus of programming and policy efforts towards strengthening drought resilience, indicates a greater resolve and commitment to finding longer-term approaches to supporting more secure livelihoods for dryland populations.

At the same time, the region's drylands feature more as important concerns in national economic development strategies, particularly in Ethiopia and Kenya where considerable new investment has been made in infrastructure and resource development in these areas. While governments and

investors trumpet the potential of these investments to enhance the livelihoods of dryland populations, the outcomes of these changes are still unclear for small-scale livestock units and people living in poverty in small towns. They may, in fact, constitute a new type of stressor in places where investment hastens land and resource grabbing, creating new restrictions on resource access. Further rigorous analysis is needed of how an influx of national and global capital into pastoral regions could yet further transform livelihoods and production systems, with what consequences, and for whom.

The report adopts a focus on **pastoralist systems**. These **refer to a production system centred on the rearing, marketing and trade in livestock and animal products**. However, a pastoral system encapsulates a far wider range of non-livestock livelihoods and productive activities existing in drylands that may also be associated with pastoralism through a variety of social and economic relationships. Pastoralist systems have experienced dynamic changes – economic, social, political and environmental – as well as intensifying ties to the region’s political and commercial capitals, markets beyond and a global diaspora. Importantly, these changes are evident in the fact that the nature and magnitude of pastoral systems today is not a linear function of the number of pastoral herding households, or their livestock holdings (Kratli and Swift, 2014), but a much wider constellation of pastoral peoples no longer focussed on livestock-keeping, as well as actors in a wider political economy who have invested in drylands.

Different livestock-based production systems have emerged in different political-economic and socio-ecological settings in the drylands, underlining the importance of understanding **trajectories – or changes over time** – in particular places. Today, varieties of pastoralism include commercialised forms of livestock-keeping oriented to large domestic and regional export markets; smaller-scale livestock-keeping for subsistence and local marketing combined with farming and other rural activities; the maintenance of very few small-stock in and close to towns alongside the pursuit of various tasks-for-cash; and customary pastoralism based on long distance movements, key resource use, and maintaining a network of bond friendships through which to exchange livestock and labour as the basis for mitigating risk.

This report focuses on five pastoralist systems (see Map 1): the **Maasai** system in Kenya's South Rift Valley, the **Somali** region of Ethiopia, **Borana** Plateau in southern Ethiopia, **Karamoja** in northern Uganda, and **Northern Bahr el Ghazal** region in the greater Bahr el Ghazal livelihood zone of South Sudan. These systems were purposely selected to reflect the very different trajectories of pastoralism in the region, which in turn relate to varying access to markets and resources and the positioning of these in diverse political-economies and ecological and socio-cultural systems. Furthermore, within pastoralist systems there are starkly different options for individuals and groups defined by age, gender, wealth and affiliation to an ethnic or section group. Diverging pathways across and within pastoralist systems highlight the challenges of programming to reduce vulnerability and strengthen resilience.

The analysis that follows is informed by these questions:

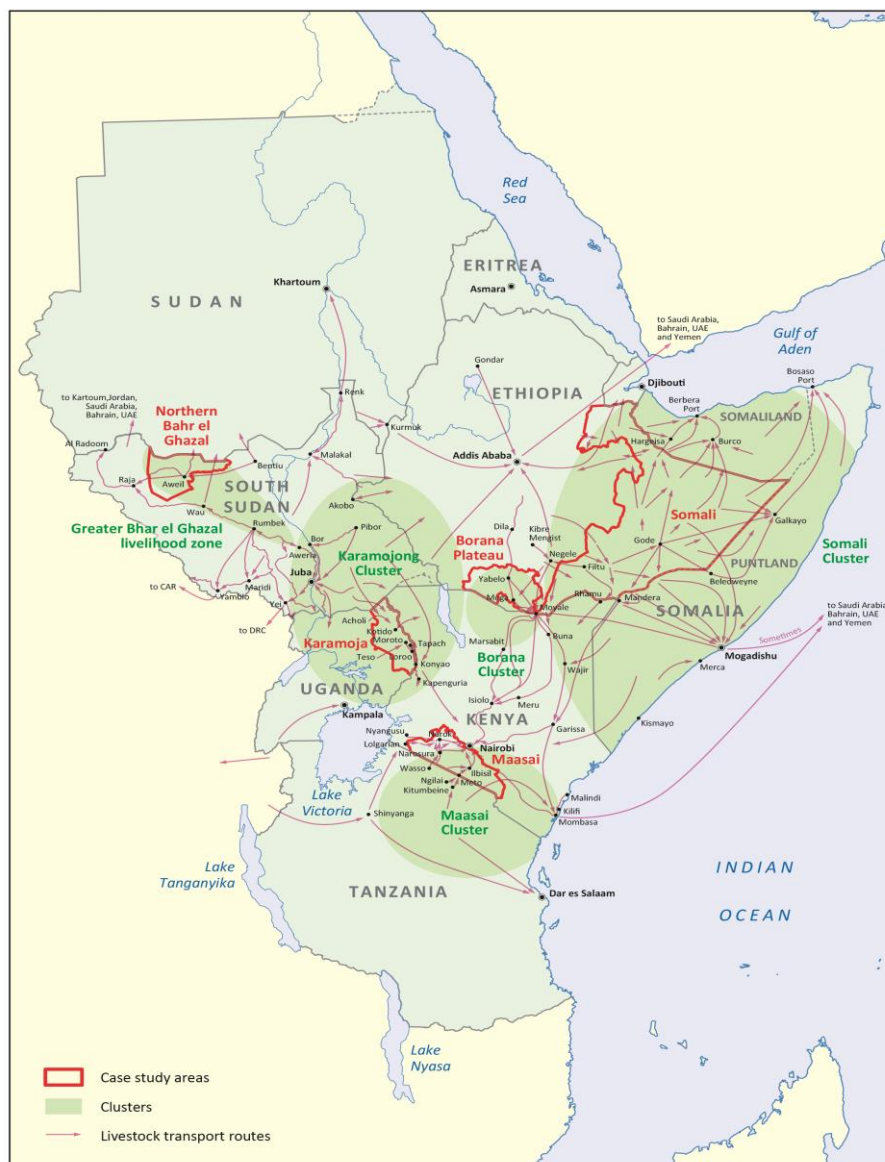
1. What are the pathways of change being experienced in different pastoral systems, and for different livelihood groups within these, in eastern Africa, over the last fifteen years to date, according to the evidence and data?
2. What is the state of the data on these changes?

3. How are these dynamic changes affecting the nature, extent and distribution of poverty and vulnerability as well as the scope for strengthening resilience today?

The report reviews and synthesises the findings of existing secondary sources on changes in eastern Africa drylands, a region defined here to include South Sudan, Ethiopia, Somalia, Kenya and Uganda. It also presents insights drawn from an exercise to map known data sources on pastoral societies and production systems in the region's drylands. Moreover, the report details priority, long-term evidence gaps as well as recommendations for future research and data collection. The following section briefly describes the study's methodology. Section three synthesises findings on trends and drivers of change in eastern Africa drylands, as well as the implications of these for pastoral livelihood pathways. Section four outlines the **Pastoralist Livelihood Systems Analysis**, introducing the three layers (steps) that can be followed to understand the context and drivers influencing options and opportunities for strengthening resilience. The concluding section considers the implications for resilience policy and programming in pastoral areas of eastern Africa, and recommendations for further research and data collection.

Map 1. Pastoralist systems covered by the study and livestock flows in eastern Africa

Sources: Map adapted from Gertel and Heron 2011, ICPALD 2015, Majid 2010, McPeak and Little 2006, and Simpkin 2005.



II. Methodology

The research had three main objectives: 1) to synthesise literature on poverty, vulnerability, livelihoods and change in the arid and semi-arid lands of East Africa, 2) to catalogue national and sub-national datasets on poverty, vulnerability, livelihoods and resilience drawing on the work of others, and 2) to identify priority, long-term evidence gaps, and make recommendations on research and data collection approaches and methodologies. The research was undertaken because very few research studies have taken a holistic look at livelihoods and resilience in dryland eastern Africa. The evidence base is essentially a geographical patchwork, across which this research has looked to form a dynamic view -- developing a framework of analysis that has the potential to pull together evidence from various disciplines and sources of data to understand the dynamic pathways of change in the region.

A team of Country Evidence Specialists in Ethiopia, South Sudan, Kenya and Uganda interviewed key experts to gather information on the five pastoralist systems covered by this study. Their work was central to compiling essential grey literature in an evidence synthesis and identifying relevant datasets for inclusion in the data mapping of the systems. A separate report, **Changes in the drylands of eastern Africa: case studies of pastoralist systems in the region**, reviews the dynamics of change in these systems and the wider implications of these.

More than 400 documents were retrieved by formal literature search using a number of databases, complemented by a process of manual back-search, as well as by snowballing techniques to identify additional literature. Key informant interviews were also carried out with experts on different pastoralist systems and themes, to highlight other documents for research. These documents were screened, assessed and included in a robust analysis that included: articles that were published in an academic journal; grey literature cited by published articles or recommended by country evidence specialists or interviewees; and published policy documents. Both grey and academic literature (from 2000 onwards) was included, but advocacy documents were excluded.

More than 100 datasets were mapped according to their research detail and survey collection methods, and assessed for the usefulness in generating understanding of dynamic change in the region. The data sets were then analysed in the context of the literature pertaining to existing data in the region, and through the complementary work of partners to evaluate possibilities for their use in understanding trends of change, and also to identify gaps and areas of further work.

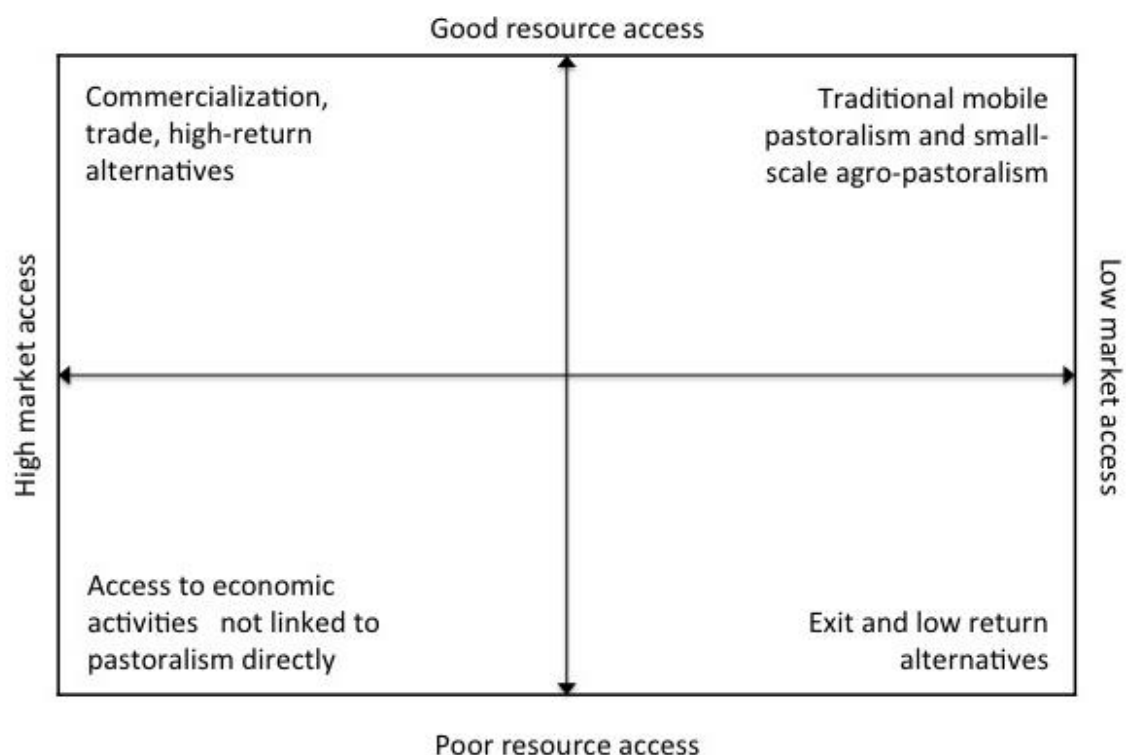
More information on both methodologies and reviews is available in the **Technical Note on the Evidence Synthesis and Data Mapping**, an accompanying document to this report.

III. Change over time: pastoral systems past and present

This section assesses key insights from academic and grey literature concerning trends and drivers of change over time in pastoral areas, the outcomes of these for poverty and vulnerability, and their implications for developing attitudes towards resilience. It considers the nature and characteristics of customary pastoral systems in eastern Africa so as to contextualise more recent dynamics and their significance for the different trajectories of pastoralism in the region. Before considering recent

trends and dynamics shaping pastoralism, Figure 1 presents a simple schema for thinking broadly about change over time in pastoral areas. This indicates four different pathways that pastoralists are taking to maintain their livelihoods: some are **moving up** into commercialisation, regional and export livestock trades, and other high return economic activities; others are **moving out** into activities not linked to pastoralism directly but that may nonetheless be linked to livestock-keeping through various feedback loops and value added diversification activities; some are **hanging in** and continuing to earn a living through traditional mobile pastoralism or small-scale agro-pastoralism; while many more are **dropping out** or exiting into a range of tasks-for-cash and other low-return economic activities. These categories and the related schema constitute one layer of the **Pastoralist Livelihood Systems Analysis** presented in the following section, and builds on a wider body of work on directions in agricultural livelihoods, as also now reflected in the DFID AgRefresh strategy (Beguin and Howlett 2015). As this section details, diverse trends shaping pastoralism in the region have very different consequences, with distinct trajectories apparent at a system-level as well as diverging prospects for individuals and groups within systems. These consequences are considered at the end of this section.

Figure 1. Pastoralist livelihood pathways in eastern Africa



Limitations in the literature review needed to be considered before a thorough review of the evidence. While the literature on eastern Africa pastoralism is patchy and uneven, nonetheless there is a large body of work. Thus, the literature review was limited, fundamentally, by not being able to cover all of the evidence available on the geographic areas across the wide spread of thematic issues of the study. To limit the scope of the review, this study primarily focuses on literature since 2000. The scope is narrowed further by focussing on five systems. As explained above, these systems (Somali Region of Ethiopia, Borana Plateau of Ethiopia, Maasai in Kenya's South Rift Valley, Karamoja

in Uganda, and Northern Bahr el Ghazal in South Sudan) were purposely selected because they are emblematic of diverging pathways of change evident in pastoral systems in eastern Africa more widely. While the literature review focusses on evidence of change over time in these five systems, a limited range of sources covering wider themes and other geographies were also consulted.

Unsurprisingly, overall the literature on Northern Bahr el Ghazal was relatively thin compared with the other systems covered (Figure 2). Qualitative research methods were the most represented in Borana Plateau, Somali Region, Maasai South Rift, and Karamoja region. Only in Northern Bahr el Ghazal were mixed methods used slightly more prominently. Mixed methods were also highly utilised in all the research. Mixed methods approaches included a survey component utilised in combination with at least one qualitative research method. It is worth noting the comparison with stand-alone quantitative methods including econometric work that did not include a qualitative component, which are among the least represented. It is particularly difficult to find evidence that was informed by participatory research outside of Karamoja (Figure 2). Participatory methods were coded when participatory methods were expressly discussed in the methodology. Participant observation, key informant interviews, and focus group discussion were coded under qualitative methods. Qualitative research methods were the most represented in Borana Plateau, Somali Region, Maasai South Rift, and Karamoja region. Mixed methods were also highly utilised across the systems covered by the study. Mixed methods approaches included a survey component utilised in combination with at least one qualitative research method. It is worth noting the comparison with stand-alone quantitative methods including econometric work that did not include a qualitative component, which are among the least represented.

Figure 2. Type of method informing literature, by pastoralist system

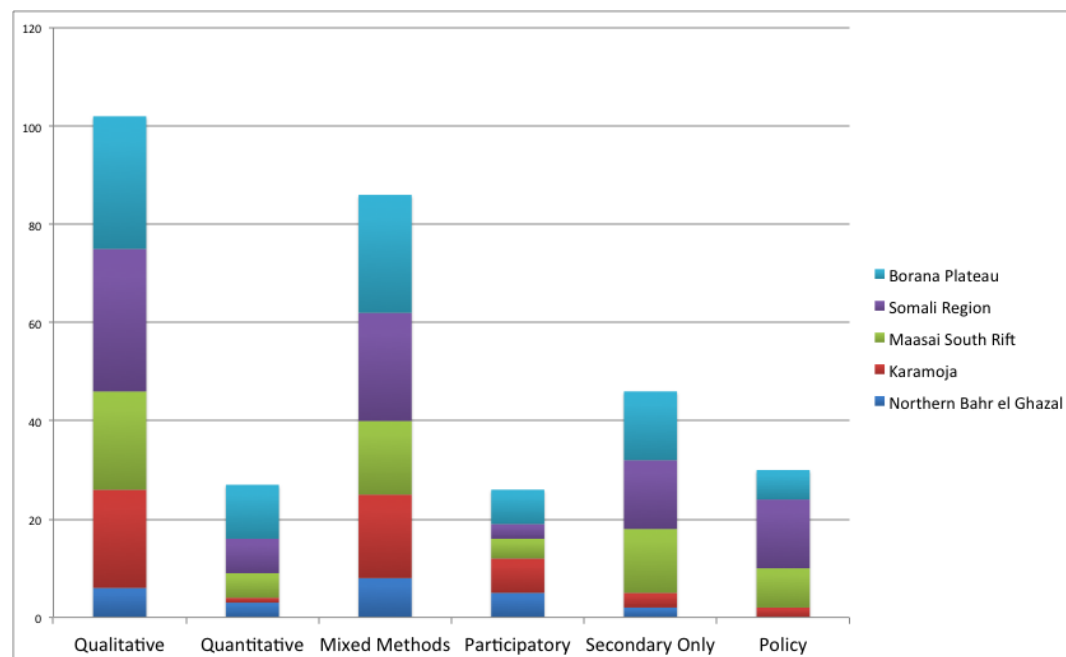
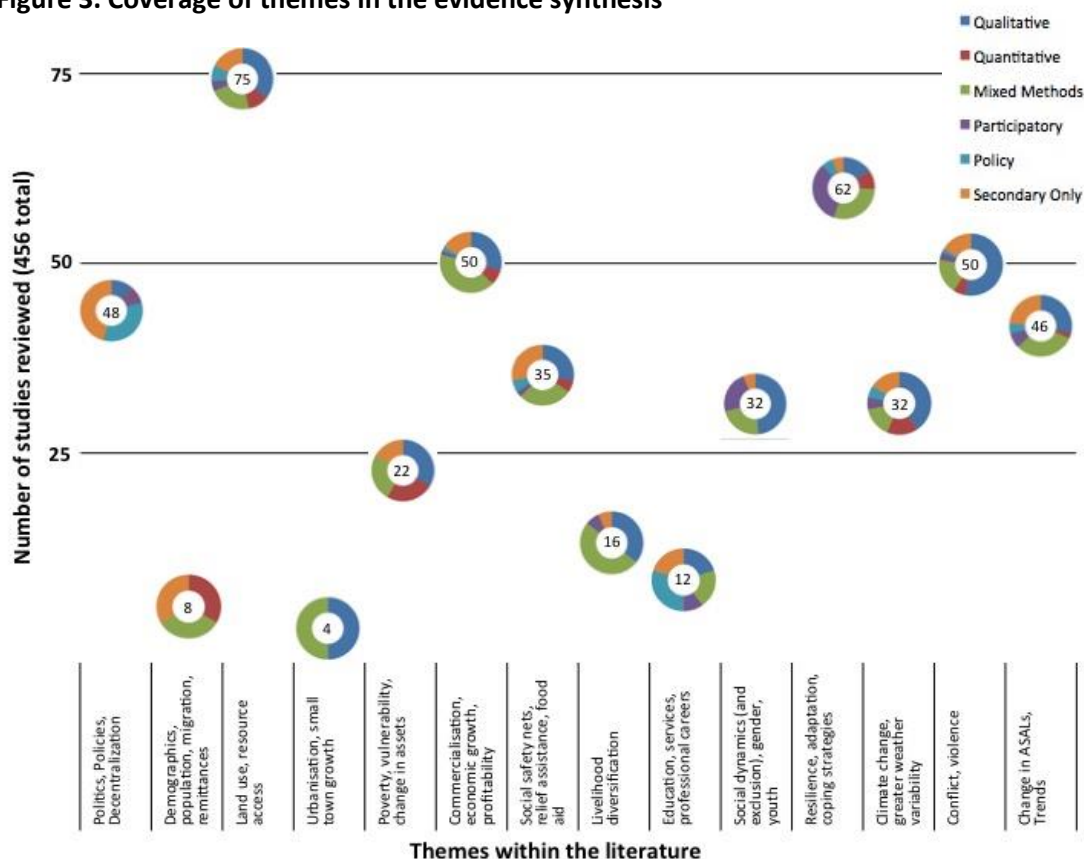


Figure 3. Coverage of themes in the evidence synthesis



Furthermore, there were also gaps in coverage on specific themes, including: urbanisation and small town growth, demographic change including population and migration, education and services, social dynamics including gender and youth aspirations, livelihood diversification particularly for poorer and more vulnerable groups (Figure 3). Better covered themes (in order of rank) include land use and resource access; resilience, adaptation and coping strategies; conflict and violence; commercialisation, economic growth and profitability; and politics, policies and decentralisation.¹

Customary pastoral systems in eastern Africa

Over the past several decades, the drylands of eastern Africa have experienced tremendous change and transformation. These areas are home to some of the largest pastoralist populations in the world where livestock-based production systems are still active and pastoralism remains the most productive use of most of the region's drylands. The physical distribution of grazing resources in the drylands is uneven, with many concentrated in key areas along rivers or on hilltops, as well as determined by episodic and uncertain rainfall. The region's pastoralist systems evolved to incorporate adaptive mechanisms for managing resource variability and uncertainty. Through the *mobility* of herds and people across low-productivity dry rangelands, for example, pastoralists were able to support mixed-species herds by knitting together the use of separate, distinct pockets of key resources. The effectiveness of herding strategies depended on the *flexibility* of pastoral units to seize opportunities and evade hazards in highly variable and uncertain rangeland environments. This approach necessitated independent decision-making, the logic of which was driven by the ability to

¹ For a longer discussion, see the 'Technical note on the evidence synthesis and data mapping' that accompanies this report as well as the associated Excel spreadsheet detailing the themes of every publication reviewed for this study.

adapt the movement of their herds and knowing when to expend available labour to care for livestock to optimise use of fluctuating rangeland resources. Pastoralist systems have long exhibited a boom and bust cycle (Dahl and Hjort, 1979). Therefore pastoral production strategies tended to prioritise larger herds, to help ensure a reliable flow of livestock products and services by investing during 'good years' and keeping extra animals as insurance for when conditions deteriorated (Livingstone, 1991).

In the past and often up until now, states in the region have often regarded pastoralism as an anachronistic way of life, harbouring little economic value, and threatening environmental ruin and disaster. In the agrarian-dominated political systems of Ethiopia, Kenya and Uganda, successive governments sought unsuccessfully to push pastoralists into becoming full-time farmers, ranchers or petty traders. The perception that pastoralism contributed little to wider economic output, and that drylands were of 'low potential', justified a glaring bias in the allocation of public resources in favour of 'high potential' agrarian highlands, which in Kenya were acquired by white settlers with access to large amounts of capital.

Yet, in spite of these perceptions, pastoralist systems generated significant wealth from environments that could not sustain many other economic activities, and were closely integrated with other land uses. Pastoralists maintained substantial social and economic ties with other livelihood groups in drylands, including fisherfolk, hunters and gatherers, and farmers. These ties helped pastoralists to engage in a range of non-livestock activities to complement and support livestock production, including flood retreat farming, irrigated agriculture, hunting and gathering of natural products, marketing and trade, and even fishing. Pastoralist systems were also often linked to wider systems of marketing and trade. Thus, for example, before the outbreak of civil war, and even still, Somalia was the largest exporter of goats in the world.²

Over time, pastoralist systems in eastern Africa have been redefined as they have become increasingly bound into processes of state territorialisation and wider dynamics of trade and investment. These changes are apparent in a number of distinct, longitudinal trends in drylands. Evidence of these is assessed in the following section.

Trends shaping eastern African pastoralism

Arguably the most significant trend redefining pastoralism in east Africa is **the fragmentation of rangelands** through processes of excision, privatisation (often taking the form of enclosures) and commodification of rangeland resources (Abbink et al, 2014; Flintan et al, 2011; Galaty 2013; Galvin et al, 2008; Homann et al 2008; Lesorogol, 2005; Mwangi, 2007; Nunow, 2013; Tache, 2013; Western and Nightingale 2004). Rangeland fragmentation directly threatens adaptive processes in customary pastoralist systems, as movements become more difficult to make and key resource areas are fenced and set aside for non-livestock uses. In Borana, 'indigenous rangeland categories lost their functionality in preserving a seasonal grazing system' due to uncontrolled land use (Homann et al 2008: 511).

Rangelands have been carved up through the establishment of private enclosures, water points and cisterns, 'farmlands', ranches, and conservation areas. Some fragmentation has been driven by state **investment in large irrigation schemes**. Successive governments in Ethiopia have expanded industrial agricultural estates in the Awash Valley for cotton and sugar production, even though per

² 'Where Somalia is king of the world.' *Mail and Guardian Africa*. May 3, 2015. Available at: <http://mgafrica.com/article/2015-04-30-somalia-livestock>

hectare returns for pastoralism are higher than for industrial crops (Behnke and Kerven 2013).³ Elsewhere, governments excised large riverine areas to establish irrigation schemes that are meant to provide pastoralists with alternative livelihoods. These were established at great cost, but often had disappointing results. For example, in the 1970s the United Nations Development Programme (UNDP) and Food and Agriculture Organisation (FAO) supported a number of schemes in Turkana, investing up to 62,000 USD per hectare or 21,800 USD per tenant (Hogg, 1987). The schemes were poorly designed, failing to take account of irregular river flows. The small plot size of 0.4 ha per household insured the dependence of the scheme farmers who relied on food aid and the loan of agricultural inputs to cobble together an existence. The schemes fell into a state of disrepair and ruin barely ten years after being introduced (Lind, 2007). In many areas, inadequacies in land use planning and enforcement resulted in poorly planned water development schemes and the establishment of bore holes, contributing to local degradation and conflict (Birch and Shuria, 2002; Flintan et al, 2011).

Internal processes of **sedentarisation and the claiming of resources** by pastoralists are hastening rangeland fragmentation. In Borana, the fencing of commonly used forage banks (*kallo*) has spread since the 1980s and become commonplace in spite of directives by the *gumi Gaayo* to prevent the practice (Homann et al 2008: 515). In the South Rift region in Kenya, the establishment of group ranches, supported by the state and World Bank, set in motion the individualisation of land tenure, and the carving up of the rangeland as many poorer Maasai sold their plots to a variety of local and outside investors. This is one of many examples of sedentarisation through enclosure, in which a combination of state intervention and local efforts have enclosed and commoditised commonly owned land ('the commons') (Korf et al., 2015).

A related trend, also contributing to fragmentation, is **sedentarisation and the uptake of land and resource dependent activities** such as dryland farming, charcoal burning and harvesting fuel wood. While pastoralists have long practiced a range of non-livestock activities, diversification has become far more significant in a context in which populations are increasing and access to key natural resources is diminishing (Sandford, 2013). Regional drought and livestock disease epidemics in the early 1980s pushed many pastoralists to settle permanently and seek alternatives to livestock keeping. The Borana increasingly turned to crop cultivation following the 1984/1985 period of drought (Homann et al 2008: 511), while many Turkana remained in famine relief centres even after the worst of the crisis had passed (Lind, 2005). In South Rift, the presence of group ranch institutions and tenure facilitated permanent farming and sedentarisation of Maasai herders, who nonetheless cultivated as a way to rebuild herds. In Loitokitok Division of Kajiado, the small plots of agricultural land expanded from 7,500 hectares to almost 30,000 between 1973 and 2000 (Campbell et al 2003 in Wangui 2008: 372; McCabe et al, 2010).

In Karamoja, many pastoralists began settling in the more ecologically fecund southern fringes of the region in the early 1980s, as drought and insecurity diminished herds. Up to this day many young Karamojong continue to seek opportunities outside of livestock keeping, either in agriculture in more fertile areas such as Karenga, Abim, Namalu and Iriiri (Caravani, forthcoming), or in towns (Caravani, 2012; Stites et al, 2014). While there are many examples of failed state-led, donor-funded large irrigation schemes in the eastern Africa drylands, **privately led community-based and profit-**

³ Behnke and Kerven (2013) find that the estimated annual net, per hectare returns to pastoralism were about 6,000 Ethiopian Birr (EB) at the lower range of potential stocking densities, up to EB 12,000 at high animal densities. This compared to annual losses of more than EB 2,000 per hectare suffered by the state cotton farm in the decade of the 1980s.

oriented smaller-scale irrigation activity has spread across the region, driven by an indigenous entrepreneurial class. Examples include along the Wabe Shebelle River in Ethiopia's Somali Region, and in the Mandera triangle. Sandford (2013) estimates that the total extent of the irrigated lands involving pastoralists in the Horn of Africa at 120,000 hectares. However, plot sizes typically are very small at around 0.25 ha/household and dryland farming remains a high-risk activity in many areas, and for most is not a reliable substitute for livestock keeping.

Sedentarisation has occasioned a greater need for **basic services and markets** for trade and exchange, helping fuel the **growth of small towns**. While urbanisation is a relatively neglected theme in literature on pastoralism, these dynamics are significant to understanding the livelihood pathways of a growing proportion of dryland populations. In recent years, Garissa in Kenya's arid northeast was the country's fastest growing city (Little, 2014). Dadaab, also in Kenya's northeast, hosts the world's largest refugee camp, and now ranks as Kenya's third largest city.⁴ Jigjiga, the capital of Ethiopia's Somali Region, expanded from a small regional centre in the 1990s into a prosperous mid-sized town with a population approaching 150,000. A variety of factors have driven small-town growth in the drylands. Food insecurity and famine precipitated large-scale settlement in and around relief distribution centres in many parts of the region. Gode in Ethiopia's Somali Region swelled at different times in the 1980s and 1990s as a centre for relief distribution, as well as to absorb returnees from the Ogaden War, who returned to Ethiopia following the outbreak of Somalia's civil war in 1991. MSF estimates the population of Aweil in Northern Bahr al Gazal has grown to more than 100,000. International humanitarian operations in these places have helped to establish critical infrastructure and services for local populations. Kakuma in Turkana, also host to a large refugee camp, has become an important source of employment, business opportunities, and commercial goods for Turkana herders (Sanghi, 2015).

In recent years, **indigenous capital and state investment** have encouraged more dynamic growth in dryland towns. Capital investment by local and transnational Somali merchants in Jigjiga and other towns in Somali Region has accelerated sedentarisation (Korf et al. 2015). In Karamoja, a rental market has expanded rapidly as well-off Karamojong construct housing for recent migrants. After decades of comparative neglect, the drylands of the Horn and East Africa are on the receiving end of an unprecedented surge of investment. Ethiopia's infrastructure spending as a percentage of GDP is now the highest in Africa. Road building and repair has been the major emphasis of this infrastructural push. Likewise, in Kenya, the 135 million USD, Isiolo-Merille-Marsabit-Moyale road, to be finished in 2016, will be the first major project completed under the Lamu-Port-South Sudan Ethiopia Transport (LAPSSET) Corridor. Road tarmacking and street lighting in Lodwar, Isiolo and Wajir by newly established county governments were funded from devolved Kenyan Treasury resources, as well. Here again, indigenous capital is intersecting with state investments to produce dynamic results. In Kenya's Tana Delta region, the expanding use of motorbikes as public transport is doing much to improve the flow of people and small goods alongside the operators of small boats that cross the many inlets and tributaries dissecting the delta (Nunow, 2013).

Improvements in roads and concomitantly in transport services (ranging from public buses to lorries and motorbikes) are making markets and **basic services** more accessible for dryland populations, while also supporting the penetration of outside capital. **Education services** remain limited in the

⁴ 'Life in Dadaab: three generations of refugees isolated from Kenyan society.' *Guardian*. January 27th, 2016. <http://www.theguardian.com/global-development/2016/jan/27/life-dadaab-three-generations-of-refugees-isolated-from-kenyan-society>

region (Morton and Kerven 2013, Teshome and Bayissa 2014, King-Okumu 2015) but in some areas it is improving in towns, which is also serving as an incentive for urbanization (Stites 2014). There is consensus in the literature (Birch et al 2010, Devereux 2006, Little et al 2010, ILO 2013, Oxfam et al 2013, Teshome and Bayissa 2014) and the participatory resilience evidence (RAU 2015, Way et al 2014) that people aspire to better education for improved livelihood opportunities and stronger resilience, which requires an improved, integrated, and quality education system that is able to withstand shocks in the drylands (Morton and Kerven 2013, Scott-Villiers et al 2015). Yet, while these investments represent a welcome renewal of interest by states in drylands and an opportunity to reduce long-standing inequalities in the provision of public goods and services, the outcomes of capital projection in such areas can be ambiguous. McPeak and Little (2014: 67) observe that, 'While transport improvements can create new opportunities for more price responsive marketing and value added processing, it is by no means clear that the benefits to the majority of dryland residents will outweigh the costs, if current trends continue.' Examples abound in the region of land and resource grabbing in the drylands, or of pastoralists making ill-informed sales of individual land holdings. A land rush in South Rift, driven by speculators spurred by the area's proximity to Nairobi and Maasai distress sales, has seen the rangeland become highly fragmented as the area transitions into a peri-urban frontier. This has left many Maasai worse off through a process that they explain as 'selling wealth to buy poverty' (Rutten 1992; Mwangi 2007). An economic rush in Ethiopia's Somali Region, incentivised by transnational marketing networks, has seen the rapid commodification of pastoral resources such as charcoal, water points and cash crops (Korf et al 2015: 3). In Harshin, traditionally an important drought grazing reserve that lies on a strategic trekking route for livestock being exported through Berbera, there has been a near total privatisation of grazing areas and water as the rangeland was carved into household plots for farming and private grazing (Flintan et al., 2011).

Thus, these examples show that the prospects of new state and private investments delivering broad-based benefits for dryland peoples will depend on the extent to which they take account of three critical issues: the impact of inequality, rights to land and other natural resources and the manner of their planning and implementation (Birch and Lind, 2014).

Infrastructural upgrades and extensions in the drylands are helping to power **further expansion of formal livestock exports**, particularly from Ethiopia, which has experienced unprecedented growth in exports over the past decade. The main supply areas are Borana for cattle, refrigerated sheep and goat carcasses, and Somali Region for live camels, sheep and goats (Aklilu and Catley, 2014). The Ethiopian highlands have also experienced a large expansion in value addition for livestock produced in the lowlands. Alongside these rural dynamics, livestock fattening lots in Adama have expanded greatly, supplying the booming export market. Even before infrastructural improvements in Ethiopia and Kenya's drylands, the region was connected to a larger regional livestock marketing and trade. Much of this was informal, and today the annual volume of **informal cross-border livestock trade** accounts for considerably more trade than official export trade (McPeak and Little 2006, Little et al. 2010). Further, the informal trade between Ethiopia and Somaliland feeds approximately 50 per cent of the small stock exported from Berbera and Bossaso, most of which is sourced from eastern Ethiopia's lowlands (Majid, 2010; Eid, 2014). Pastoralists have also responded to increasing domestic demands associated with high and increasing human populations in urban areas, and rising purchasing power among some consumers (Aklilu and Catley, 2014; Hussein, 2013; McPeak and

Little, 2006; Mahmoud, 2010).⁵ Still, in spite of some pastoralists responding to commercial export opportunities, less than 7-8 per cent of Borana herds are composed of male animals that are sought in livestock markets, with most herd structures overwhelmingly oriented to milk production (McPeak and Little, 2014: 56).

This positive picture of dynamic economic change in the region is tempered by concerns around the potential impacts of **climate change**, a prominent theme in many resilience studies. In participatory research, drought continues to be identified as the main shock facing dryland populations (Mercy Corps 2013; RAU 2015; Way 2014; WFP 2011a, b, c, d; WFP 2013). In a drought year, households experience acute food shortages, a rise in malnutrition rates, distress sales and extreme coping strategies, and a peak in household expenditure; workloads for both men and women are extremely high, and households are fully engaged in water collection, charcoal burning and trying to cope with the severity of the shock (WFP 2011a, b, c, d). However, while local perceptions are that droughts are worsening, these often take into account variables other than rainfall including changes in land use, resource availability and other factors related to risk in pastoral systems (Little et al 2001). Contradictory and varied rainfall trend-lines in the region (Catley and Aklilu, 2013; Ericksen et al, 2013; Devereux, 2006) throw into question claims that global climate change is leading to irreversible changes in the resource base for pastoralism. Projections of changes in future annual rainfall are uncertain, with differences in projections for countries as well as regions within these. Yet, even without the risks of longer-term climate change, the sensitivity of livestock production to climatic variations means there is a need to pay greater attention to climate risks and the vulnerability that this brings. As mentioned above, herders have long managed droughts of varying intensities through mobility, herd splitting, and opportunistic movements to exploit key resource patches.

The perception of many pastoralists that drought shocks are worsening should be understood in the context of increasing rangeland fragmentation and unequal access to resources, which restrict mobility and flexibility, thereby undermining adaptive capacities. The consensus of the literature is that the threat to pastoralists' wellbeing is not drought, but *'the increasing marginalization of pastoralists' drought response mechanisms'* (Yohannes 2012: 10, original emphasis; Kifie and Gebre-Michael 2009). While climate change can affect the distribution and prevalence of natural resources, so too will environmental, social, economic and political factors (Campbell et al 2009; Mkutu 2002; Oxfam International 2010). There are inadequate arrangements to cope with droughts and other emergencies. Adaptation is constrained by a number of factors including resource pressures (Stark et al 2011), restrictions to mobility (SIM 2010), conflict (Grade et al 2009), limited access to information (CARE and Save UK 2009), limited education and an education system that is not resilient to shocks (Scott-Villiers et al 2015), and social and gender inequalities and marginalization (CARE and Save UK 2009).

Today, partially overlapping and conflicting claims to land compound a situation in which pastoralists must negotiate or clash over diminishing access to key resources. While negotiations are often the primary and most *effective* method for managing contested resources, particularly in times of drought, political divisions can drive **conflict**. For many years, a proliferation of small arms in the region has increased the opportunity for conflict to lead to violent and fatal clashes (Little and McPeak 2014; Mkutu 2002), as evident over many years of chronic, low-intensity conflict in

⁵ Examples include the establishment and spread of camel micro-dairying operations by Gode town-dwellers over the past 20 years, who supply both local markets as well as the Somali market in Addis (Hussein, 2013).

Karamoja (Grade et al, 2009) as well as in Turkana (Eaton, 2008; Lind, 2015; McCabe, 2004). The proliferation of small-arms through long-established trading routes and networks has pushed governments in the region to attempt disarmament efforts at various times, most recently in Karamoja (Akabwai 2007). Forced disarmament in Karamoja led to fewer violent incidents (Burns et al 2013; RAU 2015) but also entailed cultural and livelihood losses for pastoralists (Kizito et al., 2012; Knighton, 2010; Stites and Akabwai, 2010), who continued to be exposed to forays by neighbouring pastoralist groups who were not disarmed.

While livestock raiding continues in many parts of the region, the nature of ‘pastoralist’ conflicts is becoming more complex and subsumed within **struggles for political-administrative control**. These new-type of conflicts sometimes adopt a cover of ‘livestock raids’, even though their primary motivation has little to do with acquiring animals. Intense competition in parts of Ethiopia and Kenya pivot around control of sub-national political offices – in contexts of federalism in Ethiopia and decentralisation in Kenya – and the access to public resources that these office’s guarantee (Hagmann and Mulugeta, 2008; Scott-Villiers et al, 2014; Sharamo, 2014). In Isiolo, Kenya, both individuals and clans place a high level of investment in political representation, ‘changing the whole dynamic of the conflict to be more political than the traditional resource based jostling’ (Boye and Kaarhus 2011; UNDP Kenya 2010: 1). This is one example of the political struggles that are part of devolution process in Kenya (Scott-Villiers 2014). In Mieso district in eastern Ethiopia, the conflict is driven by contestations over formerly communal grazing land. In some areas, customary institutions are breaking down but the state is unable to meaningfully fill the gap (Hagmann and Mulugeta 2008). Elsewhere, tensions between farmers and agro-pastoralists are on the rise, for example in the Dawa-Ganale River Basin Area (Gedi 2005), in Kordofan (Egemi 2008), the Gedarif state in eastern Sudan (Yasin Abdalla and Samat 2011) and along the Ethiopia-Somalia border. In other areas, such as the conflicted boundary area along the South Sudan – Kenya border, tensions over grazing and water resources are coupled with a contested political boundary that politicizes and incentivizes support for groups to establish claims (Eulenberger 2013; Karani 2010; McCarthy and O’Hagan 2013). Thus, ‘pastoralist’ conflicts often intersect with a host of divisions and interests that extend far beyond sites of localised violence. Owing both to the fact that pastoralist areas are being subsumed in ever more complicated governance arrangements, and the increasing influence of various transnational actors and flows (in guns, in lucrative commodities, in militants, in global capital investments in drylands), customary structures and central governments alike are less able to manage the dynamics of conflict and violence happening in pastoral areas.

Conflict is also contributing to a loss of mobility (Odhiambo et al 2012; Kebebew 2001), and where conflict is most acute, particularly in South Sudan, it is having the heaviest effect on livelihoods, cutting off traditional migration patterns and breeding opportunity for livestock diseases *en masse* (HPN 2013; Pantuliano et al 2009). There is evidence that conflict is a life-defining factor in the region driving herding strategies and migration (Lind, 2015). A study in Turkana found that in comparison to previous years, security concerns now completely drive herding strategies whereas previously it was only one factor to consider: 100 per cent during the 1998 study period, 40 per cent in 1993-1994 and 20 per cent during the 1979-1981 (Pike 2004). In Karamoja, security was also driving factor in the decision to migrate to small towns and urban areas for greater security (Stites et al 2014). In a study on Borana pastoralist dropouts, it was listed as one of the three main causes of people exiting into alternative, largely town-based livelihoods, alongside drought and chronic poverty (Desta et al 2008). It is commonly listed among the top priorities in resilience participatory

research (UNDP 2014a, b, c, d).

Diverging pathways and prospects for east African pastoralists

Livelihood transformation and changes in this dynamic context are complex, yet also contradictory. Increases in rangeland fragmentation, sedentarisation, small town growth, commercialisation and infrastructural investment are all changing access to resources and markets in the drylands. These changes are shaping livelihood choices, as well as constraining some livelihood pathways.

Areas and people with good access to natural resources and markets are **moving up** because they are able to maintain and sell livestock and their products as a successful business enterprise, commercialising the milk and livestock trade, selling in high export zones, creating private abattoirs and finding lucrative business opportunities along the livestock value chain. The estimated value of the regional trade in livestock and meat was 1 billion USD for the Horn in 2010 (Catley et al. 2013). Pastoralists moving up are particularly evident in the high-export zones of Ethiopia's Eastern lowlands, which historically keep many cross-border trade and exchange relations with neighbouring areas of Somaliland, Puntland and Somalia (Catley and Aklilu, 2013). Yet, the ripple effects of this trade are wide, extending into northern Kenya, where livestock-keepers increasingly supply camels through Moyale-based traders to the regional trade (Mahmoud, 2013). This trade is spurring local initiatives, such as the emergence of private abattoirs in pastoral areas of Somalia and Somaliland, as well as a diversity of marketing and service provision relationships.

Areas and people with good resource access to rangeland and water sources in particular, but who do not have high market access are **hanging in**, practicing customary forms of pastoralism based on high mobility, banking on extended social rites, and through opportunistic use of key resource patches within the wider landscape.

Rangeland fragmentation is constraining traditional mobile pastoralism because pastoralists are less able to access the key resources that are needed in periods of drought. When a pastoralist's herd is no longer viable due to lack of good resource access, the household exits pastoralism, or **drops out**, at which point household members seek productive activities not directly linked to herding. There is of course nothing new about pastoral people taking steps away from mobile livestock keeping toward other alternatives. Yet, the context in which people leave pastoralism is qualitatively different today. Some dropouts remain closely linked, though stockless, and still consider themselves to be pastoralists (Teshome and Bayyissa 2014).

Pastoralists exiting into different livelihoods is differentiated from those areas and people who elect to pursue economic activities that are not linked to pastoralism directly but have good market access, **moving out**. The opportunity to step out of pastoralism into 'value added diversification' is limited to those able to take advantage of resources that will achieve a high return on their activities. However, small town expansion, better connections with larger centres and the younger generation's acceptance of non-traditional livelihoods are enabling those relatively few people to earn a living from the pastoral economy without herding animals. Examples of moving out include the expansion of micro-dairying operations in towns, the collection and sale of fodder to town dwellers, and marketing in hides and skins. Some pastoralists are organising themselves to supply milk to the populations of fast-growing small towns and larger centres in the pastoral areas, but, also to those who migrated further away (out-migrated) to reside in cities such as Nairobi, Addis Ababa, and even London (Abdullahi et al., 2013). In Eastern Ethiopia, camel milk is collected from pastoral

producers and flown to the Gulf, while recent developments in Kenya include the processing and packing of camel milk for sale in supermarkets and other outlets.

While pastoralism remains the most productive use of most of the region's drylands, indigenous pastoral production systems have come under immense pressure in recent decades. A basic conundrum is that vulnerability and poverty seem to worsen even while economic growth abounds, commercialisation processes gallop apace, and the region's remote margins become increasingly tied into wider systems of market activity, trade and investment. The pastoral poor live in the shadow of the region's livestock boom and its intensifying economic integration, excluded from the potential to benefit from commercialisation, and much less able to return to a leaner form of traditional livestock-keeping (Aklilu and Catley, 2010). The breadth and depth of vulnerability were evident during the 2011 drought crisis, which affected nearly 10 million people in Somalia, Kenya, Ethiopia and Djibouti. The UN declared a famine in Bakool and Lower Shabelle in Somalia -- the first time it had done so in the Horn in nearly 30 years. More than a year after the famine was declared over, the UN estimated that 260,000 people had died and that 2.7 million still required life-saving assistance and support to rebuild their livelihoods (Lind and Kohnstamm, 2014).

A sizeable and growing proportion of the population in pastoral areas is chronically vulnerable and lacks clear alternative livelihoods. Per capita livestock holdings have dropped sharply in most parts of dryland east Africa (Lybbert et al, 2004; Devereux, 2006; Little et al., 2001a; Desta et al., 2008; Davis and Bennett, 2007), to the point that holdings now fall far short of subsistence requirements for a large proportion of pastoralist populations. The ratio of cattle per person in Borana declined from 1984-1999 from an average of 4.1 head of cattle to 2.25 head of cattle (Homann et al 2008: 506). In Kenya's South Rift Valley, while overall cattle and goat numbers rose between 1973 and 2001, per capita holdings had fallen to just four in the 1980s, a trend that has continued (Western and Nightingale, 2004). While the pastoral caloric terms of trade and potential for more value added processing means that some households can still maintain their well-being with a smaller herd, for many this is not the case.

Higher livestock mortality rates are driving a decline in herd sizes (Headey et al, 2012: 7). Between 1980 and 2000, Borana suffered three major droughts in which pastoralists lost 35-67 per cent of their livestock inventory with a monetary value worth hundreds of millions of dollars in USD (Desta et al 2008: 5). The Maasai in Laikipia felt the impacts of a drought in 2009-2010 so severely that some began referring to it as *Olamei Oodo* or 'the Great Drought' (Lind and Barrero, 2014). One estimate is that 64 per cent of cattle herds and 62 per cent of sheep were lost (Zwaagstra et al., 2010). These losses happened in spite of the fact that six weather stations in northern Kenya, monitored by the Kenya Meteorological Department, reported higher rainfall deficits during droughts in the 1980s and 1990s than in the two years preceding the crisis that pushed the Maasai to migrate to Mt. Kenya in 2009.

High livestock losses have resulted in a downward shift in the distribution of households between those considered in local terms to be wealthy, middling, poor and destitute (Morton 2006 in Desta et al 2008: 5). Desta (2008), who charts the downward trend of pastoral drop-outs in Borana, found that while a majority were already poor before moving to towns, between one-third and half were either middle or better off, indicating they were unable to recover from livestock losses. With livestock poverty deepening for many pastoralists over a long period, there has been a shift to keeping livestock that are more marketable, particularly smaller herds that can be easily disposed of to meet cash needs. Having a small herd also makes it difficult to build stock back up, as small herds

that are milked intensively experience lower calf growth and survival when pasture is scarce (Western and Nightingale 2004: 23). In contrast, wealthier households are able to make more milk for available for livestock consumption, resulting in better calf health (Holden et al 1991 in McPeak and Little, 2014: 56). The privatisation of rangeland resources, and increasing fragmentation experienced in many East African rangelands, also makes it more difficult to support livestock, even if people could get hold of them (Flintan, 2011). This is complicating pathways out of poverty: opportunities to climb back into livestock keeping are shrinking if you are poor, especially when access to key grazing resources is becoming ever more constrained.

Those who are best able to adapt to dynamic change are those with access to and control over productive resources (Amsalu et al., 2013). Those with the poorest access to and control over productive resources face the highest constraints on their resilience. People try to cope with shocks and stressors, and to survive in 'normal' times, in different ways, including: cutting meals (Birhanu et al., 2015); migration and/or the splitting of the pastoral household in Kenya, Ethiopia and Uganda (Watson 2010; Kebebew et al 2001; Stites 2014); collecting and preserving hay; paying for pasture in Tanzania (Goldman and Riosemena 2011); modifying rangeland management practices; changing herd composition particularly to drought resistant animals such as goats and camels in Ethiopia and Kenya (Anderson et al., 2012; Simachew 2010; Belayneh et al., 2009; Aklilu and Catley, 2009; Odhiambo et al., 2012; Yohannes et al., 2010); distress livestock sales,; charcoal production (Birhanu, 2015, Headey et al., 2012, Kebebew et al., 2001); seeking external aid or support from customary safety nets (Birhanu, 2015); and in Kenya, promoting conservation and wildlife tourism (Odhiambo et al., 2012).

Significant numbers of pastoralists are destitute and survive by knitting together meagre amounts of income and livelihood derived from various tasks-for-cash, informal social support and occasional relief assistance, usually in the drylands' expanding towns and urban areas. Evidence points to increased impoverishment and destitution of pastoralists who settle (Adano and Witsenberg, 2005; Fratkin, 1992; Hogg, 1986; Little, 1985; McCabe et al, 2010). Further, pastoralists' human health is negatively correlated with the degree of their sedentarisation. Fratkin and Roth (2005) compared the health and nutritional outcomes of sedentarisation, comparing five Ariaal and Rendille communities in a drought year and a normal year. They found that children in sedentarised communities showed three times the level of stunted growth (measured by height by age) and wasting (measured by weight by age) than the nomadic community. McPeak and Little (2014: 62) also find that pastoralists still engaged in mobile livestock systems have lower sensitivity to human illness.

In spite of there being evidence of comparatively poorer nutritional and health outcomes for sedentarised pastoralists in many places, settling in and near to towns has advantages in offering access to livelihood activities that do not depend on having herds, as well as proximity to local markets and services. In Borana areas of northern Kenya, households with better access to markets and infrastructure had higher and more diversified incomes (McPeak and Little, 2006) and those who combined livestock-based livelihood with cash income had the highest level of wellbeing and the least vulnerability (McPeak et al., 2012: 171). In southern Somalia during the 2011 famine, one in three households had adequate market access during the crisis and were more likely to maintain or recover adequate food security (Mercy Corps, 2013: 5).

More recently, in some dryland regions of Kenya and Ethiopia, the provision of Government and donor supported safety-net provision in the form of cash or food contributes to the myriad

household coping strategies, but amounts of assistance are generally minimal proportionally to a household's needs (Lind and Kohnstamm, 2014; Lind et al., 2014; McPeak and Little, 2014; Sabates-Wheeler et al., 2011).

The turn to resilience

In recent years, governments in East Africa and their development partners have sought ways to address this conundrum of deepening poverty and vulnerability in a context of expanding economic growth and integration. In particular, 'resilience' has emerged as a boundary concept bringing together communities of practice and thinking spanning humanitarianism and development, as well as disaster risk reduction and climate change. This report follows Béné et al (2015: 11) in defining resilience as 'the *ability* or the *capacity* of individuals, groups of people, organisations, institutions, or systems to deal effectively with shocks and stressors.' They elaborate three dimensions that can be measured in relation to shocks and stressors at different levels. The first of these is *absorptive capacity*, which includes the risk mitigation measures that individuals and households adopt to manage the impacts of shocks. The second dimension of resilience is *adaptive capacity*, referring to processes of learning and adjustments that individuals and households make in response to shocks and stressors. The third dimension is *transformative capacity*, which refers to wider contextual conditions – governance, infrastructure, social protection and basic service provision – that enable/constrain individuals and households to make more systemic changes to their livelihoods. Bahadur et al (2015) distinguish a fourth capacity – *anticipatory*, referring to abilities to anticipate and reduce climate impacts through preparedness and planning.

Resilience interventions concern measures to improve or maintain people's wellbeing in a context of shocks and stressors (Béné et al, 2015). Resilience analysis directs attention not only to the significance of shocks and stressors, but also the need to understand relationships at and across multiple levels, from individuals and households to communities, institutions, and higher-level systems. Resilience capacities can be influenced by transformational policy reforms that change the institutional 'rules of the game' (Béné et al., 2012, in Bahadur et al, 2015). Further, resilience is shock and context-specific and, so, resilience building is also context-specific. However, resilience is not simply used as an analytical tool to help better understand the ways that households and communities respond to shocks and stressors. Increasingly, resilience is also seen as an *outcome* (of interventions/programmes) that needs to be measured and monitored. It is not an end in itself but rather a step toward achieving *longer-term impacts*, such as improvements in food security and wellbeing and poverty alleviation. Importantly, resilience and longer-term impacts (food security, wellbeing, poverty reduction, and asset accumulation) are not always positively linked (see e.g. Béné et al. 2012). In these conditions one of the key questions is to determine the conditions under which this relation is, or can be turned into, a positive one.

While change in the drylands is both rapid and unpredictable, and has differentiated outcomes for systems and individuals and groups within this, a common factor for all in achieving greater individual and collective wellbeing is being able to develop the capacity to create and shape positive alliances, to respond flexibly to new opportunities, and to adapt and transform.

Resilience analysis requires understanding of how changes are constraining livelihood opportunities and risk mitigation strategies but also providing opportunities to create wealth and transform lives and livelihoods. Understanding and planning for resilience requires a *longitudinal perspective* to uncover longer patterns in poverty, vulnerability and wealth, as well as a *focus on systems* to map actors, variables and connections in and amongst these across scales.

Summary

This section has synthesised evidence of drivers and influences of change in pastoralist systems in eastern Africa and their implications for poverty, vulnerability and resilience. Dynamic change in the region has resulted in differentiated outcomes for different systems in the region as well as for individuals and groups within these. While some benefit greatly from expanding trade, marketing and opportunities for commercialisation, a larger proportion of dryland populations continue to struggle to make a living. The dynamics of intensifying commercialisation in the region, happening alongside large new infrastructural and agricultural investments, are exclusionary, as wealth is becoming even more concentrated amongst the better-off who are well-positioned to grasp new opportunities. The implication is that vulnerability is not something static but, rather, is a dynamic and constantly changing state. These dynamics are defining of the challenge for programming and interventions intended to expand the resilience capacities of poorer and vulnerable individuals and groups. The following section proposes and explains a simple framework, consisting of three layers of research and analysis, to understanding pastoralist livelihood systems and complex changes happening in these over time.

V. Pastoralist Livelihood Systems Analysis: a conceptual model to understand change over time in pastoral drylands

This section explains the elements and steps of the **Pastoralist Livelihood Systems Analysis**, a framework and approach to analyse the dynamics and impacts of change over time in pastoralist systems. Specifically, this framework provides a method for i) mapping a system in a holistic way that draws on and combines internal and external system meta-level influences as well as livelihood profiles at the intra-system (group and household) level and; ii) identifying changes and understanding resilience trajectories for livelihood groups within the system. This is a crucial step towards future efforts to map and understand change in dryland eastern Africa, and subsequently to provide appropriate support to policy-makers and markets, and provision for changing pastoralist systems in these areas. The Pastoralist Livelihoods Systems Analysis consists of three layers of evidence and data gathering and analysis, as described below.

Layer 1: System/context analysis

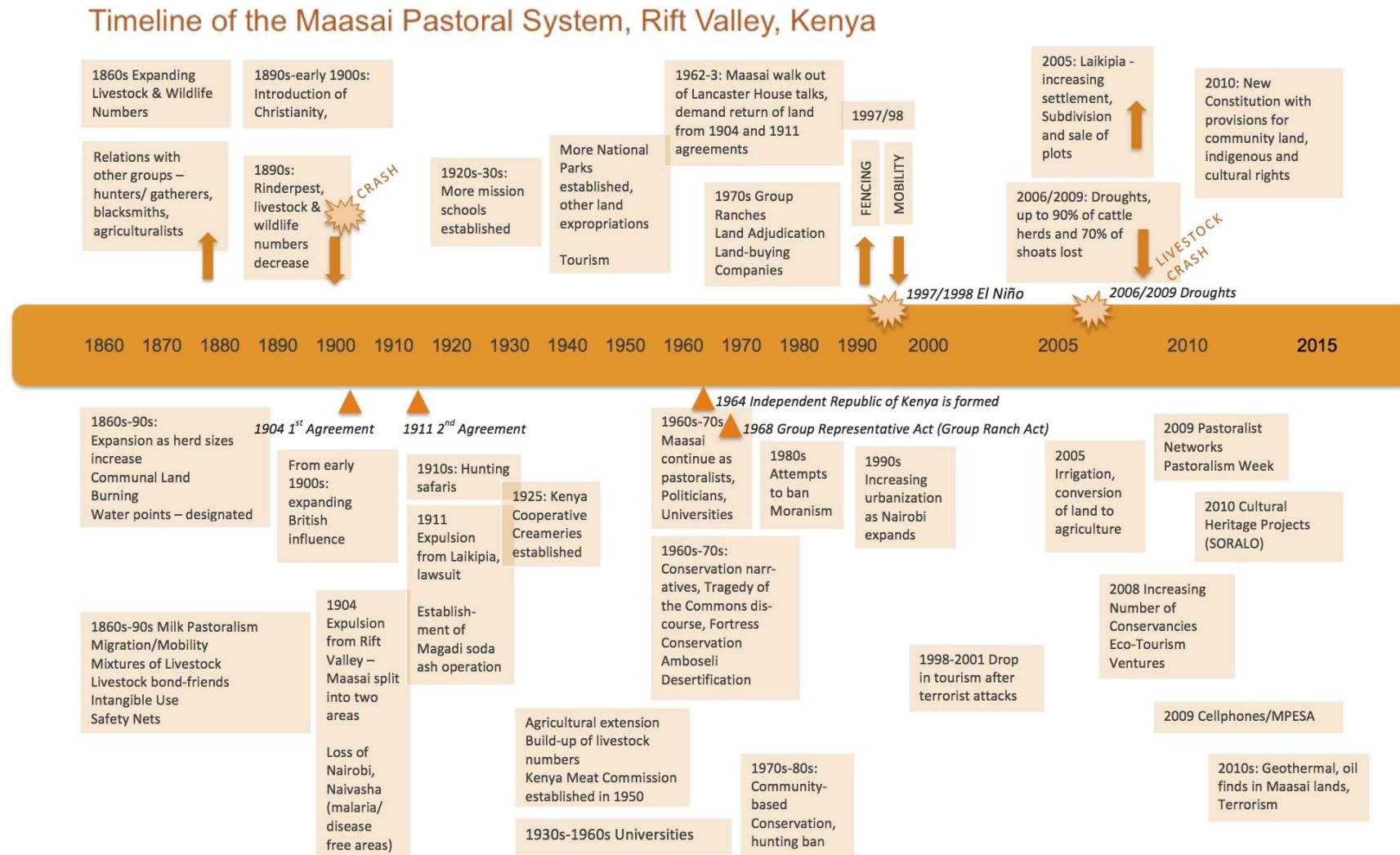
Mapping a pastoralist system necessarily requires information that can describe a complex layering and network of relationships, influences and dynamics. On the one hand it is important to understand the structure of the system itself, how it relates to, interacts with and depends upon other systems and how it is, in turn, influenced by other systems and external factors. This is described as a system-level analysis. The system itself has a path dependency that is reflected in the evolution and balance of the range of livelihoods pursued and social dynamics inherent to the system. Yet it can be (more or less) manipulated by policy decisions made at supra-system level or by covariate climate, economic or conflict shocks.

To conceptualise a system, it is necessary to draw on the synthesis of existing evidence including a timeline of the system, interviews with key experts in the field and a mapping and analysis of meta-level data and indicators, ideally over time. These together provide an understanding of the shape

and context of the system as it currently exists and a view of how it has evolved and may continue to adapt or change over time.

For a long-view of the system and change over time, a timeline, such as the one in Figure 4 below, can be developed to detail key events and trends that have influenced production systems and livelihoods (see the Case Study Report for examples of timelines for the five different systems).

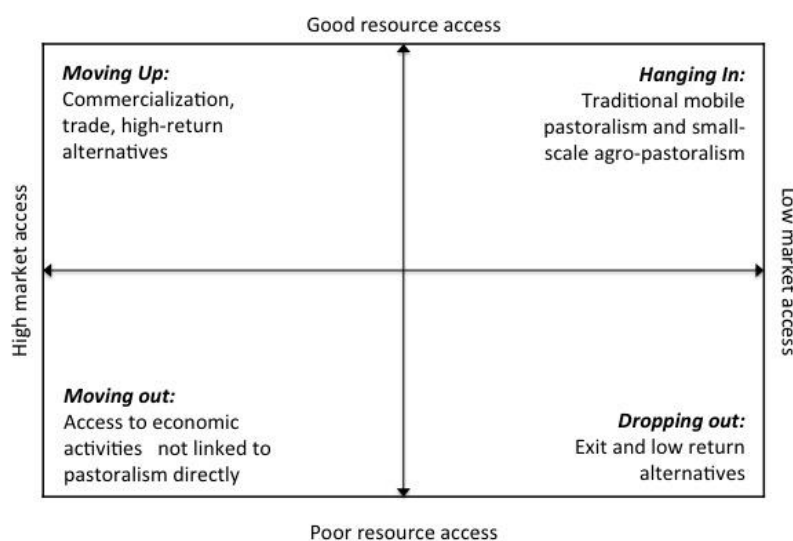
Figure 4. Example of timeline analysis to be performed on pastoralist systems



A complementary process is to draw upon meta-data that provides both a static (current) and dynamic (where data is available at multiple points) contextualisation of the socio-economic and ecological influences on the system. The most promising and comprehensive source of empirical data and indicators that currently exists are the Intergovernmental Authority on Development (IGAD) Member States Baselines. The International Livestock Research Institute (ILRI) and Habitat INFO, working on the CGIAR project on behalf of the Technical Consortium for Building Resilience in the Horn of Africa, compiled and processed over 450 datasets and indicators into a database and mapped them onto a GIS platform (Busby and Smith, 2014; Chesterman and Downie, 2014). The indicators are characterised as ecological, social or economic, and many are aggregate-level indicators from national level datasets such as DHS data, MDG indicator data, national poverty data, climate protections and others data that combine observable characteristics with projections.

Moreover, existing secondary evidence and datasets, particularly those that are longitudinal, can be assessed to determine access to resources and markets as fundamental indicators to define and distinguish between different types of pastoralist systems. Specifically, four different pathways for pastoral livelihoods in eastern Africa are identified depending on access to resources (a continuum of good to poor) and markets (a continuum of high to low). These are illustrated in Figure 1 (and reproduced below for ease of reference): (1) **moving up**: commercialisation, trade and high-return alternatives, (2) **moving out**: access to economic activities, not necessarily linked to pastoralism directly, (3) **hanging in**: traditional mobile pastoralism and small-scale agro-pastoralism, and (4) **dropping out**: exits and low-return alternative economic activities. Figure 5 draws these categories into a simple schema of livelihood change in dryland eastern Africa. It adapts a similar model developed by Catley et al. (2013). It draws on Dorward (2009) who contrasts pathways of stepping up (accumulation and improving income), stepping out (diversification) and hanging in (getting by

Figure 5: Pastoralist livelihood pathways in eastern Africa distinguished by resource and market access



through mix of local production, labour and off-farm work). Mushongah (2009) adds a fourth pathway, dropping out, to describe those who are destitute, reliant on relief aid or who are migrating away. Figure 5 uses two axis depicting level of access to resources and access to markets to illustrate four pathways for pastoral livelihoods in the region. We propose this model to develop an understanding – in a general sense – of the broad contours of a pastoralist system today: the context, structure, and trends (in policy, climate, economy, demography, land and resource access, conflict) shaping current conditions and options.

Layer 2: Mapping livelihoods of households and individuals within a system

As with any schematic diagram, Figure 5 conceals enormous variation and nuance in the situation of pastoralist systems across the region. Drawing from a thorough reading of the evidence gathered and synthesis for this report, Figure 6 illustrates a much more detailed mapping of the range of livelihoods. Once the general patterns shown in figure one are disaggregated it becomes obvious that change over time has contributed to significant differentiation within systems, indicated by widening inequality and uneven capacities to bounce back after shocks. Thus, in this second layer of the framework we consider differentiated situations of households and individuals within pastoral systems.

While layer one focuses on defining the broad characteristics of a system, and the influences shaping relative market and resource access within this, additional analysis is required to understand the circumstances of varying households and individuals. In layer two, different livelihood stakeholders are plotted on the diagram of pastoralist pathways to develop a disaggregated view of outcomes of change over time, noting that one person may employ multiple economic activities to make a living.

Figure 6: Mapping livelihood and economic activities of different households and individuals

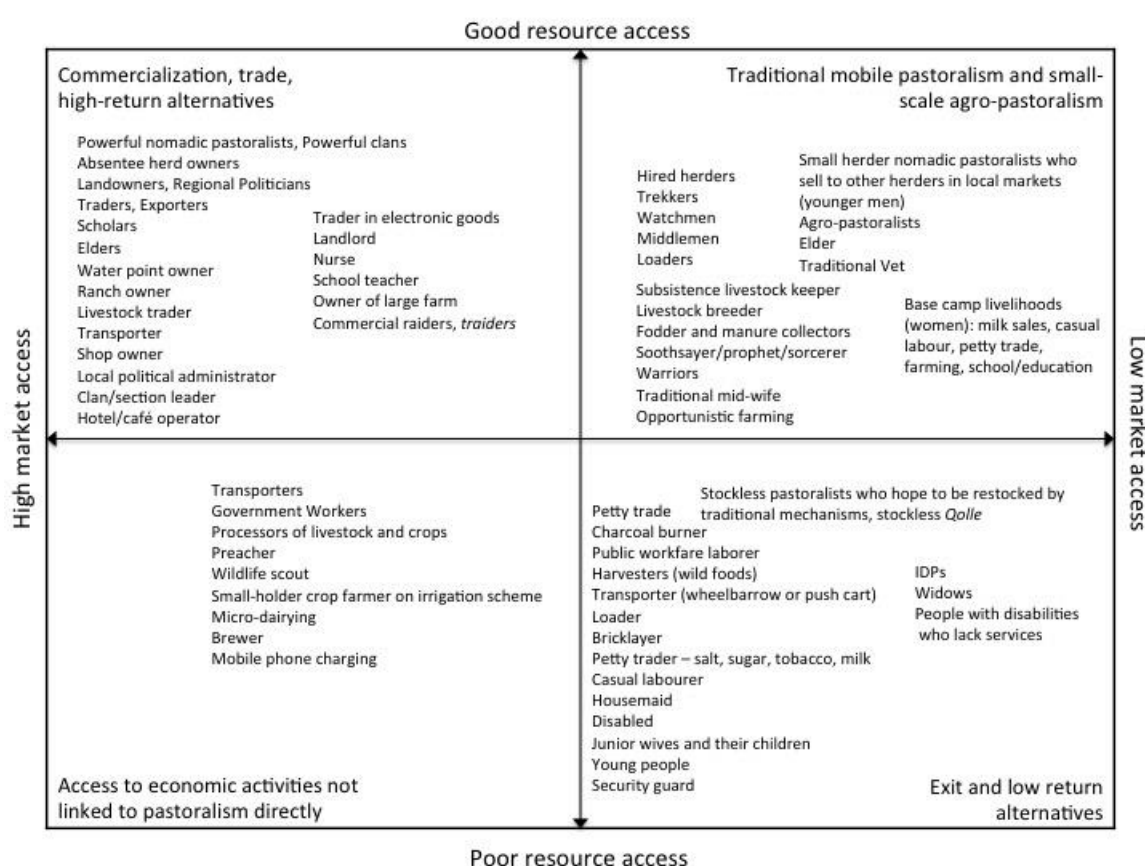


Figure 6 draws on the evidence collected for this study; these diagrams are also reproduced for each of the five systems covered by this study in the accompanying report **Changes in the drylands of Eastern Africa: case studies of pastoralist systems in the region**. By looking at the stakeholders within systems that are moving in different directions, the effect of complex changes that are happening in these areas can be unpacked.

The data mapping exercise, completed as part of this work and detailed in the **Technical note on the evidence synthesis and the data mapping**, as well as the accompanying Excel databases, points to the datasets that can be used to place numbers and proportions related to the stakeholders outlined in Figure 6. From the review, of the 107 data sources available for the five systems covered by this study, there are approximately 45 data sets (cross section and panel) that provide information on a range of household income sources.

Layer 3: Developing categories to model livelihood change and resilience over time

In layer three, the findings from layer two are used to derive empirical categories – livelihood groups – that map onto the framework presented in Figure 5. That is, using empirical indicators of resource access and market access collected at multiple points in time (identified through the data mapping exercise), it is possible to track *change* over time and the *directionality* of livelihoods across the four quadrants.

A first attempt to empirically classify pastoralist livelihoods and change over time has been developed by McPeak, Little and Doss (2012) and then further developed in McPeak and Little (2014), who propose a simple categorisation of four livelihood groups distinguished by their access to the cash economy (a proxy for market access) and livestock assets (a proxy for resources): ‘left out’ (*dropping out*), ‘moving from’ (*moving out*), ‘staying with’ (*hanging in*), and ‘combining’ (*moving up*) groups. They explain:

One is the lower cash, lower herd-ownership group - the ‘left out’ group since they have lower access to both herds and the cash economy than the other groups and are the most impoverished group. A second group is the higher cash, lower herd-ownership group; we termed the ‘moving from’ group. This group resides in dryland areas, but are moving in a direction away from a herd-based livelihood to occupy other niches in the local economy. A third group is the lower cash, higher herd group, labelled the ‘staying with’ pastoralism but not engaging with the cash economy to the degree seen in their peers. Finally the higher cash-higher herd group, labelled the ‘combining group’, is strongly involved in both pastoralism and the cash economy relative to the other groups.⁶

These categories relate closely to the four different pathways for pastoralism indicated in Figure 5. Table 1 below illustrates these categories with the terminology used in Figure 5. The main indicators used to create the livelihoods groupings for the analysis are: herd size (in terms of tropical livestock units TLUs); total income per capita per day; cash income as a per cent of total income; total income variability.

⁶ McPeak and Little 2014, page 54.

Table 3. Livelihood categories for resilience analysis

Livelihood categories for resilience analysis		
<i>Herd size/cash income</i>	<i>Lower cash income</i>	<i>Higher cash income</i>
Lower herd size	Left out (<i>dropping out</i>)	Moving from (<i>moving out</i>)
Higher herd size	Staying with (<i>hanging in</i>)	Combining (<i>moving up</i>)

Source: McPeak and Little (2014)

The advantage of adopting this categorization is three-fold. First, it clearly overlaps with the framework outlined above in that it captures the *directionality* of livelihoods, allowing for analysis of pathways of change. Second, the categorization can be tested empirically using household level data. And third, it can be used to understand resilience.

Using household data gathered in Kenya and Ethiopia quarterly from 2000-2002, McPeak and Little use the livelihood categories to draw out how different sub-groups in the population are differentially impacted by a range of shocks: climate, health, market and conflict shocks.⁷ Their work illustrates how these groups vary in terms of their exposure to shocks, sensitivity to shocks, and capacity to cope with shocks. Specifically, they seek to expound the notion of resilience in pastoral systems by developing alternative measures, contrasting income-based measures to asset-based measures, and measures to assess when households started to bounce back to a common income threshold. This work contributes to this study a method to understand the implications of livelihood trajectories for the vulnerability and resilience of different households and groups. The McPeak and Little framework for measuring change and resilience are shown below (Table 2).

Table 4: Measuring recovery and resilience

Measuring recovery and resilience		
Recovery/Interim Resilience Outcome vs. Resilience Outcome	Measure	Outcome
Income based resilience index Recovery	How long does it take for households to return to pre-shock income level?	'Bounce Back' to income level
Resilience	How long does it take to attain an income above extreme poverty threshold?	Bounce back and build up
Asset based index Recovery	How long does it take for household to return to re-shock asset level?	'Bounce back' to herd/resource size
Resilience	How long does it take household to get to a herd threshold of 4.5 TLUs?	Bounce back and build up

In order to similarly create livelihood categories for the type of empirical analysis described here, datasets that collect the key variables overtime were identified (see accompanying Technical Note). The data catalogue indicates the relevant variables that can be extracted from all the data sources. The following five pairs of potentially promising datasets can be utilised quickly and at relatively low cost to perform insightful and relevant analysis on changes in pastoralist livelihoods, as well as on resilience of these livelihoods to specific shocks:

- Ethiopia: Borana Plateau: PARIMA (2000-2002) and IBLI (2012-2015)

⁷ McPeak and Little (2014) adapt the 2012 work to apply the World Bank's Economics of Resilience framework.

- Northern Kenya: PARIMA (2000-2002) and IBLI (2009-2013)
- Kenya: Maasai South Rift: Homewood, Kristjanson and Trench, Staying Maasai (1998-2004) and Grandin Maasai Systems Study (1981-1985)
- Karamoja, Uganda: Northern Uganda Baseline Study (2004, panel with 2008)
- Somalia: Devereux (2006) and Ethiopia Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) Project Impact Evaluation Baseline Survey Report (2013)

Only the Uganda data provides data from identical households at different points in time, however the other pairs of datasets are still useful for understanding change at a sample level as they contain comparable indicators. Further work can build on these existing datasets, applying the methodology outlined above to understand the resilience of different livelihoods to shocks and stressors. Separate resilience analyses can be conducted for different pastoralist systems, and for groups within these who experience varying trajectories of change and capacities to respond (as shown in the report **Changes in the drylands of eastern Africa: case studies of pastoralist systems in the region**). Each separate system may more-or-less be predominantly characterised by one of the 2x2 change trajectories (for instance, *moving up*), but within the system different groups (of households) will have their own trajectories (for instance, *dropping out*, *moving out*). Ideally a method to track change will differentiate between the system level of change and patterns within the system.

The evidence review and system mapping exercises, in keeping with Figure 5, have shown that markets and the level of commercialisation are relevant livelihood dimensions common across all systems. Empirically, the market access dimension can be measured using similar, if not identical indicators to those in the McPeak and Little framework (such as distance to market, cash income). However, the evidence synthesis clearly shows that pastoralists in a number of areas are in fact increasingly pursuing land-based livelihoods (farming, harvesting wood for fuel, charcoal burning), a combination of livestock and farming-based livelihoods, and still others are moving into processing, trade and activities that may or may not be related to pastoralism yet they remain embedded in the pastoralist system (such as hides and skins, micro-dairying, collecting and selling forage for a fee). This broader conceptualization necessarily means that the modelling will become more complex as it requires thinking in more than just the two dimensions of commercialization/markets and livestock, and accounting also for the nature of resources used within different livelihoods. **Further work should strive to include a range of resources, over and above livestock, to draw out and identify the complex patterns of change within the drylands environment.**

Indicators will also need to be measured in terms of ‘good’ and ‘bad’ resource access. For each system, and informed by the context analysis and literature review, different indicators will be appropriate. The appropriateness of different indicators will be informed in large part by the evidence synthesis review. So, for instance, in relation to the detailed mapping in Figure 6 above, it will be possible to identify dominant mixes of resource-dependent livelihoods. The data sources can then be interrogated to see if appropriate indicators and proxies exist to be able to measure these different livelihood categories. If such indicators exist, then cluster analysis or factor analysis can be used to group households empirically and measure change over time. Clustering different levels of resource-dependency into one composite indicator is beyond the scope of this work, yet will be important as follow up work. This data mapping exercise highlights potential sources for data collection (see Technical Note). The extent to which it is possible to measure change in livelihoods is dependent on the availability of data that collected in the same place, over more than one time period.

Summary

In this section we have described what we believe to be an innovative, layered approach to mapping and measuring change and dynamics both of a system itself as well as the livelihoods that comprise the system. Using a creative bricolage of methods and data appropriate to the different layers of the system, it is possible to build up a picture of the trajectories of change of the system, as well as the influences on and within the system and livelihoods. Ideally, future work will bring these different types of data and analysis together to provide a grounded understanding of trajectories of poverty and vulnerability in different regions.

V. Conclusion and recommendations

The breadth and depth of vulnerability in dryland eastern Africa, as exemplified by the 2011 Horn of Africa crisis, spurred the recent turn to resilience by governments in the region and their development partners. The focus has been on pastoralist populations, in particular, and the apparent need to expand competencies at all levels to manage change with the aim of securing livelihoods and wellbeing. While the extent of pastoral vulnerability is evident across a range of food security, nutrition and other livelihood indicators, there are diverging pathways for pastoralists in the region, with some clearly benefitting from expanding commercialisation opportunities and enlarging domestic and export livestock trades. Others are exploiting the advantages presented by improving infrastructure, services and communications in and around growing small towns. Yet, many pastoralists are excluded from dominant growth processes, locked out of opportunities to engage with markets and new outside capital. Many are dropping out. In recent years the greatest focus has been on extending social assistance and public workfare programmes to provide a ‘floor’ of support for these populations. Livelihoods of the poor and most vulnerable in pastoralist systems are highly differentiated and therefore various combinations of support are required to respond to their specific needs. More imaginative approaches call for a much more granular analysis of the livelihoods of those who have exited full-time pastoralism, but who might still maintain a variety of social, cultural and economic ties with the livestock economy.

Thus, across the region, and within pastoralist systems in different areas, very different trajectories are apparent. The existence of diverging pathways, as well as continuing volatility in systems, complicates determinations of how to encourage resilience. This study details a **Pastoralist Livelihood Systems Analysis** as an approach to understanding the dynamics of change over time and their implications for poverty, vulnerability and resilience. The basis of the approach is a focus on *pastoralist systems* to map connections amongst actors and variables across scales, as well as a *longitudinal view* of patterns in poverty, vulnerability and wealth. The practical contribution of the approach for resilience programming in the region is two-fold. First, by directing attention to systems it overcomes an inherent bias of many research efforts that emphasise administrative units, thereby missing critical flows and connections across borders and groups, which may nonetheless be revealing of the ‘wiring’ of livelihoods and productive activity. Second, it emphasises the need for a longer-view, thus overcoming the tendency of more circumspective perspectives that might overplay or wrongly interpret shorter-term trends.

Advances in resilience programming in dryland eastern Africa require grounded insights on trends over time in particular places. While there is a reasonable understanding of broad changes in the region, and emergent forms of pastoralism in this setting, practical action will require more

extensive data over time as well as more precise insights on what is happening for different livelihood categories (moving up, moving out, hanging in, and dropping out) as well as for groups within these who may seemingly follow a similar pathway but require different sorts of resilience strengthening.

The patchiness of evidence across themes and systems is detailed in this report. While pastoral areas in general are less studied, and the data from these areas is both thin and less reliable compared to agrarian and urban areas, rigorous, longer-term research has been undertaken in some areas, notably in Somali Region of Ethiopia, the Borana Plateau, some Maasai areas in Kenya and in Karamoja. Remoteness and chronic insecurity in part explain why there is relatively less rigorous evidence or data available on pastoralist systems in areas of Somalia and South Sudan. Further, the thematic focus of research on the region, unsurprisingly, reflects wider aid and development priorities, such as conflict and climate change. More efforts are required to stimulate research demand from within pastoral societies, to better reflect their priorities, aspirations and ways of understanding change. Some important themes that are underexplored in the literature, but vital to understanding how pastoralism is changing and with what consequences, include urbanisation and small town growth, demographic change including population and migration, education and services, and internal social dynamics around gender and young people.

The results from an exercise to map available datasets on dryland eastern Africa carried out for this study shows that there are minimal long-runs of data, especially panel data. The datasets lack consistency and compatibility of indicators. National datasets are unable to adequately represent dynamics at lower levels and at the pastoral system level due to methodology, access and design issues. Pastoralist systems cut across national and administrative boundaries, yet most data is bounded by national or regional boundaries. Very few datasets are publicly available and there is limited collection of data on indicators that relate explicitly to pastoral and agro-pastoral livelihoods. There is a need to fill data gaps by collecting indicators on population, livestock, land use, livelihoods (income sources) and mixed migration, as well as other major demographic indicators: pastoral livelihoods, income diversification, education and access to social services, and conflict. This can be done in large part by improving methodologies and coverage of national surveys. Detailed recommendations on data collection, survey design and analysis are provided in the accompanying technical report. More general recommendations are made in the box below.

Recommendations:

- **Adopt a systems-approach to data collection and analysis** in order to better understand dynamic change in eastern Africa. One such approach is the **Pastoralist Livelihood Systems Analysis**, requiring data appropriate to different layers of the system to build up a picture of the trajectories of change of the system, as well as the influences on and within the system and livelihoods.
- Data collection and analysis should strive for a longitudinal perspective of **change over time** – panel or long-term research methods should be used where specific indicators are comparable across datasets and time. Focus on efforts to measure resilience using panel data to test income and livestock indicators over time in recovery periods (post-drought)
- All large-scale data collection efforts that claim to represent drylands must ensure that samples **adequately represent the full diversity of livelihoods found in these areas, include definitions of pastoralists and questions that are appropriate to pastoralist lives and livelihoods.**
- **Donors, governments and development actors** should support further empirical analysis on understanding change and resilience in the drylands, following the method described in Layer 3 of the **Pastoralist Livelihood Systems Analysis**. Empirical analysis should compare data on indicators related to herd size and type, cash income, income sources, and assets over time to measure change and resilience. Specific data sets and methodology for this are further detailed in the **Technical Note on the Evidence Synthesis and the Data Mapping** accompanying this report.
- **Data sets should be shared publicly and cross-posted** to make sure that it is both accessible as well as to avoid possible duplication in efforts.
- **More efforts are required to stimulate research demand from within pastoral societies**, to better reflect their priorities, aspirations and ways of understanding change.
- **Investments in research should address these relatively underexplored themes:** urbanisation and small town growth, demographic change including population and migration, education and services, and internal social dynamics around gender and young people.

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