UNIVERSITY OF NAIROBI

ASSESSMENT OF THE INFLUENCE OF FORMAL AND INFORMAL INSURANCE ON PASTORAL RESOURCE COOPERATION FOR DROUGHT MANAGEMENT IN SAMBURU CENTRAL SUB-COUNTY

BY

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DECLARATION

I, BRIAN NGUGI MUCHEMA, do hereby declare that this is my original work. It has not been presented nor submitted for a degree in any other university. I have not allowed, and shall not allow anyone to copy my work with the intention of passing it off as his or her own work.

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DEDICATION

I dedicate this work to my daughter, S.K Ngugi.

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LIST OF ABBREVIATIONS

ASALs: Arid and Semi-Arid Lands

FGDs: Focus Group Discussions

GSLs: Group Savings and Loan Organizations

HOA: Horn of Africa

HSNP: Hunger Safety Net Programme

IBLI: Index-Based Livestock Insurance

ILRI: International Livestock Research Institute

IPCC: Intergovernmental Panel on Climate Change

KIIs: Key Informant Interviews

KLIP: Kenya Livestock Insurance Program

KNBS: Kenya National Bureau of Statistics

SALW: Small Arms and Light Weapons

SDGs: Sustainable Development Goals

SER: Socio-ecological Resilience

SSA: sub-Saharan Africa

TLU: Tropical Livestock Units

ABSTRACT

Recurring violent conflicts among pastoralists in Samburu County portend greater susceptibility to the adverse effects of climate shocks, particularly droughts. The combined problems of conflict and climate shocks threaten the pastoralism livelihood. The study set out to assess the role of formal and informal insurance methods in promoting resource cooperation during resource scarcity among pastoralists in Samburu Central sub-County. The study sought anchorage on the resilience theory, particularly the socio-ecological resilience model. The cross-sectional research design employed a mixed methods primary data collection approach from a sample of sixty-nine household respondents. A focus group discussion, four key informants, participatory resource mapping, and field observations. The study found that barely a third of the surveyed households had ever purchased an Index Based Livestock Insurance (IBLI) policy. The study inferred that IBLI uptake thrived amidst well-endowed social networks, as kin-remittance (50%) was the largest source of IBLI purchase finances. The contribution of IBLI to resource cooperation was found to be insignificant, given the low uptake, product awareness and trust amid adverse drought and conflict effects. Droughts had occasioned social instability due to competition while bearing environmentally harmful coping strategies. These factors aggravate pastoral mobility conflict, resource scarcity, and drop-out. This suppresses pastoralism's social-ecological resilience while dampening resource cooperation prospects. Additionally, the proliferation of Small Arms and Light Weapons (SALWs) (28.1%), deteriorating local governance (23.1%), and telecommunication growth (24.7%) aggravate hostilities. The study recommends a holistic reestablishment of a socio-ecological resilience-oriented resource governance framework. Further research on bundling conflict mitigation with early warning and preemptive risk management strategies is recommended.

1.0 CHAPTER ONE: INTRODUCTION

1.1 Background Information

Since pre-colonial times, pastoralist communities in Northern Kenya have witnessed conflicts that predominantly revolve around livestock-related land and resource property rights dynamics (Sax *et al.*, 2022; Seltzer, 2019). These conflicts continue to escalate in deadly manifestation of violence of varying scales, further dampening the prospects for resource cooperation and thus suppressing the socio-ecological resilience (SER) of pastoralism. The contemporary escalation of hostilities has caught the attention of the state, given the increase in small arms proliferation, livestock raiding commercialization, banditry, and land property rights disputes (Ltipalei *et al.*, 2020; Sax *et al.*, 2022). The research affirms a futuristic increase in climate shocks manifested through droughts and the inevitable disruption of societal stability, including violent conflict (Ide *et al.*, 2020). Cases in point include the trigger of civil war in Darfur in 2004 and Syria in 2011, which have received international interest to the extent of being referred to as 'climate wars' (Ide *et al.*, 2020).

Change in the climate is extensively acknowledged as a "risk multiplier" for its role in aggravating pre-existing problems such as poverty, conflict, and resource scarcity (Scheffran *et al.*, 2019). The 2020 to 2022 and now 2023 drought whose impact on the pastoral livelihood, mainly pastoral resource availability, was unprecedented. Climate shock exposed rural settings with heavy reliance on naturally occurring resources are set to experience adverse effects, including the onset of conflict (Adaawen *et al.*, 2019; Quandt, 2021; Scheffran *et al.*, 2019). Often, climate crisis response in Africa, especially droughts, is usually reactionary as opposed to preemptive (Adaawen *et al.*, 2019; Thomas & Berisso, 2021). Increased frequency and intensity of conflicts in Kenya are especially witnessed in the pastoral regions such as Samburu Central sub-County (Sax *et al*., 2022).

Resolving these multifaceted conflicts could potentially alleviate their socio-economic and ecological situation, enhancing pastoral resource cooperation and adaptive climate capacity.

Drought is the primary climate shock in Samburu Central sub-County as in the rest of the ASAL counties of Kenya (Kirui *et al.*, 2022; Siedenburg, 2021). Consequently, the low and erratic precipitation levels have severely affected the access and availability of forage and water (Siedenburg, 2021). The apparent frequency and intensity of the drought have raptured the capacity and elasticity of traditional resource governance institutions (Adaawen *et al.*, 2019; Lind *et al.*, 2020). These traditional institutions have been long been established to guide resource property rights. Hence, the subsequent contestation and depletion of pastoral resources due to uncoordinated resource sharing (Linke *et al.*, 2018). In the inefficacy of resource governance institutions, decline in resources aggravates societal inequality in resource access and utilization, hence, poor cooperation. Pastoralists with large herds appropriate resources at the detriment of 'the pastoral poor', as noted by Mabebe, (2022). Similarly, asset ownership inequality can potentially breed inequality in adaptation capacities.

Long-established traditional herd management techniques, including pastoral mobility, are proving unfeasible, especially due to their negative relationship with conflict (Siedenburg, 2021). Consequently, pastoralists and agro-pastoralists in Samburu- Central sub-County engage in a mix of conflictual and environmentally harmful herd management practices to avert the aggravating rate of asset losses and imminent pastoral drop-out. Indeed, drought is the primary cause of widespread herd mortality in Kenya and regionally (Adaawen *et al.*, 2019; Gebrekidan *et al.*, 2019; Kirui *et al.*, 2022).

Moreover, environmentally harmful response approaches to avail livestock forage are being employed, thus aggravating the scarcity, particularly due to land degradation. The aggravation of

societal instability is seen by Lind *et al.*, (2020) and Scheffran *et al.*, (2019) as a consequence of reactionary rather than cooperative and preemptive institutionalized responses towards resource scarcity shocks. Ideally, crises call for cooperation instead of conflict (Scheffran *et al*., 2019), but the overbearing nature of ecological extremes could, to a certain extent, cave into discord. Coupled with other endogenous and exogenous social and political factors, climate extremes can extend vulnerability towards violent conflict in fragile settings such as Samburu Central sub-County (Scheffran *et al.*, 2019). The research infers that aggravating complexities of the conflict in the study area that ride on its long history continue to embolden the monopoly of force while further constraining pastoral mobility and engraving pastoral inequality. The continued buildup of unresolved conflict events gradually breeds a crisis of serious proportions.

Historically, cooperation, particularly in times of scarcity, has been realized within and between pastoralist communities through the resource informal insurance or risk-sharing (Sax *et al.*, 2022; Scheffran *et al.*, 2019). Nonetheless, this study inferred that climate shock and conflictual cleavages have watered down the capacity of informal insurance, hence the aggravation of conflict. Additionally, the compatibility of both informal and formal risk-sharing methods has the potential to realize better adaptive capabilities for pastoralists. Formal livestock insurance is presented as a preemptive measure for enhancing pastoralist resilience against climate shocks as espoused by Kirui *et al.*, (2022) but, its viability amid conflict vulnerability in the study area is little explored.

The research found that intensive pastoral labor demands of responding to scarcity exert pressure on household productivity as is noted by Scheffran *et al.*, (2019). Consequently, the labor demands threaten social networks and collective resilience as Volpato & King, (2019) submits. However, it does not mean their role in enhancing cooperation has been negatively affected, as they are still considered valuable and integral to society's moral fabric. The uptake of IBLI in Samburu Central

sub-County and the region remains low hence, its tangible contribution to resource cooperation is insignificant.

1.2 Statement of Research Problem

The prevailing cyclic conflicts affecting Samburu County pastoralists further aggravate their vulnerability to the hazardous impacts of climate shocks such as drought and floods. Evidence shows that communities in conflict-prone settings are highly exposed and vulnerable to resource scarcity from climate shocks such as drought (Ide *et al.,* 2020; Scheffran *et al.,* 2019; Sitati *et al.,* 2021). This reinforcing climate-conflict combination results in poor livelihood productivity and social cohesion (Abrahams, 2020; Medina *et al.,* 2022). The scarcity of forage and water due to climate shocks intensifies existent conflict fault lines, especially during herd migration (Adaawen *et al.*, 2019; Chelang'a & Chesire, 2020; Seltzer, 2019), hence poor resource cooperation. Pastoralism in Samburu Central sub-County exists in this climate-conflict problem that undermines its socio-ecological resilience and the feasibility of cooperation. This study acknowledges the possibility of realizing resource cooperation amid resource scarcity as noted by Abrahams, (2020); Gebeyehu *et al*., (2021) and Okumu, (2021).

Resulting from the increased frequency and extreme nature of droughts, many livelihoods including pastoralism, struggle to recover (Adaawen *et al.,* 2019). In Africa, response to climate shocks, especially droughts, has traditionally been reactionary rather than preemptive intervention (Adaawen *et al.*, 2019; Thomas & Berisso, 2021). Scholars find limited capacity in informal insurance structures, such as livestock transfer and herd splitting, to cope with long-term and widespread risks (Berg *et al.,* 2022; Siedenburg, 2021). Additionally, informal insurance ought to promote resource cooperation while mitigating conflict through functional local resource

governance institutions that have steadily demonstrated failure (Lind *et al.*, 2020). This vulnerability predisposes pastoralists to conflict and insecurity (Thomas & Berisso, 2021). Nonetheless, the need for preemptive self-insurance methods in averting livestock loss from severe impacts of shocks such as disease and drought has been affirmed by Fava *et al.*, (2021).

Index Based Livestock Insurance (IBLI) is fronted as a preemptive enhancer of resilience for pastoralists confronted by shocks (Kirui *et al*., 2022) that cause resource scarcity and livestock loss while bearing conflictual encounters (Abrahams, 2020; Adaawen *et al.*, 2019; Chelang'a & Chesire, 2020). Fortunately, studies have shown a complementary advantage between the two forms of insurance (Jensen & Barrett, 2017; Matsuda *et al.*, 2019; Santos *et al.*, 2021; Takahashi *et al.*, 2019). However, little is known of what prevailing conflict scenarios portend for the success of novel adaptation interventions such as IBLI, due to limited funding and research in conflict exposed areas (Sitati *et al.*, 2021). Consequently, this study sought to assess how informal and formal insurance influence resource cooperation rather than competition in Samburu Central sub-County.

1.3 Research Objectives

1.3.1 General Objective

To assess the influence of formal and informal insurance methods in promoting resource cooperation in times of resource scarcity, among pastoralists in Samburu Central sub-County.

1.3.2 Specific Objectives

i. To evaluate the extent to which climate shocks have caused pastoral resource scarcity in Samburu Central sub-County.
ii. To assess trends of conflicts experienced during pastoral mobility in Samburu Central sub-County.
iii. To appraise contemporary informal and formal insurance approaches employed during resource scarcity in Samburu Central sub-County.

1.3.3 Research Questions

a) To what extent have climate shocks caused pastoral resource scarcity?
b) How has conflict changed due to herd mobility?
c) How have pastoralists informally and formally insured against resource scarcity in recent years?

1.4 Justification of the Study

The effects of conflict in society are unfavorable to development efforts, much as is with the effects of climate shocks such as drought (Ide *et al*., 2020). The critical need for cooperation and enhanced resilience against climate change cannot be overemphasized (Von Uexkull & Buhaug, 2021). The

study looked at conflict in Samburu Central sub-County from the lens of resilience amid climate change given that cultural and historical dynamics also influence it. It is undesirable that (93%) of news items in Kenya portray the inadequacies of pastoralism, with conflict and drought forming the main features (Nyariki & Amwata, 2019). Therefore, understanding the operationalization of formal insurance (IBLI) within social networks as resilience enhancers of pastoralism can influence social cohesion or resource cooperation.

Developmental policies have mainly emphasized the technical aspects of pastoral development, such as sedentarism, cultivation, and intensification of pastoralist areas (Cuni-Sanchez *et al.*, 2019; Gebeyehu *et al.*, 2021; Pollini & Galaty, 2021). However, the research is critical in influencing policy towards the socio-cultural, political, economic, and environmental governance issues that are often neglected. The study speaks to the decision-making dynamics involved in the management and control of primary pastoral resources. This is also in line with the (AU) policy framework on pastoralism of 2010, which was the pioneer blueprint to champion the preservation of traditional pastoralism (African Union, 2013).

This study is pivotal in realizing the following sustainable development goals (SDGs) and their targets. Specifically, the study informs contribution to goal 13 on climate action by promoting a pre-emptive adaptation tool, IBLI. SDG goal 16 is on peace, justice, and strong institutions, especially the informal resource governance institutions that can better guarantee social cohesion, hence, functional informal insurance structures even in times of scarcity. Lastly, SDG 10 on reducing inequalities. Given the complementary nature of informal and formal insurance, all pastoralists can endeavour to preserve their lives while sharing finite pastoral resources (Santos *et al.*, 2021; Takahashi *et al.*, 2019).

1.5 Scope and Limitations

The research focused on the role of informal and formal insurance methods in enhancing pastoral resource cooperation as a conflict mitigation strategy. The study focused on the consequences of climate shocks causing pastoral resource scarcity. The scope was on Angata Nanyikie Location of Samburu Central sub-County. It is one of the pastoralist regions where the IBLI product was initially piloted in Northern Kenya. The area is also marked by cyclic conflicts revolving around key pastoral resources ethnic, political and boundary hostilities. Angata Nanyukie location was selected for this study owing to its population density, relative security, and accessibility by road. The limitation of insecurity is constraining given that Samburu is one of the counties that have been declared 'disturbed and dangerous' by the government of Kenya.

1.6 Operational Definitions

- Resource cooperation is the trust-based collaborative access and utilization of natural capital.
- Resource scarcity is the perceived decline in the supply of ecosystem goods and services to meet ecological demands.
- Pastoral mobility conflict is the active competition over scarce livestock resources during herd mobility.
- Informal insurance is a social network-based arrangement for risk transfer or sharing, often anchored on values of reciprocity and altruism.
- Formal insurance is the contractual transfer of responsibility for probable risk where specified premiums and payouts are made conditional on particular precarious events.

2.0 CHAPTER TWO: LITERATURE REVIEW

This section discusses the effects of the leading climate shocks that affect pastoralism and its relationship with conflictual rather than cooperative interactions among pastoralist communities. It further depicts the applications of formal and informal insurance and their complementary advantage. While insurance is fronted as a livelihood and poverty alleviation intervention, its contribution to enhancing cooperation is little explored.

2.1 Climate shocks

Scholarly evidence is contested and remains inconclusive as to whether climate change has a direct or indirect causation of conflicts across the globe (Abrahams, 2020; Adaawen *et al.*, 2019; Koubi, 2019; Scheffran *et al.*, 2019; van Baalen & Mobjörk, 2016). Nonetheless, there is widespread concurrence that the two issues threaten human security. Empirical projections indicate a futuristic increase in conflicts related to climate shocks such as droughts. This is coupled with the disruption of societal structures of stability (Ide *et al*., 2020; Seltzer, 2019). For instance, there has been a positive correlation between extreme temperatures and rainfall variability, with the onset of 21% of all civil wars experienced in Africa since the 1950s (Richardson Golinski, 2023). In 2007, the Intergovernmental Panel on Climate Change (IPCC) reported that the manifestation of climate change was indisputable and would significantly facilitate the onset of conflict in varying contexts (Koubi, 2019; Seltzer, 2019). Nonetheless, empirical studies acknowledge that the climate-conflict causal effect could be both direct or indirect, intertwined or mediated by other non-tangible contextual variables (Richardson Golinski, 2023).

The United Nations Security Council (UNSC), African Union (AU), European Union (EU), and Intergovernmental Panel on Climate Change (IPCC) have all characterized climate change as a "threat multiplier," to mean that there is no direct stimulus to conflict but exacerbates tensions and

fault lines (Koubi, 2019). The IPCC also notes that the effects of climate change will widen inequalities that will bear conflict due to resource scarcity and population migration caused by extreme climatic shocks like drought desertification and flooding, hence sea-level rise (Koubi, 2019). Nonetheless, it is imperative to acknowledge that the climate-conflict dichotomy could also present opportunities for cooperation, as this research sought to find out. In this regard, Abrahams, (2020) negates the linear analogy that climate change will likely aggravate conflict situations while it may not have any impact.

2.1.1 The global effects of drought

Globally, the effects of drought are the most damaging natural hazards, for agricultural and livestock production, particularly in the developing world (Adaawen *et al.*, 2019; Smith & Frankenberger, 2022). This work defines drought as a natural phenomenon that manifests in unusually low precipitation levels, high temperatures that cause high evaporation rates and hydrological variability (Richardson Golinski, 2023). The major climate risk hotspots include Central and South America, Central, West and East Africa, and South Asia (Atwoli *et al.*, 2022), perhaps due to their high exposure and low risk management capacity. Indeed, the 2022 report of the IPCC signifies that regions marked with governance challenges, violent conflict, less development, poverty affected, and constrained access to primary resources are highly vulnerable to climate risks (Atwoli *et al.*, 2022). Generally, climate change is seen mainly as a "macro-driver" of conflict because of its potential to cause broad challenges to human security and development (Barnett & Adger, 2007; Sitati *et al.*, 2021).

Studies show that the worsening dwindling of critical natural capital like water and pastures would cause population migration due to ravaging climate shocks, particularly droughts, increased temperatures, and intense precipitation, which could all trigger conflict (Lelenguyah *et al.*, 2021;

Seltzer, 2019). Against this backdrop, it is imperative to note that existent conflict situations could be aggravated by the effects of climate change while presenting developmental challenges (Sitati *et al.*, 2021). Scholarly work indicates that the apparent manifestation of resource scarcity, ethnic violence conflict, and environmental degradation, climate change is set to complicate the problem in settings such as Samburu Central sub-County and beyond (Fortnam *et al.*, 2020; Omolo, 2010; Seltzer, 2019; Sitati *et al.*, 2021).

The World Health Organization estimates that droughts affect approximately 55 million people annually, with 700 million people projected to have been displaced by the year 2030, as 40% of them will experience adversity of water scarcity (Ekundayo *et al.*, 2022). Such events include drought experienced in inter alia, the Eastern Amazon ecosystems, North America, Sub-Saharan Africa and the Asias (Tan *et al.*, 2020). Climate shocks such as drought have been found to trigger mass migration in countries such as Syria with consequences of conflict (Tan *et al.*, 2020). The IPCC continues to project an increase in global drought frequency due to suppressed precipitation, intensifying evapotranspiration and increased surface air temperature (Tan *et al.*, 2020). Though it is difficult to measure the severity of droughts, as noted by Ekundayo *et al.*, (2022), their effects on pastoral resource availability cannot be overemphasized.

The effects of drought navigate beyond the environment sector, but also to the economy and social fabric (Ekundayo *et al.*, 2022). The continued global emission of greenhouse gases has incrementally seen an aggravation in the global warming manifestation of droughts (Tan *et al.*, 2020). The apparent experiences of extreme climate events have borne the suffering of flora and fauna in diverse ways, including resource scarcity and food insecurity (Smith & Frankenberger, 2022; Tan *et al.*, 2020).

2.1.2 Drought effects on pastoral resource availability in Africa

Africa is widely seen as a drought "hotspot," with more adversities being projected in the future (Tan *et al.*, 2020). Higher temperatures and lower precipitation are correlated with food insecurity, water scarcity, and crop failure that are exacerbated by poor adaptive capacity (Fortnam *et al.*, 2020; Ide *et al.*, 2016). The Sahel region that covers countries such as Mali, Burkina Faso, Mauritania and Chad has long experienced extreme adversities resulting from drought over the decades. In the 1970s and 80s, it is estimated that the region experienced fatalities in the millions (Adaawen *et al.*, 2019). Studies also find an increasing occurrence in drought frequency across sub-Saharan Africa (SSA) hence exacerbating the vulnerability of pastoralists and farmers given the high poverty levels.

Moreover, droughts marked by resource scarcity have intensified the risk of inter-state and communal conflicts in sub-Saharan Africa, specifically livestock-correlated violence in Kenya (Koubi, 2019). Though the flipside of increased communal violence in the Horn of Africa (HoA) during wet seasons (Koubi, 2019) is well-founded, the scarcity dimension portends more conflict dynamics, as this research espouses. The drought phenomenon has greatly devastated livelihoods across HoA, whose arid and semi-arid lands (ASALs) accommodate one of the largest pastoralist populations globally (Manzano *et al.*, 2021; Sax *et al.*, 2022). Additionally, the 1998 to 2000 drought cost Kenya roughly $2.8 billion spread across livestock and crop losses, environmental degradation to power and industrial shortfalls (Sax *et al.*, 2022).

2.1.3 The effects of climate shocks in Kenya

It is estimated that close to two-thirds of natural calamities in Kenya emanate from climate extremes, mainly droughts and floods (World Bank Group, 2021). Drought is the greatest cause of frequent and widespread livestock losses in Kenya and the region at large (Adaawen *et al.*, 2019; Gebrekidan *et al.*, 2019; Kirui *et al.*, 2022). Climate issues have become less predictable, with

numerous and frequent prolonged droughts over the years (Lenaiyasa *et al.*, 2020). Drought is one of the major reasons why pastoralists opt to engage in alternative modes of livelihood and income generation (Kirui *et al.*, 2022). Studies show that the devastating effects of frequent droughts are rapidly driving dropping out of pastoralism (Kirui *et al.*, 2022). Herders are, therefore, confined in a vicious cycle of poverty as they cannot engage in other viable pastoral-related and unrelated livelihood activities (Gebrekidan *et al.*, 2019; Kirui *et al.*, 2022).

Floods have also been cited to exacerbate livelihood vulnerability and herd mortality in Kenya with the frequency upsurge being attributed to land degradation (Lelenguyah *et al.*, 2021). Though a rare phenomenon in Samburu County, floods are recounted to have occurred in some parts of the County and along major rivers such as Sayia, Ewaso Nyiro, Barsilinga, Lengusaka and Nagor-Oworu. Floods were reported in 2010, 2013 and 2016 (Lelenguyah *et al.*, 2021). Also, Tan *et al.*, (2020) submit that the North-Eastern parts of Kenya shall continue to experience droughts in years to come.

Fragile and vulnerable societies such as pastoralists are set to bear the brunt of climate shocks, especially in rural regions where people rely on natural capital such as land, rainfall, and water bodies as their sources of livelihood (Adaawen *et al.*, 2019; Quandt, 2021). With an unpredictable rainfall pattern, crop failure, water and forage scarcity are eminent as pastoralists and most farmers in the developing world, including Kenya, rely on rainfed agriculture (Koech *et al.*, 2020; Tan *et al.*, 2020). For instance, Kenyan economy is based on rainfed agriculture that employs 75% of the population, producing 80% of the food (Tan *et al.*, 2020). The situation is becoming dire, with Kenya being ranked number seven in the global climate risk index of 2020 (Tan *et al.*, 2020). During prolonged droughts, water scarcity leaves water pans, boreholes, and shallow wells dry, as they are the most available water sources in Samburu North (Robia *et al.*, 2020).

The effects of drought go beyond the affected geographical setting to cause population migration, economic decline, and unequal distribution of essential services (Quandt, 2021; Siedenburg, 2021). Meteorological data over the past 50 years shows that Kenya has been experiencing more warming of about 1^0 C, which is significantly above the global average (Ide *et al.*, 2016). Numerous studies have affirmed that Northern Kenya has been experiencing frequent and severe droughts (Ide *et al.*, 2016; Mude *et al.*, 2010), with a 40% probability of moderate to severe drought being experienced annually (Fortnam *et al.*, 2020). Although precipitation data for Kenya from such a timespan does not show a clear fashion, the measure of downpours during heavy rainfall events has increased (Fortnam *et al.*, 2020).

2.2 Pastoralism and conflicts

2.2.1 The resilience of pastoralism globally

Approximately 60% of countries are marked with pastoralism (Manzano *et al.*, 2021). Pastoralism is carried out across around 100 countries and has been the most extensive land use practice globally since medieval times (Chelang'a & Chesire, 2020; Manzano *et al.*, 2021). Additionally, twenty-one African countries host nomadic and agro-pastoralists within their borders (Schilling *et al.*, 2012). More than 1.3 billion people worldwide have been found to benefit from pastoralism and its value chain (Niamir-Fuller & Huber-Sannwald, 2020). The also add that traditional pastoralism's full potential is underrated.

According to UNICEF, approximately 19.5 million people depend on pastoralism across the HOA, and about 40% live in poverty (Thomas *et al.*, 2020). They survive on a minimum of one dollar per day (Thomas *et al.*, 2020). Literature shows that there is global consensus that historically, climate shocks and variabilities such as drought and temperatures have elicited diverse response options, which at the core is mobility (Adaawen *et al.*, 2019). However, governments in countries

such as Argentina, Niger, China and Italy have been faulted for executing other intensive revenue-generating policies such as industrialization, large-scale agriculture and feedlots to the detriment of extensive traditional pastoralism (Niamir-Fuller & Huber-Sannwald, 2020; Nori & Scoones, 2019). For instance, in The Qinghai-Tibetan Plateau region of Western China, government structures have adjusted policies and institutions to make pastoralism more market-oriented, sedentarization and individualization of the livelihood (Nori & Scoones, 2019).

As a result of fast growth in the Chinese economy, Qinghai-Tibetan, in the Western region of China, has experienced out-migration from formerly pastoralist areas. Government policies have been calibrated to incentivize sedentarization by encouraging individualism and the private ownership of rangelands (Nori & Scoones, 2019). Such market-centered structures have, for instance, increased the marketization of sheep, hence opening up an avenue for destocking and alternative sources of livelihood. While seeking to encourage a sedentary livelihood, the Chinese state has introduced environmental regulations to protect ecosystem services such as watersheds; hence, livestock keepers are forced to destock (Nori & Scoones, 2019).

Amid indifference towards pastoralism, the growth and development of pastoralism across the globe has been anchored and informed by environmental and social factors that vary from region to region (Lenaiyasa *et al.*, 2020; Manzano *et al.*, 2021). For instance, pastoral mobility is a cost-effective herd management system suitable for the fragile ASALs of East Africa and Sardinia in Italy (Lind *et al.*, 2020; Nori & Scoones, 2019). Nonetheless, pastoralism as an economic and social production system has, over the years, adapted to harsh and erratic environmental conditions, political, economic, and technological dynamics (Adaawen *et al.*, 2019; Avis, 2018; Lind *et al.*, 2020).

2.2.2 The state of pastoralism in Africa

Across the continent, poverty among pastoralist communities has become widespread due to the livelihood's low productivity and inefficiency in the face of perilious and variable climatic occurences (Manzano *et al.*, 2021). Tanzania has been cited as having experienced a 30% rural-urban migration by the pastoralist demography due to extended limitations in the livelihood (Niamir-Fuller & Huber-Sannwald, 2020). In Tunisia, transhumance has greatly been reduced, while in other non-African nations like, Romania, United States of America, and Finland, government policies are skewed to provide subsidies to large-scale livestock keepers, hence locking out the small-scale ones (Manzano *et al.*, 2021; Niamir-Fuller & Huber-Sannwald, 2020). Pastoral societies in Africa have managed to cope and adjust to the harsh climatic conditions while enlarging their herds through purchasing and breeding and other socially established methods (Kirui *et al.*, 2022); thus, livelihood resilience is demonstrated (Cuni-Sanchez *et al.*, 2019; Ide *et al.*, 2014; Sax *et al.*, 2022). This explains why pastoralism has become the most widespread land-use system in Africa and globally (Manzano *et al.*, 2021). For instance, the vast Sahel region has been cited by Manzano *et al.*, (2021) and Nyong *et al.*, (2007) as one that has, over time, been experiencing extreme temperatures and low rainfall, but pastoralists have fallen and risen as proof for resilience.

2.2.3 Pastoralist Livelihoods in Kenya

Over two-thirds of Kenya's land cover is ASAL, with Samburu County being one among the 23 ASAL counties (Dutta Gupta *et al.*, 2021; Schilling *et al.*, 2012). Over three million persons in the Kenyan ASALs, are estimated to rely on livestock for over 75% of their income and nutritional supplementation (Achiba, 2018; Nyariki & Amwata, 2019). Livestock keeping and production constitute 90% of employment in ASAL areas while contributing 43% to Kenya's Gross Domestic Product (GDP) (Achiba, 2018). Pastoralists supply an estimated 90% of meat products consumed

in the HOA (Avis, 2018). Kenya's, over two-thirds of cattle herds are kept by the various pastoral societies and account for the majority of meat supplies (Nyariki & Amwata, 2019). Pastoralism in ASAL Kenya, as is the case in Samburu, is the most important source of livelihood (Achiba, 2018; Nyariki & Amwata, 2019) while at the same time the most delicate and vulnerable in the whole of Kenya. This problem is projected to worsen due to constraints from inter alia climate change, insecurity, mobility, land access and utility rights and the rapidly shifting social norms (Chelang'a & Chesire, 2020; Kirui *et al.*, 2022; Matsaert *et al.*, 2011; Mude *et al.*, 2010).

Nonetheless, there has been some gentle shift from traditional nomadic pastoralism to other livestock-related and unrelated income diversification pursuits (Lind *et al.*, 2020; Pollini & Galaty, 2021). They include agro-pastoralism, handicraft, poultry keeping, value addition activities, livestock markets, etcetera (Lind *et al.*, 2020; Van Anda *et al.*, 2021), while others opt to drop out, perhaps due to their perceived unsustainability of this form of livelihood (Kirui *et al.*, 2022; Ng'ang'a *et al.*, 2020).

Being a highly vulnerable and sensitive but integral source of livelihood, pastoralism is increasingly departing from its heydays, meaning that large livestock herds are rapidly proving unfeasible (Kirui *et al.*, 2022; Van Anda *et al.*, 2021). This is mainly due to socio-ecological challenges such as changes in the land tenure regime, population pressure, environmental degradation and long-term climate changes, which deplete forage and water sources for livestock (Kirui *et al.*, 2022; Siedenburg, 2021; Van Anda *et al.*, 2021). For instance, a study in West Pokot County showed that trekking for long distances for livestock herds has a detrimental effect on the resilience and adaptive capacity of the pastoral livelihood (Muricho *et al.*, 2019). Consequently, indefinite trekking weakens livestock, thus attracting low market prices (Muricho *et al.*, 2019). Studies show that given the steady increase in the frequency of droughts and unpredictable weather

patterns affecting water and pasture availability, pastoralism is proving difficult to sustain (Mwangi *et al.*, 2020; Van Anda *et al.*, 2021). Additionally, the degradation of the environment, a shrinking resource base, limited transhumance routes due to land fragmentation, state appropriation and privatization are endangering this centuries-old livelihood (Cuni-Sanchez *et al.*, 2019). On this backdrop, the study acknowledges the potential of IBLI in enhancing the sustainability of the pastoralist livelihood.

2.2.4 Background of pastoralism in Kenya

Pastoralists' vulnerability extends further in relation to their low position on the socio-economic and political strata compared to other non-pastoral societies (Cuni-Sanchez *et al.*, 2019). Worse is that pastoralism has, since the colonial era, experienced limited attention across the board, from government administrators to policymakers alike (Ltipalei *et al.*, 2020). The Kenyan colonial era saw the British put limited focus on pastoralists because they were perceived as politically undependable, primitive, violent, and indifferent (Ltipalei *et al.*, 2020). Also, perception is rife in Kenya that pastoralism is an inferior and obsolete means of livestock production, perhaps due to its susceptibility to loss, hence the surging poverty levels (Lelenguyah *et al.*, 2021). Critical interventions are imperative to dilute negative interventions towards pastoralism.

Consequently, sedentarism and private ownership of land policies have been promoted by administrators and policymakers to the detriment of pastoral mobility in addition to impoverishment (Ltipalei *et al.*, 2020; Manzano *et al.*, 2021; Matsaert *et al.*, 2011). Such alterations in pastoralism are done with little regard to its cultural significance (Nyariki & Amwata, 2019). Generally, studies find pastoralism as being overlooked not only on the local and national stage but also in international policy agenda forums (Manzano *et al.*, 2021; Nyariki & Amwata, 2019).

Pastoralists in Kenya keep certain types of livestock that are believed to be hardy in extreme climatic conditions, such as the Borana and Zebu breeds, donkeys, dromedaries, goats, and sheep (Lind *et al.*, 2020; Schilling *et al.*, 2012). Goats and sheep are critical in enhancing the security of the pastoralist's livelihood (Lelenguyah *et al.*, 2021). Essentially, pastoralism is meant to be a low-cost natural wealth creation system, where advantages such as livestock reproduction and products such as milk and animal fat are believed to supersede the sale of live stocks (Kirui *et al.*, 2022; Mwangi *et al.*, 2020).

Literature demonstrates that the sustainability of Kenya's pastoralism is sitting on shaky ground as its economic viability is often questioned whilst it is the major livelihood source in Kenya's ASALs. Typically trekking distance to water points by herders in West Pokot County was found by Muricho *et al.*, (2019) to be 32 kilometres, while in 2022, it rose to around 35 kilometres across Kenya's ASALs (Sax *et al.*, 2022). The long-distance pastoral mobility increases the chances of other undesired outcomes, such as conflicts with other communities and human-wildlife conflicts, complicating their resilience as appropriately stated by Muricho *et al.*, (2019). The convergence of herders from diverse groups often results in ethnic competition and contests over resources, hence resource-based conflicts (Lelenguyah *et al.*, 2021). Moreover, Jensen & Barrett, (2017) posit that pastoral herd mobility is fast proving an ineffective risk management strategy against such severe drought that has the ability to barren grazing fields.

2.3 Conflict during pastoral mobility

In response to spatial and temporal resource variations, evidence shows that pastoralists have traditionally practiced livestock mobility (Freeman, 2017; Mude *et al.*, 2010; Wafula *et al.*, 2022). Essentially, migration and mobility are long-standing indicators of the continued resilience of pastoralists (Adger, 2000; Chelang'a & Chesire, 2020). Patterns of pastoral mobility in the

rangelands of East Africa have drastically changed as they are highly informed by precipitation changes (Lelenguyah *et al.*, 2021). The distortion of traditional seasonal calendars has kept herders perpetually in the quest for water and forage; this has had poor social and economic effects on their livelihoods (Lelenguyah *et al.*, 2021). Pastoral mobility patterns are often informed by the obtainability of increasingly scarce pastoral resources or by fleeing diverse forms of adversity (Lelenguyah *et al*., 2021; Nyariki *et al*., 2005). With migration being caused by inter alia climate change, population upsurge, disease and scarcity of natural capital particularly resulting from drought (Matsaert *et al.*, 2011; Omollo *et al.*, 2023), such areas have been projected to experience eco-scarcity conflict (Adaawen *et al.*, 2019; Sax *et al.*, 2022).

2.3.1 Occurrence of pastoral mobility conflict in Africa

Climate change through droughts has been found to mediate structural and environmental causes of conflict between herders and farmers. One apparent example is the Darfur region and other parts of West and East Africa, such as Nigeria and Kenya (Adaawen *et al.*, 2019). The cattle-raiding culture meant to achieve various cultural goals is at the centre of the pastoral conflict. Numerous studies on pastoralism, climate, and conflict conducted in the HoA depict a trend of resource scarcity resulting in increasing inter-group competition (Adaawen *et al.*, 2019; Koubi, 2019; Seltzer, 2019). As noted by Seltzer, (2019), communities compete over clustered resources more than they do for sparsely distributed ones.

Of fundamental interest to this study was that the mobility of pastoralist societies in search for water and pasture has been cited as a trigger for inter-communal conflicts in many parts of Africa, such as the Sahel, Darfur, and Northern Kenya (Lelenguyah *et al.*, 2021). In addition, events of climate shocks intertwine with political, cultural, and social dynamics to bear conflict, especially among heterogeneous but otherwise peaceful groups (Okumu, 2021; Seltzer, 2019). Such factors

include intra and inter-ethnic social inequalities (marginalization), weak political institutions, poor infrastructure, group grievances, and rainfall-dependent livelihoods (Okumu, 2021; Scheffran *et al.*, 2019; Seter *et al.*, 2018).

2.3.2 Occurrence of conflict during pastoral mobility in Eastern Africa

Inter-communal conflict among pastoralist groups across East Africa existed long before the 19th Century when the British first documented it (Seltzer, 2019). Also, Eastern Africa is markedly one of the major high-risk zones for climate change exposure in the continent and globally (Atwoli *et al.*, 2022; Freeman, 2017; Ide *et al.*, 2016; Sax *et al.*, 2022). Literature is replete with diverse examples of how climate shocks such as drought trigger natural resource-related migration and subsequent conflict. Nonetheless, (Adaawen *et al.*, 2019) infer that other socioeconomic, environmental and political factors mediate this scenario. Contemporary literature on conflict across the HoA rangelands, shows that the practice has transformed into a commercial enterprise that enjoys a political dimension that employs ethnicity as a measure of distinction (Elfversson, 2019; Ltipalei *et al.*, 2020). Given the porous national borders, they leverage the proliferation of SALWs to raid and drive away livestock for sale in the grey market (Thomas & Berisso, 2021). This organized crime has recently caused mayhem to the noble endeavour of pastoral mobility (Chelang'a & Chesire, 2020). There is limited scholarship on the future implications of this recent conflict trend, as it threatens human and national security.

2.3.3 Occurrence of pastoral mobility conflict in Kenya

Internal migration has been found to cause local resource conflicts, especially between herders and farmers (Scheffran *et al.*, 2019). For optimal herd mobility, livestock keepers have had patterns for herd mobility on normal and stressful occasions (Nyariki *et al*., 2005; Chelanga *et al*., 2017).

Migration patterns have dramatically changed from customary and traditional to patterns punctuated by individualistic qualities that are widely seen to be causing violent conflict (Nyariki *et al.*, 2005; van Baalen & Mobjörk, 2016). An example of traditional pastoral routes is in the Southern part of Kenya at Lolita Naimina Enkiyio Forest; the Maasai communities have a traditionally established formula that guarantees the peaceful sharing of grazing lands (van Baalen & Mobjörk, 2016). In the event of disputes, established customary laws and institutions mediate and regulate resource utilization.

Exposure to both climate shocks and conflicts can leave people homeless and displaced (Sitati *et al.*, 2021). Scholars in the climate-conflict discourse submit that competition and resource scarcity arising from drought-induced migration could quickly escalate into violent conflicts (Adaawen *et al.*, 2019; Seltzer, 2019). In a survey conducted among the Maasai in Laikipia, households with over fifty-one heads of livestock were likely to move in the quest of water and pasture (Ng'ang'a *et al.*, 2020). Owing to dwindling forage and water, pastoralism migration routes in Kenya have changed. In response, pastoralists have driven their livestock into the pasture and water-rich areas that other groups inhabit; hence, the spillover effect bears competition and hostilities in the receiving regions (Lelenguyah *et al.*, 2021; Scheffran *et al.*, 2019; van Baalen & Mobjörk, 2016).

Moreover, the mobility of Kenyan pastoralists into urban and peri-urban areas such as Nairobi is mainly because there has been a dramatic change in land use and tenure (Wafula *et al.*, 2022). Also, climate change-related droughts have become frequent and prolonged (Quandt, 2021). In areas such as Samburu County, where different nomadic societies practice pastoralism side by side, boundary and inter-ethnic disputes, conflicts over resources, and cattle rustling are bound to manifest (Kumssa, 2019). As a result, people get displaced from their homes due to hostilities and clashes over the limited resources in the host areas (Kumssa, 2019). Therefore, climate risk-related

conflicts are borne out of a complex web of other structural casualties such as poor governance, poverty, and ethnic tensions, as is the case in Samburu Central sub-County and Samburu County at large (Freeman, 2017; Kumssa, 2019) hence, the decision to migrate is equally informed not exclusively by environmental factors (van Baalen & Mobjörk, 2016).

2.3.4 Pastoral conflict incidence in Northern Kenya

For ages, inter-communal cattle raiding and rustling have been a cultural practice whose goals were meant to serve certain cultural or family traditional endeavors (Ltipalei *et al.*, 2020; Sax *et al.*, 2022; Seltzer, 2019), but this tendency has steadily degenerated from its initial course. Cattle raiding or livestock violence that involves pastoral societies accounts for some of the deadliest contestations in Kenya in recent times (Elfversson, 2019). Initially, community leaders planned and authorized the practice, but lately, the tradition abets crime and long-standing communal hostilities (Ltipalei *et al.*, 2020; Thomas & Berisso, 2021). With its long history anchored in pastoral customs, the practice was justified culturally across the various pastoral groups, the need to restock as a risk-coping strategy after a drought or to raise bride wealth (Elfversson, 2019; Okumu, 2021).

Additionally, the raids are usually conducted to affirm ethnic nationalism identity and intimidation in the clamor for scarce resources and political competition (Okumu, 2021). For instance, active violence among the *Pokot*, *Turkana*, and *Samburu* serves to exhibit a sense of cultural heroism and the subsequent elevation in social status for the heroic individual fighters (Ltipalei *et al.*, 2020). Both oral and print literature submit that previously, livestock raiding was done using spears, bows, and arrows. Cattle raiding and contestations are now conducted using brutal force and sophisticated weaponry (Ltipalei *et al.*, 2020). The warlords are comprised of business people and the politically influential (Thomas & Berisso, 2021), while the warriors in Samburu and adjoining

communities are comprised of circumcised young men 15-30 years of age, the Morans (Ltipalei *et al.*, 2020; Okumu, 2021). Cattle raids in Northern Kenya have degenerated into violent conflict pitting ethnic communities against one another as the main actors.

It could be argued that the current incidences of conflict in Northern Kenya result from both structural and processual reasons (Okumu, 2021). Structural fault lines in the state's weak presence in the region as the area continues to be politically and economically marginalized even in post-independent Kenya. For instance, the weakness of the state emanates from the failure to effectively man Kenya's borders, hence the proliferation of SALW (Seltzer, 2019). Environmental stress causing livelihood insecurity and resource scarcity is another structural factor that cuts across the region, triggering violent conflict (Avis, 2018; Okumu, 2021; Thomas & Berisso, 2021). Thus, that cattle raiding and rustling have escalated into lethal violence is not in doubt.

Competition is mainly over key pastoral resources such as pasture, salt licks, and water, which are of significant interest to this study. A study conducted by Quandt, (2021) found that drought drives violent conflict in some ASAL parts of Kenya to a great extent, given that some of these communities have a long history of killings and revenge attacks (Ltipalei *et al.*, 2020). In addition, livestock driven by herders into restricted areas such as game parks creates human-wildlife and conflicts with the state (Quandt, 2021).

2.3.5 Pastoral mobility conflict incidence in Samburu County

Samburu County has witnessed numerous cyclic and fierce inter-communal conflicts ranging from cattle rustling and territorial disputes to resource-based contestations (Elfversson, 2019; Medina *et al.*, 2022). Structural causes of conflict across many pastoral areas often revolve around repugnant cultural norms and poor governance (Chelang'a & Chesire, 2020). Violent conflict

witnessed in Samburu County is often triggered by inter alia disputes over water and pasture land bundled with historic ethnic enmity, political rivalry, and land issues such as boundary demarcation between communities (Ejere *et al.*, 2021; Elfversson, 2019; Kumssa, 2019). This climate vulnerability and competition dichotomy could breed adversity upon pastoral societies in Samburu Central sub-County. In this regard, interventions such as IBLI need to be scaled up for the betterment of pastoralism in the region.

2.4 Formal Insurance – Index-Based Livestock Insurance (IBLI)

2.4.1 Global outlook of formal insurance

Globally, microinsurance products have been promoted as one form of risk transfer for poor smallholder households (Will *et al.*, 2021). This intervention comes against the backdrop of widespread ecological stressors and struggling informal risk management systems that are proving unsustainable (Berg *et al.*, 2022). This is mainly because they focus on short-term risk management and coping instead of long-term adaptation strategies (Mburu *et al.*, 2015; Muricho *et al.*, 2019; Warner & Alemu, 2018). One such is pastoral herd mobility that has, over the years, been constrained by, among other factors, environmental degradation, thus leading to extensive livestock losses, particularly during severe droughts (Lelenguyah *et al.*, 2021).

Numerous studies find that informal risk-sharing is compatible with index insurance (Berg *et al.*, 2022; Jensen & Barrett, 2017; Matsuda *et al.*, 2019). Evidence shows that risk sharing is complementary to index insurance, where observed IBLI policyholder households continued receiving informal transfers from their social networks. In addition, IBLI policyholders who receive payouts have been found to enhance their household income through increased milk production and herd size, particularly for pastoralist households with small herd sizes (Kirui *et al.*, 2022; Matsuda *et al.*, 2019). Also, empirical studies show that insurance uptake leads to a low

livestock sales (herd offtake) tendency as pastoralists become more confident that losses shall be compensated (Nshakira-Rukundo *et al.,* 2021).

The need for climate adaptation has seen the development of innovations to enhance people's adaptive capacity and livelihood resilience. The formal insurance approach of Index Based Livestock Insurance (IBLI) continues to be fronted as a promising and more sustainable strategy for cushioning against collective shocks while enhancing the adaptive capacity of developing nations like Kenya (Alulu *et al.,* 2020). This comes from the realization that informal risk management approaches are becoming overstretched owing to the extreme nature of shocks being experienced due to climate change and variability (Iyer, 2021; Nshakira-Rukundo *et al.,* 2021).

Apart from poultry, livestock keeping is the major economic activity across Kenya's ASAL areas (Warner & Alemu, 2018). Given the frequent droughts, variability, and change in climate, pastoralists are usually staring at the risk of their wealth, which is cattle (Kirui *et al.*, 2022). These perennial losses expose pastoralists to dropping out of pastoralism, hence being rendered poor as they become vulnerable and unable to manage the risk (Adaawen *et al.*, 2019; Kirui *et al.*, 2022). Informal coping strategies such as preventive saving, livestock reduction, and multi-cropping have proven ineffective over the years owing to the extreme nature of shocks (Adaawen *et al.,* 2019; Iyer, 2021; Nshakira-Rukundo *et al.,* 2021). Furthermore, income diversification through other alternative sources of livelihood bears little or no fruit, given the glaring poverty levels. In this regard, preemptive response strategies such as Index Based Livestock Insurance (IBLI) have been hailed for their ability to enhance financial resilience promptly against projected shocks (Fava *et al.,* 2021). Though its implementation is not widespread, IBLI is seen by proponents as a low-lying fruit in the quest to combat the adversities of climate change, such as drought-related shocks (Kirui *et al.,* 2022; Matsaert *et al.,* 2011).

2.4.2 The general conceptualization and implementation of IBLI

The insurance program employs satellite technology to analyze weather indices such as vegetation levels and other observable features, such as precipitation and temperature, to act upon the risk needs of pastoralists (Berg *et al.*, 2022). The difference between IBLI and traditional indemnity insurance is that IBLI cushions against widespread risk such as vegetation scarcity as opposed to idiosyncratic risks (Warner & Alemu, 2018), hence doing away with the problems of adverse selection and moral hazard (Berg *et al.*, 2022). Index insurance is promoted as an affordable alternative to traditional claim-based insurance in low-income regions (Clement *et al.*, 2018) such as Samburu County. Studies show that early payouts by one month are helpful to 91% of pastoralists compared to 68% of them when payouts are made one month late (Nshakira-Rukundo *et al.*, 2021).

IBLI is premised on the Normalized Difference Vegetation Index (NDVI) that relies on satellite imagery data to assess environmental conditions, particularly pasture availability, hence significantly helping to capture drought severity (Banerjee *et al.*, 2019; Johnson *et al.*, 2023; Kirui *et al.*, 2022). Payouts for index insurance are done when indicators are associated with severe drought (Jensen *et al.*, 2017; Kirui *et al.*, 2022). Essentially, IBLI does not cover livestock mortality but seeks to give payouts that can assist pastoralists to avert the death of their livestock due to fodder scarcity (Banerjee *et al.*, 2019). Based on these features, index insurance is considered more effective than conventional indemnity insurance, which has long been unaffordable and out of reach to remote populations. Empirical evidence shows that insured households have better herd survival rates (Banerjee *et al.*, 2019). Nonetheless, index insurance has been faulted for creating basis risk (Berg *et al.*, 2022; Morsink *et al.*, 2016). This is a scenario where, even having paid for a premium, the insured persons do not receive their payout because

the index was not triggered in their favor even with actual loss of covered assets (Clement *et al.*, 2018). In a nutshell, IBLI can trigger payouts where there are no losses and can also fail to provide payouts even when it is apparent that policyholders have incurred losses (Morsink *et al.*, 2016). Hence, the IBLI product may fail to reliably cushion against aggregate shocks such as floods and droughts.

Acquiring formal insurance allows vulnerable households to recover from covariate climate shocks by being indemnified for commensurate losses (van Baalen & Mobjörk, 2016; Will *et al.*, 2021). For instance, insurance has been found to enhance investment in livestock health services, hence herd survival rates, boosting production while positively impacting nutrition requirements (Banerjee *et al.*, 2019; Taye *et al.*, 2019). Studies from 2010 have shown that anticipation on reliance on distress livestock offtake and meal reduction for insured households had declined by 36% and 25%, respectively, mainly attributable to boosted household income (Banerjee *et al.*, 2019; Taye *et al.*, 2019). Nonetheless, literature shows that some pastoralists in Northern Kenya and Borena Zone, Ethiopia used IBLI payout money to cater to household needs (Johnson *et al.*, 2023).

Recovery from shocks by averting the loss of assets can reduce vulnerability and prevent the vicious cycle of losses and entanglement into a poverty trap that would take numerous external interventions to overcome (Gebrekidan *et al.*, 2019; Muricho *et al.*, 2019). Indeed, droughts distress all pastoralists across all pastoral livelihood pathways to the point of dropping out, perhaps not by choice but by circumstance, and inevitably, climate change is set to entrench this reality (Kirui *et al.*, 2022). Although numerous reasons are attributed to susceptibility to poverty traps, limited access to insurance and credit facilities have been key contributing factors, hence, the study's quest for cooperative interactions as opposed to discord which abets the status quo.

2.4.3 Low livestock insurance upscale and uptake globally

The effects of climate change, such as increased frequency extreme weather events and other climate shocks, are expected to adversely affect crop and livestock farmers in the developing world (Batung *et al.*, 2023). Worse, they lack proper access to modern insurance or the requisite knowledge. The demand and uptake of modern insurance in the developing world is relatively low. In the wake of extreme climate variability and change, low-income persons would be expected to utilize microinsurance, but empirical evidence shows that people in developing nations who are highly susceptible to risk are unwilling to take up microinsurance (Morsink, 2012). This information contradicts the widely accepted notion that they insure their property if one does not want to take chances. In the wake of climate change and variability, natural disasters such as drought and flooding will continue to ravage, spelling doom for livelihoods and food security (Sibiko *et al.*, 2018).

Even with the greater effort being channeled toward adaptation strategies, policymakers, scholars, practitioners, et cetera affirm that contemporary adaptation frameworks often fail to materialize (Nshakira-Rukundo *et al.*, 2021). For instance, the failure of modern adaptation models, such as traditional insurance schemes for pastoralists, is attributed to barriers such as poor infrastructure and the high rate of pastoralist mobility, which in turn limit the requisite implementation monitoring (Matsaert *et al.*, 2011). On the other hand, the private sector, such as insurance companies and banks, shy away from venturing into the livestock insurance space much as they have expressed tremendous interest (Matsaert *et al.*, 2011). They cite the limited experience of engaging pastoralist societies and the huge initial investment costs of implementing the IBLI product has undoubtedly experienced the ’first-mover disadvantage’ (Matsaert *et al.*, 2011). As noted by Ide *et al.*, (2014), acquiring insurance is one of the adaptation measures against

environmental risks. For instance, a periodic insurance fee can cushion a crop or livestock farmer from possible catastrophic losses caused by weather shocks.

2.4.4 IBLI product uptake in the global south.

Even with micro-insurance products such as the IBLI, the uptake is unexpectedly low (Sibiko *et al.*, 2018; Warner & Alemu, 2018). Despite seeming to have a promising result, the uptake of Index-Based Insurance has registered low uptake (Jensen & Barrett, 2017) as the adoption rate is hardly above 30% of the target recipients, as most studies have been conducted in Eastern Africa (Aina *et al.*, 2018). Nonetheless, limited experience with financial institutions, pastoralist mobility and obstructing NGO or government community agenda have been cited as major constraints for the penetration of IBLI in Northern Kenya (Matsaert *et al.*, 2011).

In the Borena Zone of Southern Ethiopia, the adoption of IBLI was driven by education status, access to credit, farmers' perception of climate risks, off-farm income, and other socioeconomic and demographic factors (Amare *et al.*, 2019). In Nigeria, livestock farmers were willing to pay if only the premium cost and coverage offered were significantly favorable (Aina *et al.*, 2018). The uptake of livestock insurance in Marsabit County was found by Kirui *et al*., (2022) to be higher among well-to-do pastoralist households than in poorer households. Farmers and pastoralists have been cited as lacking awareness and understanding of how insurance programs function and, hence, low confidence and uptake (Chelang'a *et al.*, 2015; Di Marcantonio, 2016; Jensen *et al.*, 2018; Oduniyi *et al.*, 2020). Human beings have cognitive biases that are embedded in cultural beliefs or lack of cultural acceptance (Di Marcantonio, 2016).

Insurance penetration is relatively low in societies where there are few or no cases in which insurance has succeeded in transforming people's lives (Jarzabkowski *et al.*, 2019). Lack of finances, a wait-and-see attitude, insufficient brand promotion, and a lack of knowledge about the

product are some of the basic reasons for lacking the will to purchase livestock insurance (Chelang'a *et al.*, 2015; Mburu *et al.*, 2015). Factors such as experience with insurance, age, education, and marital status were found to inform the willingness to pay for IBLI in North West, South Africa (Oduniyi *et al.*, 2020). Access to modern insurance to help cushion against climate shocks is still a considerable challenge because the demand and uptake of modern insurance in the developing world is unexpectedly low (Jensen *et al.*, 2018; Morsink, 2012; Sibiko *et al.*, 2018; Warner & Alemu, 2018). African governments, including Kenya and Malawi, have been faulted for failing to offer political support, such as awareness initiatives for regional risk pools such as the African Risk Capacity established in 2012 (Nshakira-Rukundo *et al.*, 2021).

According to Jarzabkowski *et al.*, (2019), insurance uptake in the developing world is below 1%. This is contrary to the expectation that low-income persons would be expected to utilize microinsurance in the wake of extreme climate variability and change. Basis risk contributes to the low demand for index insurance (Nshakira-Rukundo *et al.*, 2021) hence providing a chance for informal risk sharing to thrive (Berg *et al.*, 2022). Three basis risk types have been identified concerning insurance products' quality, temporal, spatial, or geographical and design basis risk (Nshakira-Rukundo *et al.*, 2021). Studies in Cameroon and Niger have shown basis risk to be up to 50% high, which indicates half the chance that a policyholder may be imperfectly indemnified.

2.4.5 The potential of IBLI to enhance cooperation in Eastern Africa

In Borena Zone in Ethiopia, the insurance company and its partners prefer providing the IBLI product through social networks such as Group Savings and Loan Organizations (GSLs) and other indigenous community groupings to increase uptake (Berg *et al.*, 2022). In a survey conducted in Marsabit County, respondents who were members of a social group were seen to have a better understanding of index insurance; hence, they were more willing to pay than non-social-group

members (Mburu *et al.*, 2015). Therefore, information dissemination through social networks could effectively enhance awareness and instill trust in index insurance, as pastoralists are 'oral societies' in their information flows (Chelang'a *et al.*, 2015). 2.4. IBLI in Samburu County.

IBLI is one of Kenya's formal risk transfer approaches that was first rolled out in Marsabit county of Kenya in January 2009 by the International Livestock Research Institute (ILRI) and other development partners (Chelang'a *et al.*, 2015; Jensen *et al.*, 2017; Warner & Alemu, 2018). The product was subsequently scaled to other ASAL counties, including Samburu County. Anchored on low-cost, accessible and reliable satellite-generated information on forage availability, IBLI is designed to mitigate against climate-driven shocks (Banerjee *et al.*, 2019). Regionally, the product has been introduced in the Borena Zone of neighboring Ethiopia (Gebrekidan *et al.*, 2019). Additionally, IBLI has gained interest from an array of stakeholders, including GoK, that have sought to scale it up to other ASAL counties of Kenya, including Samburu (Berg *et al.*, 2022; Jensen *et al.*, 2017). For instance, similar index insurance products include Kilimo Salama, which cushions farmers against drought and excess rainfall in Kenya, and the Caribbean Catastrophe Risk Insurance Facility, which covers shocks such as earthquakes and hurricanes (Berg *et al.*, 2022).

At first, the insurance initiative was significantly subsidized but has continued to increase commercial holder contributions to make it more sustainable (Chelang'a *et al.*, 2015; Taye *et al.*, 2019). Subsidizing interventions such as IBLI have been found to help in the smooth creation of product markets (Clement *et al.*, 2018). Dissimilar to the widely recognized single and multi-peril insurance that compensates premium buyers based on a case-specific assessment of loss incidence, index insurance makes compensation to all insured clients conditional on the activation of certain indicators (Berg *et al.*, 2022; Gebrekidan *et al.*, 2019; Morsink *et al.*, 2016; Mude *et al.*, 2010).

Moreover, IBLI is free from drawbacks like adverse selection, information asymmetries, and moral hazard since it covers shared and not individual risks and losses (Gebrekidan *et al.*, 2019).

Additionally, the Kenya Livestock Insurance Program (KLIP) is a large-scale public-private partnership social protection initiative that targets cushioning poor pastoral households against covariate risks (Jensen *et al.*, 2017; Takahashi *et al.*, 2019). KLIP is an IBLI-calibrated initiative adopted and rolled out in 2015 by GoK with support from her development partners (Banerjee *et al.*, 2019; Johnson *et al.*, 2023; Taye *et al.*, 2019). This government-led initiative saw an initial targeted transfer of premiums to 15,000 households in ASAL counties, including Samburu (Alulu *et al.*, 2020). KLIP has since been scaled upwards from three to eight counties (Fava *et al.*, 2021). Under the initial KLIP initiative, IBLI policies were bought to cover selected vulnerable pastoralists' households with the idea that conditional insurance payouts would sustain the livestock amid drought (Alulu *et al.*, 2020; Taye *et al.*, 2019).

2.5 Informal insurance approaches.

Globally, societies possess unique yet institutionalized informal relationships of risk sharing or, mutual insurance, or social networking institutions (Iyer, 2021). These are usually designed to mitigate or cope with the ex-ante or ex-post shock impacts that especially result from environmental challenges (Adaawen *et al.*, 2019; Bageant & Barrett, 2017; Will *et al.*, 2021). These collective and interpersonal relationships have been found to help households recover from loss while mitigating future risk (Iyer, 2021; Mbugua *et al.*, 2019). Nonetheless, Takahashi *et al.*, (2019) and Berg *et al.*, (2022) note that informal insurance methods are best suited for addressing household-based or idiosyncratic risks rather than covariate risks often resulting from climate-related shocks. Idiosyncratic risks are shocks experienced and unique to an individual household and do not affect the surrounding ones (Clement *et al.*, 2018). Risk, in this case is the likelihood

of loss or danger, especially concerning environmental and variability (Iyer, 2021). While pastoralism is best suited for the rangelands, the apparent livelihood challenges call for risk management practices to alleviate adversity.

2.5.1 Informal Insurance in Africa

Scholarly works, mainly ethnographies, have documented various descriptions of informal insurance among African societies. They include *jie* or *ekone* among the Karamoja of Uganda, *lil-metch* among the Dassanech of Ethiopia, *lopae* for the Turkana, *tilyai* among the Pokot and *engelata* and *osotua* for the Maasai and Samburu of Kenya (Iyer, 2021). East African pastoral societies, albeit politically marginalized, had for years been coping and adapting to extreme weather events while managing to sustainably exploit the rangelands using traditional institutions of risk sharing (Gebeyehu *et al.*, 2021).

Informal insurance practices of livestock exchange also occur among the Gabra and West African Fulbe pastoralists (Iyer, 2021). Among African pastoralist societies, social networks are conceived based on socio-economic, cultural and personality attributes. Relationships can be founded on diverse levels, such as agnatic or affinal, blood or marriage relations (Iyer, 2021). Additionally, friendships can be forged and maintained through gifting, livestock feed, livestock transfers and financial assistance through group savings and loan organizations (Mbugua *et al.*, 2019).

Informal risk sharing is an arrangement for risk pooling implemented within social networks (Takahashi *et al.*, 2019). Mutual insurance approaches are usually guided and driven by values and beliefs endogenous to society, which not only include conditional volition and reciprocity but also guilt, altruism, intra-communal trust, goodwill, and moral norms of giving (Anderberg & Morsink, 2020; Ng'ang'a *et al*., 2016) For instance, there is the belief that there is an obligation to help those in need regardless of their debt history. Though an emotional burden accompanies many informal

insurance practices, some practices are reciprocal, while others are institutionalized as altruistic (Iyer, 2021). Therefore, such practices form fertile ground for maintaining social cohesion amid resource scarcity.

Further, Ngigi *et al.*, (2021) submit that borrowing in social networks is a coping strategy employed by the vulnerable of society, such as women and the pastoral poor, owing to their low asset base. In addition, in-kind transfers could be based on the giver's expectation and recollection of reciprocity by the receiver (Ng'ang'a *et al*., 2016). *Busa gonofa* in Ethiopia and *Osotua* among the *Maasai* and *Samburu* are in-kind reciprocal livestock lending from one individual to another during climate shocks (Takahashi *et al.*, 2019; Will *et al.*, 2021). Conversely, *Dabare* comprises loaning cattle to an individual who has experienced an adverse shock in a social group.

Livestock accumulation is cited as significant in managing covariate risks because of the probability that some animals will survive a raging drought; hence, such a household is expected to recover faster than those with less livestock (Ng'ang'a *et al*., 2016). Idiosyncratic risks are informally managed by investing in social capital and networks through practices such as food sharing (Iyer, 2021; Jain, 2020). Among the Karamojong of Uganda, gifting of livestock can be done for no significant reason but to instill and strengthen social networks with friends and kin (Iyer, 2021). Social exchanges are based not only on livestock but also on foodstuff, immaterial assistance, or money from friends and relations to enhance resilience (Iyer, 2021; Muricho *et al.*, 2019). Such social safety net approaches help to buffer households from the adversities caused by shocks. NGOs, national and county governments have also been found to contribute immensely towards the social safety nets among vulnerable pastoral societies (Muricho *et al.*, 2019).

Livelihood diversification allows households to spread risk across time, space, and sectors such as on-farm and off-farm activities. Through livelihood diversification (Gebeyehu *et al.*, 2021; Irungu

et al., 2021), individuals acquire the capacity to access various resources from an array of livelihood activities that experience varying sensitivity to shocks such as drought and diseases (Ngigi *et al.*, 2021; Quandt, 2021). In the long run, households with diverse sources of income are better adaptable to the collective risk and are in a better position to help the less endowed. Subsequently, there is the manifestation of cooperation amid adversities such as eco-scarcity.

On the downside, informal insurance is slowly proving ineffective thus, failing to insure against covariate and idiosyncratic risks against pastoralists as climate shocks (Adaawen *et al.*, 2019; Iyer, 2021; Nshakira-Rukundo *et al.*, 2021). For instance, vulnerable households that benefit from the social safety net in West Pokot County were found to be using kin remittances in purchasing foodstuff instead of using them to enhance their resilience and adaptive capacity (Muricho *et al.*, 2019). Studies by Bageant & Barrett, (2017) and Takahashi *et al.*, (2019) submit that informal risk management approaches should not affect the demand for formal insurance; the two should be complementary.

2.5.2 Informal risk sharing in Kenya

Pastoralists in Kenya have embraced new techniques of informally leveraging their livestock to secure credit and insurance; hence, livestock is used as a currency of risk-sharing (Nyariki & Amwata, 2019). Pastoralists are also increasingly adopting crop cultivation as well as diversifying their herd composition (Cuni-Sanchez *et al.*, 2019; Gebeyehu *et al.*, 2021). The Maasai of Narok in Kenya usually engage in both agricultural intensification and extensification strategies of adaptation and livelihood diversification (Pollini & Galaty, 2021). Intensification maximizes land use to increase productivity, while extensification is the expansion of land use activities into other unoccupied areas. Other “indigenous” climate change coping strategies include herd splitting,

rapid destocking, raiding, communal ownership, and regular and opportunistic migration (Cuni-Sanchez *et al.*, 2019; Schilling *et al.*, 2012).

2.5.3 The complementary relationship between formal and informal insurance

The introduction of IBLI in Eastern Africa, slightly over a decade ago was not to fill a risk management void but to enhance the existing informal but institutionalized risk-sharing or informal insurance mechanisms (Takahashi *et al.*, 2019). Nonetheless, the relationship between the two remains uncertain, given that the uptake of IBLI is significantly low. Scholarly works have, however, found a complementary relationship where informal insurance best covers inter-household risks while IBLI indemnifies households for proximate risks from covariate risks (Mburu *et al.*, 2015; Santos *et al.*, 2021; Takahashi *et al.*, 2019). Evidence from studies conducted in Ethiopia showed that introducing IBLI amidst existing informal insurance institutions had little adverse effects on the feasibility of social exchanges (Takahashi *et al.*, 2019; Will *et al.*, 2021). For instance, the *dabare* practice of livestock transfer continued to be practiced across the divide between IBLI policyholders and non-policy holders (Takahashi *et al.*, 2019). Therefore, these two drought shock adaptation approaches are complementary and can influence cooperation amidst a conflictual environment.

Formal insurance products such as IBLI can substitute and complement informal insurance in buffering aggregate shocks as well as cattle loans, informal cash, and in-kind gifting in mitigating or coping with idiosyncratic shocks (Bageant & Barrett, 2017; Berg *et al.*, 2022). Unlike indemnity insurance, implementing IBLI among pastoralists in Marsabit has failed to cushion the numerous idiosyncratic risks (Berg *et al*., 2022; Ng'ang'a *et al*., 2016). This does not mean that such informal risk-sharing approaches are not viable; on the contrary, evidence shows that they fill the void left

by the formal ones and areas without functioning insurance markets (Anderberg & Morsink, 2020; Takahashi *et al.*, 2019).

2.6 Research Gaps

Studies are replete with examples of how shocks such as drought worsen global challenges, including pastoral resource scarcity and conflict (Adaawen *et al.*, 2019; Richardson Golinski, 2023; Smith & Frankenberger, 2022). Literature has also documented the causal processes and effects of resource scarcity in Samburu County (Lenaiyasa *et al.*, 2020). However, there is limited scholarship on the scale to which climate shocks result in resource scarcity in conflict-prone settings such as Samburu Central sub-County. Such knowledge is imperative in understanding the intertwining roles of resource scarcity and conflict with regard to resource cooperation. The subsequent, socio-ecological resilience born out of cooperation is mediated by an amalgamation of informal and formal risk sharing strategies.

Pastoral mobility is a critical process in the exploitation of primary pastoral resources (Lind *et al.*, 2020); hence, the critical need for resource cooperation through the existent informal and formal insurance practices. Scholarly works have sought to establish the driving and causal factors of conflict among pastoralists and farmers in Kenya (Ejere *et al.*, 2021; Elfversson, 2019). Nonetheless, they are limited in documenting the pastoral mobility conflict tendencies during herd mobility in Samburu Central sub-County. The study sought to assess the contemporary conflict tendencies of resource competition during herd mobility.

In the quest to enhance pastoralist societies' adaptation capabilities, a complementary niche between formal and informal insurance has been discovered (Takahashi *et al*., 2019). However, there is limited literature on how these two forms of risk sharing and their complementary

advantage can advance resource cooperation and social cohesion amidst long-standing instability and resource competition.

2.7 Theoretical Framework

This study is anchored on the resilience theory on ecological systems by Crawford Stanley Holling in 1973 (Batung *et al.*, 2023). The etymology of the word resilience draws from the Latin word 'resilire', which implies 'bounce back' (Batung *et al.*, 2023). The concept's history can be traced back to the first century BC and has evolved with the times, hence its application in diverse disciplines inter alia engineering, ecology, psychology, sociology, and human geography (Batung *et al.*, 2023). According to Holling, resilience denotes the capacity of a system to absorb both biotic and abiotic disturbance (cope) and then reorganize itself (recovery), which is characterized by changes that still maintain the same identity (Batung *et al.*, 2023; Muricho *et al.*, 2019). From a social science perspective, the study is shaped by the SER model that became accentuated in the 1990s (Batung *et al.*, 2023).

Socio-ecological Resilience (SER) is premised on the presumption that a symbiotic relationship exists between the natural environment and the social world (Batung *et al.*, 2023). Resilience theory outlines how various dynamic systems organized at different temporal and spatial scales interact to cause varying degrees of change (Garmestani *et al.*, 2019). The SER acknowledges that social and ecological systems are interconnected in a complex relationship where they influence each other (Brown and Williams, 2015). For instance, in this study, social systems include human relationships of cooperation or competition and livestock ownership, infrastructure economies, leadership, and resource governance institutions in Samburu County. The ecological system would consist of the abiotic and biotic elements such as natural resources such as the soil, temperature, pasture, water, livestock, and biodiversity within Samburu County (Garmestani *et al.*, 2019).

First, a system must have experienced and resisted some shock that it managed to stabilize without fundamentally altering its functionality. Samburu Central sub-County pastoralists have buffered against shocks such as drought and conflict over the years. Second, they must show their ability to self-reorganize; hence, a system must exhibit its increased capacity for learning and adapting endogenous procedures with external influences (Batung *et al.*, 2023; Brown & Williams, 2015). In this regard, pastoralists in Samburu County continue to seek adaptive ways to mitigate against losses amid their deteriorating coping capacities. Thirdly, a transformative capacity enables revamping the systems' social, ecological, and economic structures if the former ones are untenable (Batung *et al.*, 2023).

Consequently, IBLI has been presented as an ex-ante transformational tool that potentially arrests the likelihood of livestock losses. Enhancing pastoralism's adaptive capacity could create cooperative interactions instead of conflictual ones. For this study, pastoralism and agro-pastoralism are likened to a socio-ecological system where there is a constant endeavor to build shield capacity against shocks such as drought and conflict that could make them susceptible to poverty and mortality.

2.8 Conceptual Framework

The conceptual framework presents the case of how pastoralism in Samburu Central sub-County is faced with the problem of conflict. In addition, further social, economic and ecological resilience continues to dwindle due to livelihood constraints, primarily climate shocks. Some of these ecological constraints emanate from climate shocks that often result in resource scarcity. Socio-economic, cultural, and political constraints combined create conflictual encounters among pastoralist societies in Samburu. This combination of problems is caused and continues to exacerbate the erosion of long-established resource-sharing institutional frameworks. This cycle

of conflict amid livelihood constraints places pastoralism in a precarious position of incapacity to adapt to climate change.

Moreover, the framework introduces informal and formal insurance as intervening variables that can stimulate transformation from conflict to pastoral resource cooperation. Being a proactive rather than a reactive risk sharing intervention, the IBLI product (formal insurance) gives quick recovery to pastoralism amidst resource scarcity. In addition, the circumstantial decline of informal risk sharing interventions also reinforces the social safety nets from the recovery of pastoralists who receive IBLI payouts. Consequently, the formal and informal safety nets instill cooperation even in (property rights) accessing and using pastoral resources.

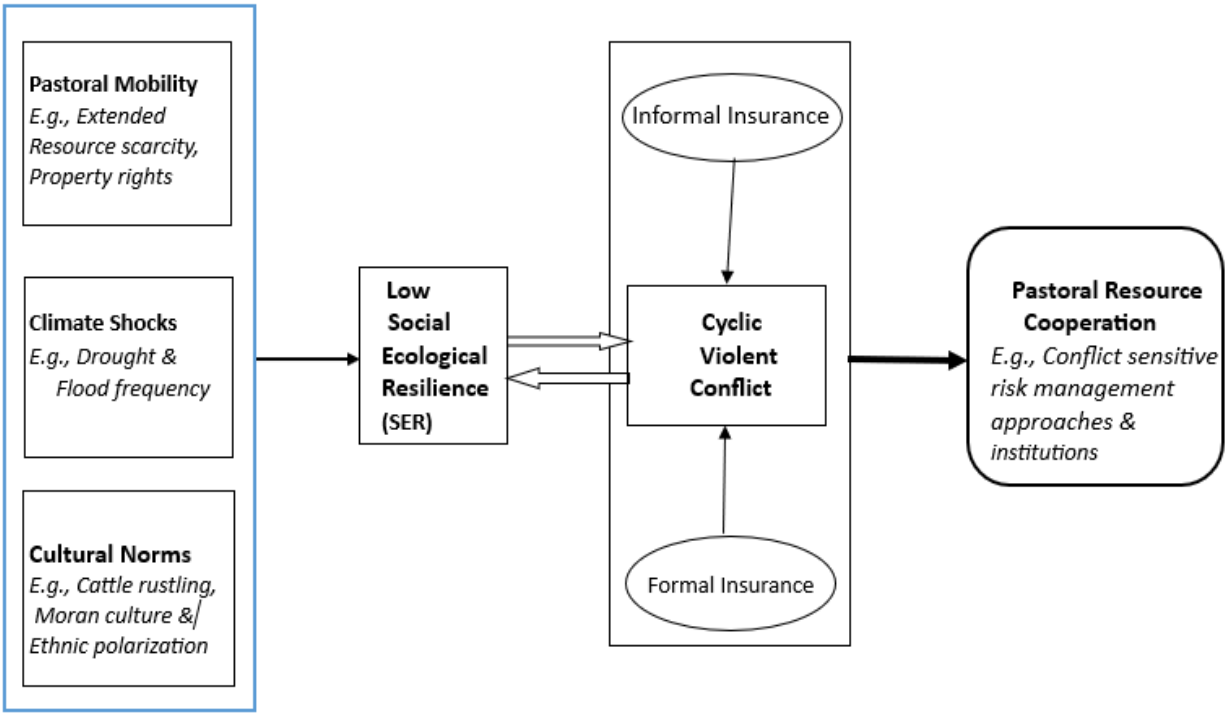


Figure 2. 1: Conceptual framework.

Source: Author, 2023.

3.0 CHAPTER THREE: MATERIALS AND METHODS

This chapter mainly describes the features of the study area, the research design, sampling, the data collection and analysis procedures employed.

3.1 Study Area

Samburu Central sub-County in Samburu County was purposely selected to be the study area because it has been a subject of extreme weather events and recurrent resource-based conflicts. Being majorly a rangeland where pastoralism is the main practice, Samburu County was resourceful to the study as it was also marked with agro-pastoralism. Pastoralists and agro-pastoralists were the target population for this study.

3.2 Location

The vast Samburu County has a total area of over 21,022 square kilometers. To the Northwest are Turkana County, Baringo County to the Southwest, Marsabit to the Northeast, Isiolo to the East, and Laikipia to the South (KIPPRA, 2018). Administratively, the county is demarcated into three sub-Counties: Samburu Central, Samburu East, and Samburu North sub-counties (KNBS, 2019). Samburu County sits between latitudes $0^0$30‘and $2^0$45‘North of the equator, between longitudes $36^0$15‘and $38^0$10‘East (KIPPRA, 2018).

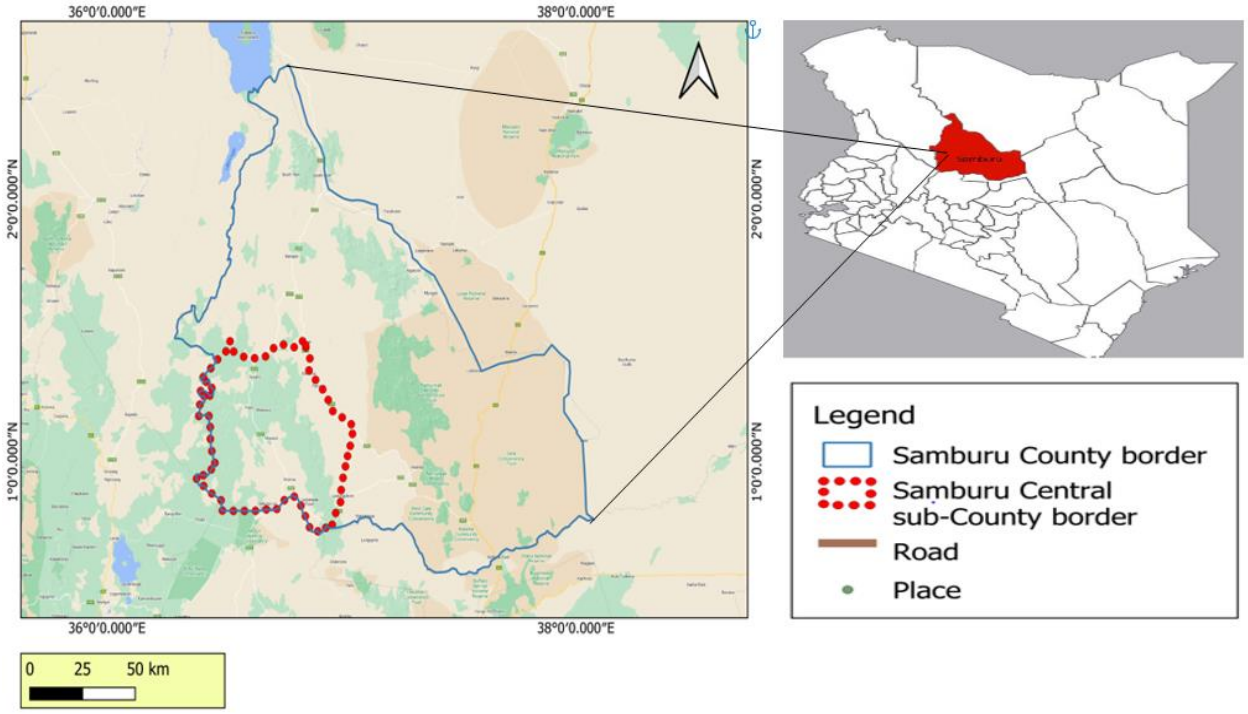


Figure 3. 1: Map of Samburu Central sub-County Location

Source: Author, 2022. Map rendered on *QGIS*.

3.3 Climate

Samburu County experiences tropical climatic conditions, with its driest period being January and February. Like the rest of Northern Kenya, the area experiences a bimodal type of rainfall whereby short rains fall in October – December and long rains in March – May (KIPPRA, 2018). The county's annual mean temperature is 29 ^{0}C. More than two-thirds of the land area in Samburu County is categorized as being of low potential rangeland. The larger part of the county receives between 250 – 600 mm of rainfall annually, while only about 7% of the land area receives 600 – 900 mm annually. This small land area is categorized as medium-to-high-potential land suitable for agriculture (KIPPRA, 2018).

3.4 Land Use

Land is integral to a society's growth and development as it guarantees prosperous posterity. Land ownership in Samburu County is divided into private, public, registered community land or group ranches, and unregistered community land under the county government's trusteeship (KIPPRA, 2018).

The prevalent land uses are nomadic pastoralism, wildlife sanctuaries that support the tourism economy (Van Anda *et al.*, 2021), urban development, and crop farming in areas that receive higher precipitation, such as the Maralal highlands (Ltipalei *et al.*, 2020). The Samburu livestock herds have large numbers of small ruminants, much as the cow is the most coveted and prestigious possession. With the high reliance on water for cattle and the apparent reduction in grass cover and forage, there has been a significant reduction in the cattle number among the Samburu over the years (Ltipalei *et al.*, 2020).

3.5 Flora

Samburu County is endowed with an array of plant life. The county's forest area comprises both gazetted and non-gazetted forests. The gazetted forest cover accounts for approximately 15% of the land area. The four gazetted forests are Leroghi forest and Ndoto Ranges, Mathews Ranges, Mt. Nyiro Forest reserves (KIPPRA, 2018). A large ninety-two percent of the county's land area is rangelands covered by grassland and shrubs (Lelenguyah *et al.*, 2021). Cultivation is limited to a limited high potential area of Poro in Samburu Central sub-County (KIPPRA, 2018). It comprises mainly of primary subsistence crops such beans and maize seasonal farming. Also, cash crops grown in Samburu include barley, millet, wheat and pyrethrum for industrial usage.

3.6 Fauna

The county affords habitat to diverse species of animals. Samburu is one among counties with the largest wildlife numbers whose habitation is outside protected areas. This wildlife habitat is home to the big five, waterbucks, Somali ostrich, and beisa oryx (KIPPRA, 2018). This wildlife resource means that the county is able to tap into tourism for revenue. The county is also conducive for beekeeping hence, presenting alternative income sources. Moreover, Samburu County is replete with wildlife conservancy activities, both government and community overseen (KIPPRA, 2018). This has been applauded as for promoting tourism while mitigating against human-wildlife conflicts. However, the problem of poaching remains to be a major threat to the preservation of wildlife sanctuaries in the county.

3.7 Demographic Features and Community Profile

According to the Kenya National Bureau of Statistics (KNBS), Samburu county's population has grown from 223,947 in the 2009 census to 310,327 in the 2019 census (KNBS, 2019). The vast county is home to the Samburu ethnic group, among others, such as the Turkana. Being a Nilotic-speaking people, the Samburu trace their origins in the Sudan (Ltipalei *et al.*, 2020). They have a close resemblance to the Maasai with regards to customs, traditions as well as livelihood and subsistence practices. In addition, approximately 98% of their language is similar to the Maasai (Ltipalei *et al.*, 2020). However, much has changed between the two Maa-speaking groups regarding political and socio-economic influences and livelihood endeavors.

Historically, most of the county's inhabitants relied on pastoral livelihood. However, there is some practice of agro-pastoralism, particularly in the Maralal highlands, where the research study was conducted (Ltipalei *et al.*, 2020). Samburu county has a higher poverty index than other counties

in the region, with seventy to seventy-five percent of the population living below the national poverty line of about USD 1 per adult per day (Van Anda *et al.*, 2021).

3.8 Methodology

3.8.1 Reconnaissance

A two-day reconnaissance exercise was conducted in June 2022 to facilitate familiarization with the study site. During the visit, sensitization and contacts were established with various stakeholders, including the administrative and community leadership, on the purpose and goals of the study. In addition, logistical plans were done for purposes of sampling and data collection efficacy. The recruitment of one research assistant was accompanied by an orientation into proper understanding of the research questions and methods of interviewing and questionnaire administration.

3.8.2 Study Design

Essentially, the study sought to research the status and trend of certain phenomena and practices. Overall, the study aimed to assess the contribution of both formal and informal insurance towards enhancing cooperation amid climate-driven scarcity and conflicts with the end goal of conflict resolution. Hence, the cross-sectional study design was employed to integrate qualitative and quantitative research and data methods, a mixed methods research design (Kagunyu & Wanjohi, 2015). The design was ideal because it encompassed the depth and breadth of information to enhance corroboration and understanding of the open-ended and closed-ended data as envisioned by Asenahabi, (2019).

Some questions and responses were truncated in time differences of ten years over the past thirty years leading to 2022. This technique was meant to enhance the reliability of the research findings

and conclusions. The responses to the truncated questions were solely based on the respondents' recollection and knowledge of community history and change over time. Interviews were done in either Kiswahili or the Samburu dialect and were translated into English. In addition, respondents were not required to be above the age of thirty years to provide the necessary information. Since pastoralist communities are 'oral societies' (Chelang'a *et al.*, 2015), hence a lot of information is passed on to generations. The triangulation approach complemented the qualitative and quantitative data sets for an integrated analysis and interpretation (Asenahabi, 2019).

The target population for this study was the pastoralists and agro-pastoralists from the Samburu ethnic community. The primary data was collected using semi-structured questionnaires, community mapping, focus group discussions (FGDs), and key informant interviews as per the research design. The findings from the primary data collected were interpreted and presented per the set of research questions drawn from the research objectives. The survey drew samples from two sub-locations. Morijo and Angata Nanyukie sub-locations were purposively selected as they had accessible respondents with the requisite characteristics to address the objectives (Bhardwaj, 2019; Moser & Korstjens, 2018). They met the criteria of the documented presence of IBLI policyholders, a large number of households compared to the rest (KNBS, 2019), and was fairly secure and accessible compared to the rest.

3.8.3 Sampling

The research employed both random and purposive sampling procedures. The study area, Samburu Central sub-County was purposively selected for this study as it satisfies the following criterion. The area has been experiencing climate shocks such as prolonged droughts and resource scarcity. Additionally, the area has a history of pastoral resource conflict occurrences, especially between bordering communities such as the Turkana and Pokot, equally affected by climate shocks. Also,

the area is one of the IBLI pilot sites. Lastly, the area's accessibility and population density were useful in deriving rich data to address the research questions. The sampling unit for this study was the household where one individual, preferably the household head, was engaged in filling out the semi-structured questionnaire. The sampling frame for the survey desired that households be involved in livestock keeping.

This study's target populations were pastoralists and agro-pastoralists in Samburu Central sub-County of Samburu County, which has 33,720 households (KNBS, 2019). Given the fiscal and logistical constraints as acknowledged by Mugenda & Mugenda, (2003), Angata Nanyukie's Location 1,581 households served as the accessible household population for the study.

3.8.4 Sample Size

With a target population of more than 10,000 households, the study employed the (Mugenda & Mugenda, 2003) formula to calculate a sample size (Kagunyu & Wanjohi, 2015; Ongachi & Bwisa, 2013). The formula was employed in light of fiscal and logistical constraints (Ongachi & Bwisa, 2013; Rotich *et al.*, 2014).

Sample size $n = \frac{Z^2 (p)(q)}{d^2}$ $\quad n = \frac{(1.96)^2 (0.05) (0.95)}{(0.05)^2}$

Sample size - n = 72.9905 i.e., 73

Where N is greater than 10,000;

n = The desired sample size (when the target population is greater than 10,000)

Z = 1.96 - Normal standard deviation at 95% confidence level

p = target population proportion estimate is 5% (Rotich *et al.*, 2014)

q = 1-p

d = level of statistical significance

Therefore, where N is less than 10,000 in the case of Angata Nanyukie Location, the accessible population (Mugenda & Mugenda, 2003).

$$nf = \frac{n}{1+ n/N} \qquad nf = \frac{73}{1+ 73/1581}$$

Sample size = 69.77 households

n*f* = the appropriate sample size when the accessible population is less than 10,000

N = Accessible population (Kagunyu & Wanjohi, 2015)

From the formula above, 5% of the accessible population was adopted from (Ongachi & Bwisa, 2013). Whereas Gay (1981) recommends that a 10% sample size of the accessible population is acceptable, this study adopted the 5% estimate leveraging on the homogeneity of the population. In this regard, pastoralists share limited variation in their livelihood characteristics. With a homogenous population of livestock keepers, number tag labels were assigned to households for simple random sampling technique to select participant households. The problem of insecurity in the study limited the study's capacity of having a representative sample. The study villages were purposively selected under the guidance of the local administration officers on which areas were safe to visit at a particular time subject to the availability of respondents. The study noted the erratic escalation in hostilities and violence with concern. Furthermore, Kothari, (2009) notes that a sample is contingent on what the researcher wants to know or the purpose of the inquiry (Rotich *et al.,* 2014).

3.9 Data Collection Methods

Verbal consent was sought from potential respondents as the household data collection tool was in digital form. For a satisfactory introduction, the following points were highlighted prior to

getting consent. That the purpose of the interview was solely for research purposes. That the respondent did not stand to benefit directly from their participation in the exercise. Additionally, they were at liberty to decline to answer any question or withdraw their participation at any point. Also, the respondent was assured of their anonymity. Finally, the respondents were free to ask questions for clarification. A similar exercise was conducted with the key informants, the focus group and the participatory mapping exercise.

3.9.1 Household Survey

The study's sampling unit was the household. With a semi-structured questionnaire, the survey design was used to collect categorical data from adult male or female household representatives. The semi-structured questionnaire comprised multiple selection open-ended questions and five-point Likert scales that were administered face-to-face with sixty-nine household research respondents above the age of eighteen years (Marczyk *et al.*, 2010). The open-ended line of question and answer helped in response rate maximization, as noted by Mwangi *et al.*, (2020). A five-point Likert scale was ideal for this study to appropriately measure the respondents' attitudes and perceptions on various subjects on the specific objectives (Adeniran, 2019). The target population for the study was the pastoralists in Angata and Morijo sub-locations of Angata Nanyukie Location, Malaso Division in Samburu Central sub-County, Samburu County. At the household level, 55 households (80.9%) had never adopted IBLI, as only 12 households (17.7%) were IBLI adopters.

3.9.2 Key Informant Interviews KIIs

Four key informants were selected using the snowballing technique of non-probability sampling, one lady and three men (Lelenguyah *et al.*, 2021). The study interviewed persons of standing in

society as envisaged by Artiningsih *et al.*, (2019) such as members of the provincial administration, community leaders and livestock insurance agents from the locality. The exploratory design sought to compare qualitative data using a checklist of why and how questions during face-to-face interviews with key informants (Lelenguyah *et al.*, 2021).

3.9.3 Focus Group Discussions FGDs

The study conducted an FGD in the study area, comprising 6-12 participants (Moser & Korstjens, 2018). The Focus Group Discussions comprised a purposively selected homogenous sample (Marczyk *et al.*, 2010) of pastoralists who were the target population. This purposive sample comprised participants of IBLI adopters and non-adopters, both male and female. The participants were selected based on their role in the community and age (Sagar-Ouriaghli *et al.*, 2020). They comprised men and women, the elderly 60 years and above, middle-aged 35-59 years of age, and the youth 18-35 years of age. A checklist of questions and topics for discussion was used to facilitate the focus group. The data from the focus groups were audio-recorded for subsequent transcription. The thematic analysis process assessed the narrative information instrumental in enhancing analysis (Sagar-Ouriaghli *et al.*, 2020). Moreover, the information helped triangulate data from other sources while enhancing reliability and confidence in the final report (Artiningsih *et al.*, 2019; Renz *et al.*, 2018).

3.9.4 Community Resource Mapping

The resource mapping activity allowed the Angata Nanyukie Group Ranch members to identify, locate (name of place) and plot the presence, distribution, usage and access of key pastoral resources important to pastoralists within and beyond the area. The team composition was selected by purposive sampling of the group ranch's ranking members, given their knowledge and

experience drawn from their years of residence This was done to help in evaluating the extent to which climate shocks have gone to bear resource scarcity and degradation of key pastoral resource points as well as conflict changes over time. This was instrumental in showing changes in the number and availability of pastoral resources (Flintan *et al.*, 2011). A conventional topographic map was used for reference during the activity (Robinson *et al.*, 2020).

Activity Materials

- A conventional topographic map of Samburu County. (Preferably size A1).
- Colored mark pens
- Craft paper
- Masking tape
- Camera and audio recorder
- Notebook, pens and pencils

3.10 Data Analysis

The categorical data from the household questionnaires was cleaned using Microsoft Excel, then coded and analyzed using the STATA 14. Descriptive statistics of frequencies, mean, standard deviation, percentages and cross-tabulation were generated in tables, bar graphs, and charts using the STATA 14 software for effective interpretation and presentation (Kaliyadan & Kulkarni, 2019; Kaur & Phutela, 2018). The interviews were audio recorded with the respondent's consent for later transcription. The key informant data were qualitatively analyzed for themes and sub-themes (Lelenguyah *et al.*, 2021) that generated narrative information and triangulation from other data collection methods (Artiningsih *et al.*, 2019). The qualitative data from KIIs and FGDs was transcribed, translated and coded on the QDA Miner software. The resource mapping sketch map was preserved for presentation and content analysis. In addition, images drawn from field

observations were used for illustration. A subsequent interpretation of the data based on the various thematic areas was conducted. The qualitative results were used to triangulate the survey results and findings, analyze content, and deduce quotes from participant information to enhance narrative reporting.

Table 3. 1: Data analysis table

Objective	**Methods**	**Data Analysis**
The extent of climate shocks in causing resource scarcity	Household survey, Focus Group Discussion FGD, Key Informant Interviews KIIs, field observations by photographs and resource mapping	Descriptive statistics and content analysis
Trends of conflict resulting from pastoral migration	Household survey, Focus Group Discussion FGD, Key Informant Interviews KIIs, field observations by photographs and resource mapping	Descriptive statistics and content analysis
Contemporary Formal and Informal insurance methods	Household survey, Focus Group Discussion FGD and Key Informant Interviews KIIs	Descriptive statistics and content analysis

4.0 CHAPTER FOUR: RESULTS AND DISCUSSION

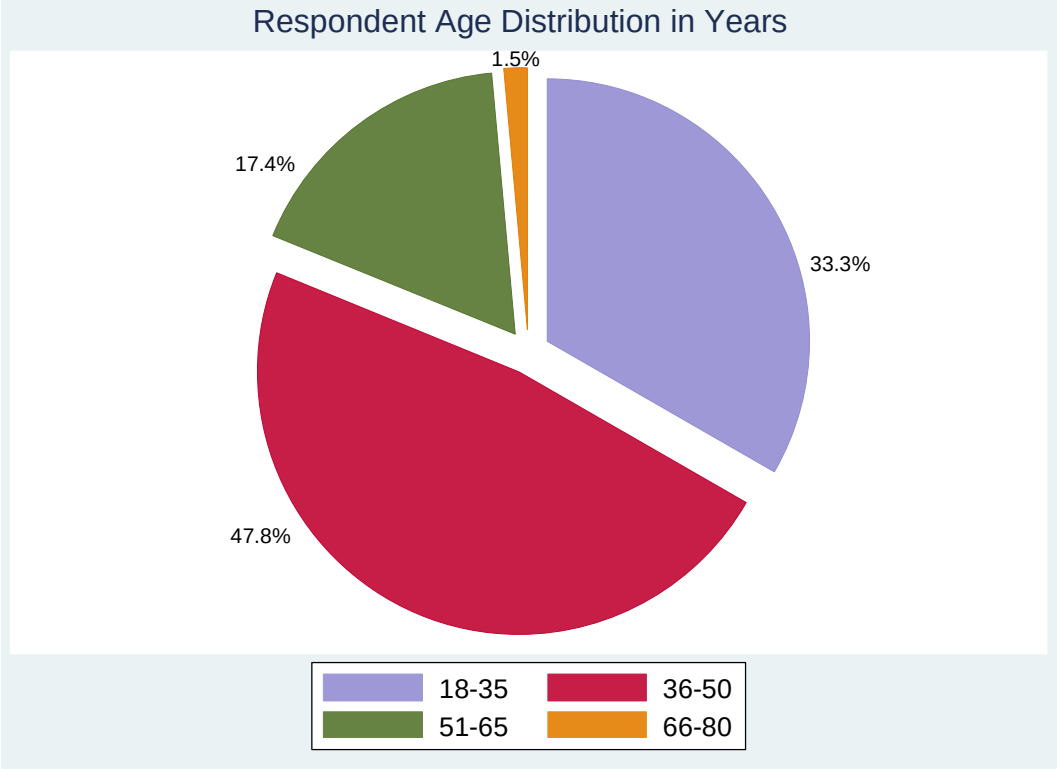
4.1 Introduction

This chapter presents the research findings, interpretation, and discussion of findings with reference to scholarly literature. The results from the field study were presented using tables, bar graphs, charts, translated direct quotes, and images from field observation. The chapter's structure begins with findings of demographic characteristics with the age distribution of respondents was also captured, as shown in Figure 4.1 below. Successive sections present the extent of resource scarcity resulting from climate shocks, the trends of conflict in the mobility quest for pastoral resources, and the contemporary informal and formal insurance methods employed in sharing the risk of resource scarcity. In light of the pressing drought situation, the study experienced respondent mobilization challenges with people migrating in search of pastures and water for domestic and livestock consumption as well as relief food at designated locations.

4.1.1 Household characteristics

The data collected was drawn from 69 filled and returned questionnaires representing 94.5% of the established sample size. With reference to Mugenda & Mugenda, (2003), a response rate of 50% is adequate, while 60% is good and 70% upwards is rated as very good. This is also in line with Bailey (2000) position that a response rate of 50% is adequate, while a response rate greater than 70% is very good. The data collected from the study area was drawn from male 44.93% and female 55.07% of household heads aged eighteen years and above. The household respondents' distribution showed that female respondents were slightly more available than male respondents. Being a pastoralist community, the men are often away from the homestead during the day. The men or morans herd large stocks, such as cattle and camels, while the uncircumcised boys usually herd small stocks, such as goats and sheep. The study found that the women, on the other hand,

are often left to take care of household roles, small stocks, weak and emaciated stocks, and the lactating ones that also provide food supplementation.



The value of n=69.

Figure 4. 1: Respondent Age Distribution

The majority of those interviewed at the household level were between thirty-six and fifty years old, 32 respondents (47.8%), as shown in Figure 4.1. The youth (33.3%) and those between thirty-six to fifty years of age are often proactive; hence they were ready to offer their time to engage in the survey exercise. Additionally, the study acknowledged that pastoralist societies like the *Samburu* are oral societies as espoused by Chelang'a *et al.*, (2015). Therefore, the study relied on historical and contemporary information from both the young and the old.

4.2 Contribution of climate shocks to resource scarcity in Samburu Central sub- County

The two main climate shocks that often adversely affect pastoralism, floods, and droughts, were investigated. The study's respondents (100%) ranked drought as the single and most adverse threat

to the pastoralism livelihood. The data analysis revealed that the current frequency of droughts also indicates an extended occurrence of drought seasons as (92.8%) of the surveyed household respondents reported a zero to two years frequency in the occurrence of drought, as shown in Table 4.1. The study respondents reported that since 2011, there was a significant increase in the frequency of droughts, as shown in Table 4.1.

Table 4. 1: Perceived frequency of drought

Drought Frequency	**Today**	***Percent***	**10 years ago**	***Percent***	**20 years ago**	***Percent***	**30 years ago**	***Percent***
0 – 2 Years	64	*92.8*	15	*21.7*	7	*10.2*	8	*11.6*
3 – 4 Years	3	*4.4*	49	*71.0*	45	*65.2*	7	*10.2*
5 – 10 Years	1	*1.5*	5	*7.3*	17	*24.6*	41	*59.4*
More than 10 Years	1	*1.5*	0	*0*	0	*0*	13	*18.8*
Total	n=69							100

During the data collection, drought was referred to as *Lamei* in *Samburu* and Jalali or Kiangazi in Kiswahili languages. The above descriptions indicate a pervasive drought problem in the study area. Participants in the FGD and community resource mapping exercise gave information that triangulated the above findings.

> "Rainfall patterns nowadays have become unpredictable. Long ago, the elders could inform the community of the coming rains by looking at stars and the moon," said an FGD participant. "Long ago, we used to have a season where we took our cattle for mating near Suguta Marmar, but nowadays, it is dry throughout," said a participant in the FGD.

These quotes show that the drought presents a great puzzle for pastoralists by disrupting their established livelihood. These statements are also affirmed by Kirui *et al.*, (2022), who assert that drought is acknowledged for negatively distorting the pastoralist way of life across Kenyan

rangelands. In this regard Quandt, (2021) notes that drought affects more people globally compared to other naturally occurring hazards. Therefore, the widespread and indiscriminate effects of drought in the study area were found to be the most pressing.

Morever, flash floods were ranked the second major climate shock threatening pastoralism in the study area. Events of flash flooding were reported as spatially isolated and occasional in occurrence. Additionally, flood intensity and effects were reported to vary with the area's topography. The study found that flash floods cause mudflows. Subsequently, soil erosion and land degradation over the past three decades have adversely affected the productivity of pastoralism, especially the availability of pasture resources (Ngigi *et al.*, 2015; World Bank Group, 2021). The formation of huge gullies was reported to cause the loss of life for livestock and human beings.

> "Flash floods usually come after drought. When a lot of water gathers in the seasonal rivers (Lagas) it carries the weak and malnourished livestock and, at times, the unsuspecting herders, especially the boys," said an FGD participant.

The statement above depicts the manifestation of double tragedy resulting from climate shocks. Formal and informal risk sharing becomes an essential proactive approach to cover presumed livestock losses.

The prolonged failure of rainfall, hence drought, and its effect on pastoralism was found to be widespread and indiscriminate. The occurrence and difference in the number of rainfall failures over the past thirty years leading to 2022, as indicated in Table 4.2**,** depicts the extent of resource scarcity in dire conditions. Having little or no precipitation for more than two rainfall seasons illustrates the prolonging of drought for more than one calendar year. Extended drought periods aggravate resource scarcity, hence the need to cover potential losses using formal and informal

insurance. As shown in Table 4.2 below, the drought phenomenon was found to have increased in frequency, hence extended severity and subsequent limited opportunities for recovery.

Table 4. 2: Parceived duration of droughts

Duration of Droughts	**2022**	**Percent**	**10 years ago**	**Percent**	**20 years ago**	**Percent**	**30 years ago**	**Percent**
One Seasonal Rainfall Failure	1	*1.5*	9	*13.0*	21	*30.4*	36	*52.2*
Two Seasonal Rainfall Failures	2	*2.9*	57	*82.6*	44	*63.8*	28	*40.6*
More than Two Seasonal Rainfall Failures	66	*95.7*	3	*4.4*	4	*5.8*	5	*7.3*
Total	n=69							100

Numerous scholarly works corroborate the case of aggravating drought occurrences as they attribute the phenomenon to the anthropogenic distortion of hydrological and environmental processes, hence exacerbating the impacts of drought (Adaawen *et al.*, 2019; Cuni-Sanchez *et al.*, 2019; Siedenburg, 2021; Van Anda *et al.*, 2021). The increased frequency and extension of droughts indicate constrained pastoral resource availability. The decline in water supply and diminishing forage, hence depletion of grazing fields to extreme levels, means tougher times for pastoralists. Also, participants in the FGD agreed that a steady surge in livestock numbers in the community over time was a cause for overgrazing, hence dampening their adaptive capacities towards drought. More so, the effects of drought have wide-ranging effects on other pastoral and non-pastoral aspects of life as well. Subsequently, this study shall discuss pastoralists' tactics in dealing with resource scarcity.

Pastoral and agro-pastoral societies significantly rely on rain-fed natural capital to sustain their livelihood (Mwangi *et al.*, 2020). As shown in Table 4.2, the failure of rainfall usually presents scarcity of naturally occurring pastoral resources, such as forage and water, that compel pastoralists to migrate for extended periods and longer distances. A study by Gebeyehu *et al.*, (2021) submitted that poor rainfall adversely affects herd productivity and the overall resilience of pastoralism.

> "There are not many labor opportunities here. Livestock is our mshahara (salary). Maybe for the men who get work to dig for electric poles and road works," said a household respondent.

This statement affirms a great reliance on pastoralism systems and that drought extremes have driven people to seek alternative ways of survival.

Drought is defined as the observed decrease in seasonal rainfall (Tan *et al.*, 2020). With the increasing frequency and severity of drought, the study respondents decried continued losses in their primary livelihood, pastoralism. The drought and subsequent resource scarcity situation were therefore found to be a core constraint towards ex-post recovery. In this regard, drought cycles in ASAL areas have been noted to have shortened and increased in frequency and intensity (Adaawen *et al.*, 2019). Indeed, as affirmed by this study, droughts have long been the primary causal factor for challenges, inter alia death of livestock, human and livestock mobility, as well as resource-based conflicts, as noted by Adaawen *et al.*, (2019) and Muricho *et al.*, (2019).

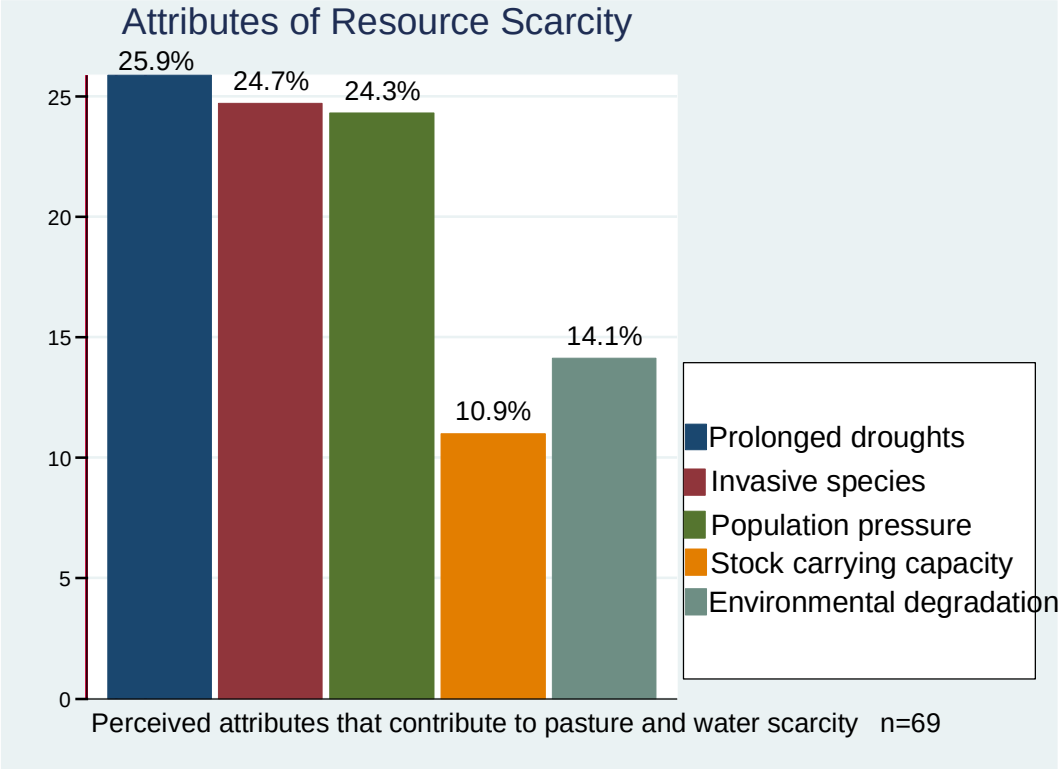
4.2.1 Human and livestock population pressure

The research respondents narrated that the area had experienced increased human and livestock populations since the late 1990s when households of the *Samburu* ethnic group were evicted from areas such as Marti and Mbukui, North of Samburu County. The evictions followed an escalation

of violent attacks from the *Turkana* over raided stocks, and whipping of political and ethnic cleavages. During the FGD, it was narrated that the *Samburu* inhabitants in Samburu North migrated to safer areas in Samburu Central sub-County, such as Morijo, Lkujita, and Ang'ata villages, where they could feel a sense of security among their fellow *Samburu* tribesmen and kin. The local administration corroborated this narrative.

> "The Samburu were evicted from Marti over twenty years ago, and many of them settled in Angata Nanyikie and other parts of Samburu Central sub-County, including Maralal," said an administration officer.

This statement illustrates how resource scarcity coupled with ethnic and political intolerance has disrupted cooperation in Samburu Central sub-County. Over the past twenty years, this displacement has created pressure on pastoral resources in the study area as depicted in Figure 4.2. The population surge of humans and livestock in the research area was attributed to the dwindling of pastoral resources within the study area. As a result, land fragmentation to accommodate, among other things, social amenities, agricultural and human settlement land uses were also reported to have contributed to the dwindling of grazing fields, as submitted by Sax *et al.*, (2022).



The value of n=69.

Figure 4. 2: Attributes of resource scarcity

Increasing changes in the land tenure system through land fragmentation, sedentarism, and rangeland degradation are attributable to the scarcity of pastures (Lenaiyasa *et al.*, 2020; Van Anda *et al.*, 2021). A series of IPCC assessment reports have indicated that the joint impacts of climate change and population upsurge across the HoA are fast-tracking the dilapidation of naturally occurring resources (Adaawen *et al.*, 2019). Additionally, Lelenguyah *et al.*, (2021) and Sax *et al.*, (2022) submit that contestations often arise due to the convergence of groups at similar resource points in times of scarcity.

4.2.2 Environmentally harmful resource scarcity response strategies

The study found that settling *Samburu* households from Samburu North in the late 1990s created stress on the available natural resources, as illustrated in Figure 4.2. Additionally, land that was formerly pasture land has been converted into agricultural farming in the high-potential areas of Ang'ata, Morijo, Lkujita, and Ngorika villages. Forest cover in the study area was also observed to have deteriorated due to clearing for crop farming, charcoal burning, and timber for fencing and constructing human and livestock dwellings, as in Figure 4.3. This corroborates Omollo *et al.*, (2023), who submit that land degradation by overgrazing and deforestation significantly fuel frequent droughts and a decline in range forage abundance.

Figure 4. 3: Images showing environmental degradation practices

From top left to bottom right: Tree felling activity, Manyatta roofed with tree bark, Axe-split timber used for fencing, and Manyatta homestead fenced with axe-split timber.

Source: Field study (October, 2022)

The focus group reported that trees are often felled to get the very top twigs using the popular cut-and-carry method.

> "During the drought, as it is now, when one needs the top tree twigs for the livestock, people usually cut down the trees," said an FGD participant.

Such environmentally harmful coping responses show the extent to which drought has gone to cause pastoral resource scarcity; the situation is further exacerbated by the felling of trees for the twigs and the logs for charcoal burning, firewood, and timber splitting. Such a degradation trend, coupled with long-standing conflict, drought, and desertification, were in 2007 linked to the onset of the Darfur war by the United Nations Environment Programme (Adaawen *et al.*, 2019). Moreover, land degradation from heavy grazing on the peripheries of recently developed water points such as boreholes, as shown in Figure 4.3, has become a concern.

> "This borehole idea is not as good; pastoralists should have been left to adjust to the situation as has been the case for years," said a former livestock insurance agent.

The sentiment above corroborates Niamir-Fuller & Huber-Sannwald, (2020), who refer to the land degradation occasioned by drilling boreholes in the Sahel in the 1970s and 1980s. Moreover, the research respondents also affirmed that newly developed resource points such as boreholes often become conflict hotspots as pastoralists compete to control the pastures adjacent to a borehole.

Figure 4. 4: Degraded pasture fields near a solar-powered borehole

Source: Field study (October, 2022)

4.2.3 Flourishing invasive species during drought

The study was told of plant and insect types whose description fits that of invasive species. The study respondents attributed these species to the dwindling of pastures. They highlighted some plant species that had become perennial by colonizing extensive spaces of what were grazing fields.

> "The lush green you see down and up that hill is not pasture, but a plant that has covered our pastures and is not eaten by the livestock, it is called *lketurai*" said a participant in the community resource mapping exercise.

The study respondents cited plant species in the Samburu dialect, such as, *lketurai, Sunoni, Seiti, Lamuruaki, Ndiati, Labai Suchuai, Senetoi,* and *Lgirigiri* that have over time been observed to displace pastures. They thrive even during droughts when the pasture fields are often barren. Attempts to physically cut down some of the plant invasive species have been futile, with increased aggression of the species. The locust (*lmati*), an insect species, was cited by forty one household

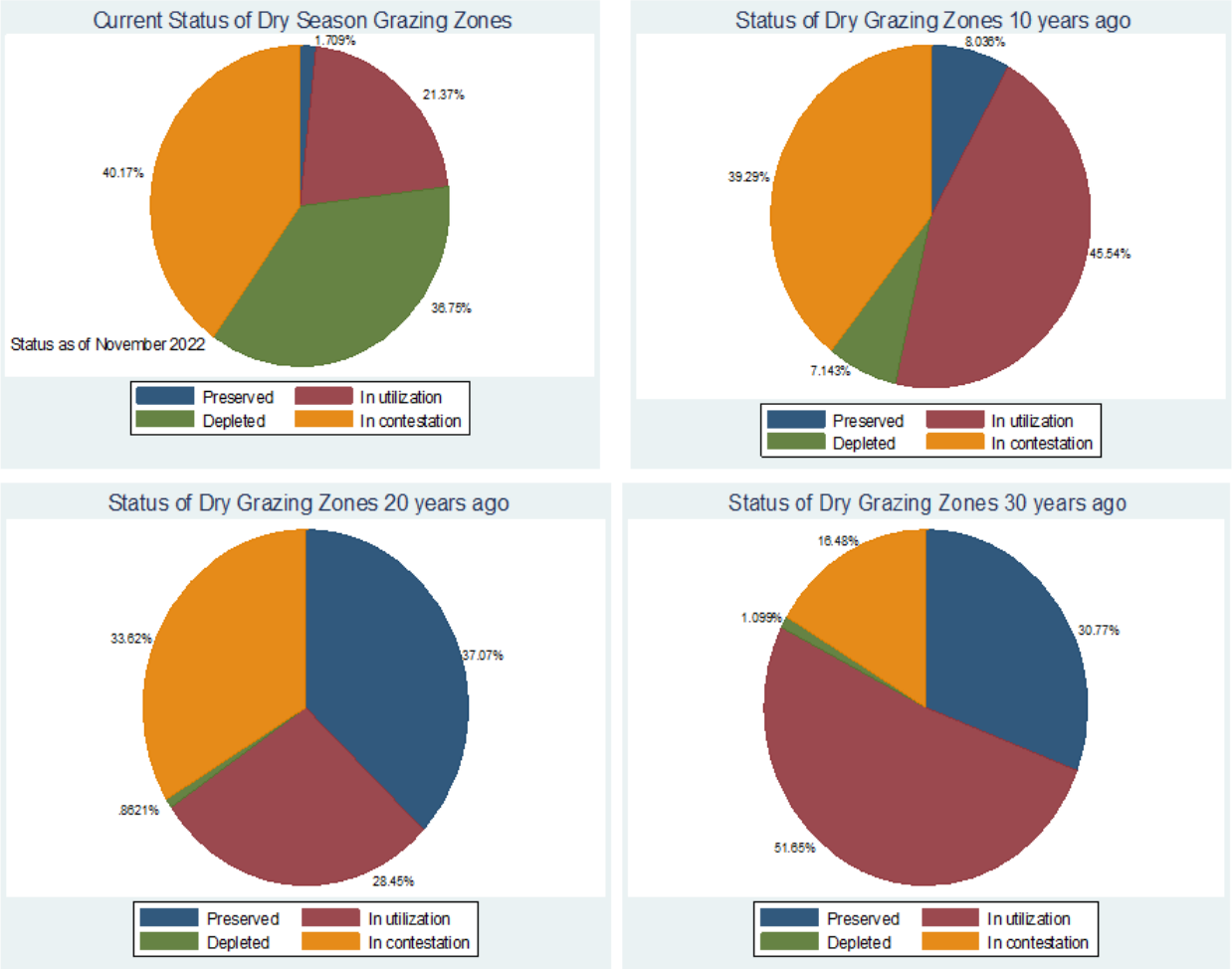
respondents (60%) of the household respondents who saw them in 2020. The manifestation of invasive species within the study area depicted the extent of drought shocks in causing resource scarcity, hence, abetting poor cooperation.

It is estimated that, half of the global rangeland ecosystems have experienced some level of degradation. Approximately 5% of this fragile ecosystem suffers strong to extreme degradation (Omollo *et al.*, 2023). Additionally, Kirui *et al.*, (2022) found that, for poor households, livestock keeping may fail to sustain their livelihoods; hence, they opt for low return and deleterious activities such as charcoal burning and the sale of firewood. Also, about 40% of Kenya's ASALs are undergoing a significant decline in natural resource abundance due to environmental degradation (Omollo *et al.*, 2023). Additionally, indigenous range grasses are fast losing their adaptive capabilities to become among the most endangered vegetation in Kenya (Omollo *et al.*, 2023). Such environmental degradation aggravates resource scarcity that begets a vicious cycle of competition, hence poor resource cooperation. In this regard, the study finds that the aggravation of resource scarcity due to environmental degradation could negatively affect social cohesion in the study area as climate change exposure overwhelms the local resilience capabilities, as is also submitted by Adaawen *et al.*, (2019).

4.2.4 Resource competition and deteriorating intra-communal social order

The poor status of local dry season grazing zones depicted a deterioration of social order, particularly the pastoral resource governance. The dry season grazing zones are pasture fields reserved for the community's livestock during the normal dry season. Pastoral resources were found to be dwindling in quantity and quality due to surging demand but low replenishment rates. The result is competition, depletion, and contestation over the scarce resources, as depicted in Figure 4.5. The study found that the status of the local dry season grazing zones (*paga)* thirty years

ago was just in utilization (51.7%) at around the same time of the year, as shown in Figure 4.5**.** The study found that resource scarcity resulted in aggressive resource competition among fellow community members, given the current depletion (36.8%) and contestation (40.2%) statuses of dry season grazing zones.



The value of n=69.

Figure 4. 5: Status of local dry season grazing zones

As shown in Figure 4.5, contestation in the status of local dry season grazing zones (*paga*) was reported to have been increasing as the reserves were being utilized into depletion. In addition to the drought problem, the scarcity of pastures and water was attributed to the uncoordinated access and exploitation of communal pastoral resources. The study inferred that pastoral resource

governance institutions could have been failing, overlooked, or overstretched over time, hence succumbing to pressure.

> "I cannot say that we have a functioning *paga* system nowadays, most of those locations have become a free for all affair," said a participant in the FGD.
>
> "There are people who ignore the elders' rules and guidance on when to access the preserved dry season grazing zones (*paga*)" said a household respondent.

These statements denote the erosion of established institutions of resource governance for selfish gain at the expense of cooperation and stability. The study found out that often those with large herds of livestock, had the means of exploiting rangeland resources within the communal land and further afield compared to those with minimal herds.

The theme of inequality or unfairness also came out both implicitly or explicitly when the subject of dry season grazing zones came up. That the privileged and influential members of the community are often the first to breach traditional resource governance institutions in 'the tragedy of the commons' model at the expense of the majority. Moreover, the study was informed that the wealthy have better access to livestock health services, pastoral labor, and arming the herdsmen to handle hostilities, much compared to those with minimal herds. Nonetheless, the less influential are also shrewd and will employ other tactics to access pastoral resources.

> "While the rest of us wait for our turn to graze during the day, there are clever ones who graze in the paga at night, hence the quick depletion of pastures," said an FGD participant.

Inequality in resource access was affirmed by FGD research respondents, where it was agreed that some community members had little regard for the long-established resource governance institutions, rendering them weak and ineffective. In addition, dry season grazing zones and water

points on the border between the *Samburu* and *Pokot* communities were reportedly held by armed groups, purportedly by the *Pokot* and the *Turkana* on their respective borders.

The study established that the dwindling of resources such as water and pasture has been accompanied by the escalation of competition and intra-communal conflicts. The reservation of communal grazing areas for orderly exploitation of range resources is a form of insurance meant to optimally maximize key pastoral resources. But it is also a soft spot for intra-communal instability due to the ever surging scarcity. Nonetheless, the study infers that tensions over the access and utilization of local dry season grazing areas is not a new phenomenon, the tensions were latent, but have incrementally manifested over the years leading to 2022.

> "With little consideration for the Paga rules, these herders force access to the Pagas when the elders have not given the green light," said an FGD participant.
>
> "Herders usually contest over who should be first to gain access in light of the limited water pastures that may not suffice to serve everyone's livestock" said a local administration officer.
>
> "Nowadays, unlike long ago, we also experience fights over pastoral resources with fellow Samburu tribesmen. Nowadays, the Samburu from the East of Samburu County, usually come to disrupt peace by attacking our immediate neighbors, the Pokot. We are left to bear the brunt of retaliatory attacks from the Pokot," said an FGD participant.

The statements above depict a community in discord. The study found that resource scarcity over the years had gradually invited unprecedented competition and contestations among the *Samburu*, thus jeopardizing intra-communal resource cooperation. The study found that perhaps the existent inter and intra-communal resource governance institutions had never anticipated such frequent and

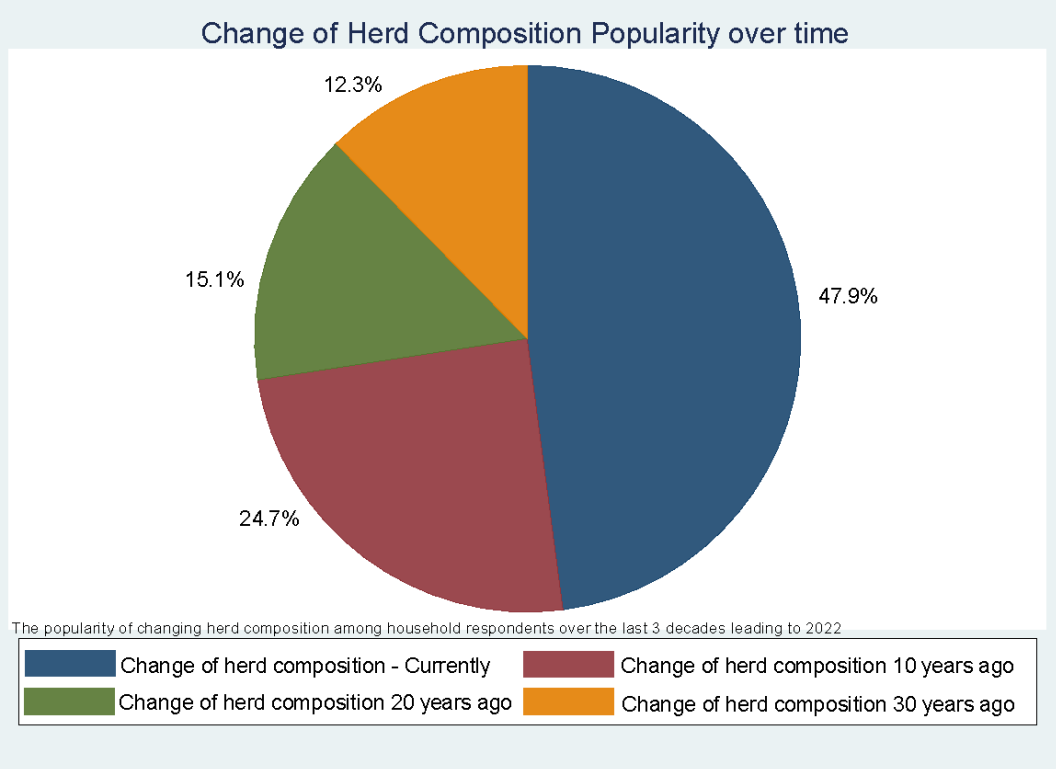
extended drought shocks and the subsequent extreme resource scarcity. The diverse conflictual responses were equally unprecedented. In this regard, the study deduced a pattern of inequity regarding resource access and exploitation accompanied by impunity.

The findings above corroborate Richardson Golinski, (2023), who notes that low precipitation levels increased the propensity for land invasions in Brazil and communal conflict in India. Such an extent of resource scarcity limits pastoralists' coping options; hence, they continue to stare at possible losses amid conflictual and violent interactions. In this regard, pastoralists in the study area are limited to sending their livestock to distant pasturelands, also marked with competition and contestation with other parties such as farmers, ranchers, and the state, as also noted by Adaawen *et al.*, (2019) and Sax *et al*., (2022).

The results above show a resource-constrained socio-ecological setting where resource competition results in deviance, disorder, and subsequent contestations within the community. Additionally, Gebeyehu *et al.*, (2021) submit that pastoral systems are rendered weak by severe drought, such as in the 1970s and 80s when traditional herd management institutions in the Afar region of Ethiopia could not withstand the effects of drought after more than 30 years of stability. Moreover, inequality is often a sign of malfunctional governance institutions. From the literature, such social and cultural institutional decay has been found to bedevil many pastoralist communities across the continent, hence the concentration of wealth in the hands of a few in countries such as Senegal and Kenya, as submitted by Niamir-Fuller & Huber-Sannwald, (2020). The ensuing intra-communal instability amid climate shocks in the study area could further distort social cohesion and, hence, poor resource cooperation.

4.2.5 Change in herd composition and livestock husbandry.

The study's results show that the popularity of herd composition change was almost the same at (12.3%) twenty and (15.1%) thirty years ago; but it had grown to (47.9%) in 2022, as shown in Figure 4.6. The study was informed that given the ravaging drought and its indiscriminate effects, pastoralists and agro-pastoralists in the study area have increasingly considered keeping manageable herd sizes. Often, the herds consist of drought-resistant breeds or deliberate small number herds.



The value of n=69.

Figure 4. 6: Change of herd composition popularity

The study respondents preferred types of livestock perceived as more resilient, such as the camel. The study also found that others were interested in keeping the exotic breeds, especially sheep and goats for their perceived productivity. Other reasons for changing herd composition were the need to alleviate the painstaking burden of managing large herds, newfound sources of income, and the fear of livestock loss from drought and theft or conflict. Nonetheless, the study found that changing

herd composition has existed since immemorial in the study area. The traditional practice was done for herd diversification in livestock herds for better production and resilience enhancement.

The research noted a shift in trend from traditional methods were mixed with more contemporary herd management practices. During the FGD, it was agreed that keeping exotic livestock could be lucrative and an avenue to guarantee high production while averting losses, primarily attributed to resource scarcity.

> "I recently went to the market to sell my indigenous breed of sheep, but I returned home with it because I felt buyers wanted to exploit me by buying at throw-away prices, while at the same time, the buyers offered good money to sheep owners of exotic breed," said a participant in the FGD.

Though the majority of breeds often kept by pastoralists are the indigenous species, the statement above illustrates a perceived preference for quality over quantity among pastoralists in Samburu Central sub-County. The study hypothesizes a growing desire to shift from traditional indigenous to embracing exotic livestock keeping. The study infers that pastoralists are cognizant of the necessity of a paradigm shift. Perhaps they lack the means to execute it due to constraints such as poverty, environmental degradation, insecurity, and inequitable property rights issues, as noted by Ng'ang'a *et al.*, (2020). Such herd management practices are informal insurance with perhaps the potential to recalibrate pastoral resource utility and reduce competition for pastoral resources. This will provide room for resource cooperation instead of competition and contestation.

The findings corroborate Pollini & Galaty, (2021) and Gebeyehu *et al.*, (2021) where the Maasai of Kenya and the Nyangatom of Ethiopia were found to be rapidly embracing resilient innovations to curb ravaging rangeland stressors including petty trade and tourism activities. While the successful adoption of adaptation innovations is contingent on social-ecological and economic

dynamics, Volpato & King, (2019) caution that changing herd composition could potentially breed inequality in the face of climate change. Literature shows that the choice of change in herd composition depends on the social-ecological context and fiscal capability (Ng'ang'a *et al.*, 2020; Volpato & King, 2019). Given the effects of droughts, the study concurs with Volpato & King, (2019) that only a few pastoralists could have the means to self-insure such herd management practices. Such inequality negates the essence of informal insurance, hence threatening resource cooperation.

4.2.6 Embracing the livestock market economy

The study was informed that the livestock market economy was growing, particularly with an increased practice of destocking as a form of herd management. In response to resource scarcity, destocking had risen to (45%). This development was attributed to establishing new livestock markets close to pastoralists. This is in addition to improved infrastructure, such as the earth link roads, rehabilitated by the county government. Since the inception of Kenya's devolution in 2013, the study area has seen the establishment of two new livestock markets: Ngorika and Poro. The proximity to markets could be attributed to the spurred interest in embracing the market economy of livestock and related products. The Poro market was cited for bringing together the Pokot and Samburu, hence, inter-communal cooperation. However, other inter-communal hostilities related to land and cattle rustling were said to have disrupted the growing economic cooperation.

Whereas pastoralists in the study area were gradually embracing destocking, conservative ideas of herd accumulation remain prevalent among the Samburu.

> "I sold my livestock, and I only have five sheep and one cow that I have left for milking. Due to the scarcity of pastures, I found them a liability, I opted to sell them, hoping that I can restock when the rains come, and there are pastures," said

an FGD participant.

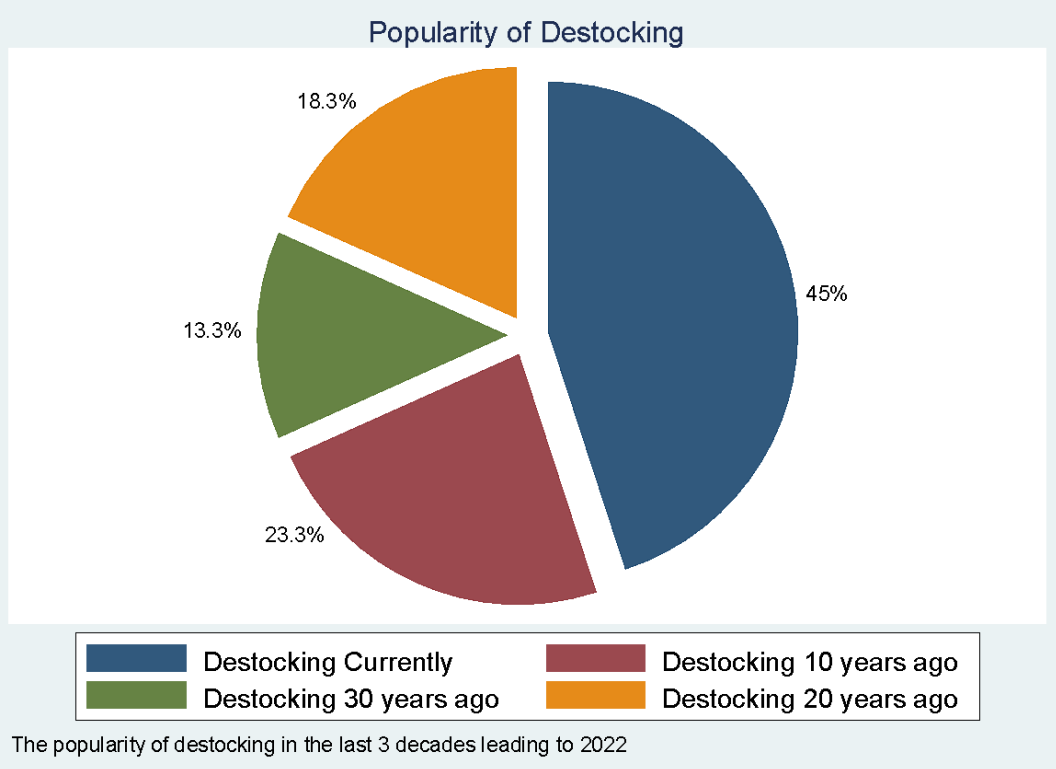
> "In a baraza meeting that preceded the opening of Poro market, an elder stood to say that this idea of having markets all over would later be regrettable as it would impoverish many households," said another FGD participant.

The argument was that pastoralists would become poor due to the frequent sale of their stocks, as it is human to desire fiscal liquidity. This development would mean that pastoralists in Samburu Central sub-County would sell their livestock every so often, particularly with the looming danger of resource scarcity due to prolonged droughts. Indeed, in a study conducted across Kenya's ASALs, destocking was identified as a common and often employed climate shock response strategy, especially among the less endowed pastoral households (Lenaiyasa *et al.*, 2020).

> "There are reports of livestock theft syndicates whose networks extend to the Pokot and Turkana sides; livestock stolen here are sold and slaughtered on the other sides and vice versa," said a local administration officer.

This study also found a downside to the availability and proximity to markets. An increase in livestock theft sold in the black market. Consequently, livestock owners are driven to destock out of fear and uncertainty of insecurity and stealing their livestock, as noted by Lenaiyasa *et al.*, (2020)

As shown in Figure 4.7, since the beginning of the last decade, roughly since 2012, there has been a significant inclination towards destocking among pastoralists. Currently, (45%) of household respondents reported to have been voluntarily off-taking their stocks. Nonetheless, the research found that, generally, pastoralists are unwilling to sell their stocks in large numbers, perhaps in the hope that their stocks would survive the drought, hope that continues to dwindle with increased drought frequency.



The value n=69

Figure 4. 7: Popularity of herd destocking

> "It is culturally significant for the Samburu to have many 'souls' roaming around the manyatta," said a participant in the FGD.

This statement corroborates Lenaiyasa *et al.*, (2020), who find that pastoralists in Samburu hold on to their herds because, majorly, it is an occupation. Scholarly evidence shows that pastoralists could end up impoverished due to the loss of livestock, especially in the absence of alternative sources of income (Kirui *et al.*, 2022). Therefore, the study infers that income from destocking creates stability and improves cooperation.

The study found that some reasons for selling livestock were informed by the need to fulfill household needs such as food, household commodities, and needs such as school fees. For this reason, destocking could also be said to help in dietary supplementation and improvement of living standards. For instance, the sale of livestock to facilitate the payment of school fees should help

improve the living standards among pastoral communities in the future. Destocking programs have been encouraged and spearheaded by the Government of Kenya in collaboration with partners such as the Kenya Red Cross. In this regard, Ngigi *et al.*, (2015) note that livestock offtake is employed as a key resilience nurturing and ex-post-shock coping method. The study infers that it promotes cooperation by mitigating competition for scarce resources.

The study was informed that two cows are usually exchanged for one camel while five goats are equated to one cow. From literature, ways of livestock off-taking include household slaughter, sales, gifting, death, and theft (Nyariki *et al.*, 2005). For this study, livestock off-take or destocking is the transactional disposal of livestock, often by making sales through cash, batter trade, or livestock transfer (Nyariki *et al.*, 2005). The study found that destocking was not a popular resource scarcity response approach for pastoralists across Samburu Central sub-County until the establishment of devolution by the Constitution of Kenya 2010. This finding negates the traditional and customary practices of herd accumulation as a form of self-insurance (Muricho *et al.*, 2019; Nyariki *et al.*, 2005), a sign and affirmation of social status and cultural prestige as submitted by Lenaiyasa *et al.*, (2020).

Although destocking might not be widespread, the study found a growing popularity of herd offtake.

> "Selling livestock is unpopular among the elderly in the Samburu community; the youthful community members are more open to selling their stocks," said a local administration officer

The above statement is in concurrence with Kirui *et al.*, (2022), that pastoralists have for ages banked on the perception of building their herds as a form of self-insurance. The benefits of large herds, such as animal products, transcended those of selling their stocks. In this regard, empirical

studies find that advancement in formal education has a positive correlation to destocking, keeping small herds, the pursuit of non-livestock livelihoods, and exiting from pastoralism altogether (Muricho *et al.*, 2019; Van Anda *et al.*, 2021).

The study found that resource scarcity resulting from drought shocks had led pastoralists to purchase fodder (72.6%) as shown in Figure 4.8 below.

> "There are those that can purchase and transport grass to their livestock," said a household respondent.

This finding was supported by the FGD participants, who affirmed the site of vehicles transporting fodder within their localities. Though with growing popularity, not all may afford commercial fodder for their livestock.

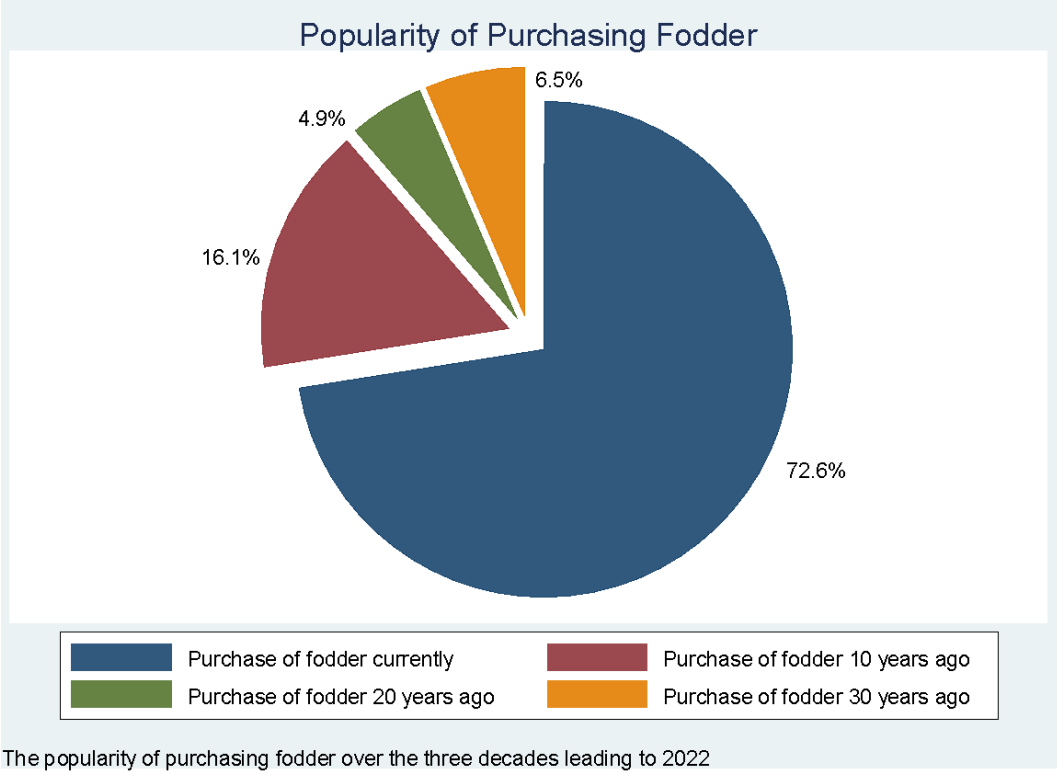


Figure 4. 8: Popularity of purchasing fodder

Studies in Kenya and Ethiopia have shown that pastoralist IBLI adopter households are able to purchase fodder, health products, and services for their livestock when they receive payouts (Banerjee *et al.*, 2019). Using cultivated fodder has also been embraced in Ethiopia and Tanzania (Ng'ang'a *et al.*, 2020). Therefore, embracing fodder among IBLI adopters would enhance herd resilience.

4.2.7 Decline in herd size threatening pastoral drop-out

The study sought to assess the distribution of livestock ownership among pastoralists in the study area. Cattle, goats, sheep, and camels are the primary livestock types owned by pastoralists and agro-pastoralists in the study area. The average year for large herd sizes was indicated as 2014, while that of least herd sizes was reported to be 2020. Primarily, the steady fall in the size of herds among pastoralists in the study area was attributed to drought, causing scarcity of pasture and water. Also, the distress sale of livestock to avert losses from livestock mortality due to ravaging droughts causes a significant decline in livestock numbers. Most respondents in the surveyed study reported some of the lowest herd sizes in the extended 2020-2022 drought. Perhaps this alarming reduction in household herd size portrays the aggravation of pastoral drop-out.

Additionally, the households' largest ever kept herd size was reported to have been 148 Tropical Livestock Units (TLU), the lowest was 16.3 TLU, and the current mean livestock ownership was 9.55 TLU, as shown in Table 4.3 below. The study found the livestock loss trajectory to be a pathway towards dropping out of pastoralism, as demonstrated by the mean of TLU herd size ownership in Table 4.3. Studies show that livestock loss likely paves the way for a vicious cycle of poverty traps that would require expensive interventions to undo, as posited by Kirui *et al.*, (2022).

Table 4. 3: Household average herd ownership over time in TLU

Herd ownership over time in TLU	Responses	Mean	Standard deviation	Minimum	Maximum
Current TLU	69	9.553623	15.44513	0.2	77.6
Largest TLU ever owned	69	27.91594	27.7826	0.4	148
Least TLU ever owned	69	4.717391	4.038526	0	16.3

The increased decline in livestock numbers was discussed during the FGD, where it was agreed that it rendered pastoralism unsustainable.

> "With this drought, we have seen people we considered as wealthy becoming poor in a short time due to loss of livestock," said an FGD participant.

This statement shows droughts' indiscriminate and adverse effects on livestock in the study area. The extent of resource scarcity resulting from extended low precipitation levels, as this study found, leads to low productivity and reduction in herds, hence, livelihood deterioration and the subsequent pastoral poverty.

The apparent decline in household herd sizes indicates that pastoralism also suffers economic losses from natural disasters. Global pastoralism losses have risen from $25 billion in the 1980s to $175 billion in 2016 (Clement *et al.*, 2018). In the event that herd sizes had declined due to the

increased popularity of destocking, the essence was not to entirely drop pastoralism. A study by Lenaiyasa *et al.*, (2020), noted that the goal of destocking is to realize a manageable herd size in light of the forage and water availability while fulfilling other fiscal commitments but is not done to abandon livestock keeping entirely.

Therefore, the study inferred that keeping manageable herd sizes could also provide room for investment into formal insurance methods such as IBLI. Additionally, empirical research conducted in the Borena zone of Ethiopia indicated a significant decline in household livestock holding in the last decade due to weather shocks that drive stocks below subsistence threshold levels, as noted by Gebrekidan *et al.*, (2019). Most critically, Lind *et al.*, (2020) note that East Africa's per capita livestock holding has increasingly been incapable of satisfying subsistence requirements. Prolonged periods of suppressed or no precipitation have been the most impactful attribute towards pastoral resource scarcity over the past thirty years, adversely affecting household herd sizes. The reliance on rainfall to replenish forage and water for pastoral livestock has adversely affected the pastoralists' livelihood. In this regard Adaawen *et al.*, (2019) and Quandt, (2021) submit that vulnerable societies, especially those that rely on natural capital, are set to bear the brunt of climate shocks such as drought.

4.3 Pastoral mobility conflict actors

Figure 4.9 illustrates the distribution of actors involved in varying magnitudes of conflict with pastoralists and agro-pastoralists in the study area. Mainly, these conflicts revolve around the access and utilization of critical pastoral resources. This is to the detriment of informal insurance practices of resource sharing that enhance cooperation. The study found that herders often clash over the region's limited pasture and water resources. Across the past three decades, the study was informed that the major actors in pastoral mobility conflicts are the pastoralist groups, allied or

pitted against themselves. In light of the changing conflict dynamics, this study found that there has been a trend of increasing actors who often conflict with herders during herd mobility. Ranchers and farmers within Samburu County and counties such as Laikipia and Isiolo have increasingly been fighting with *Samburu* herders.

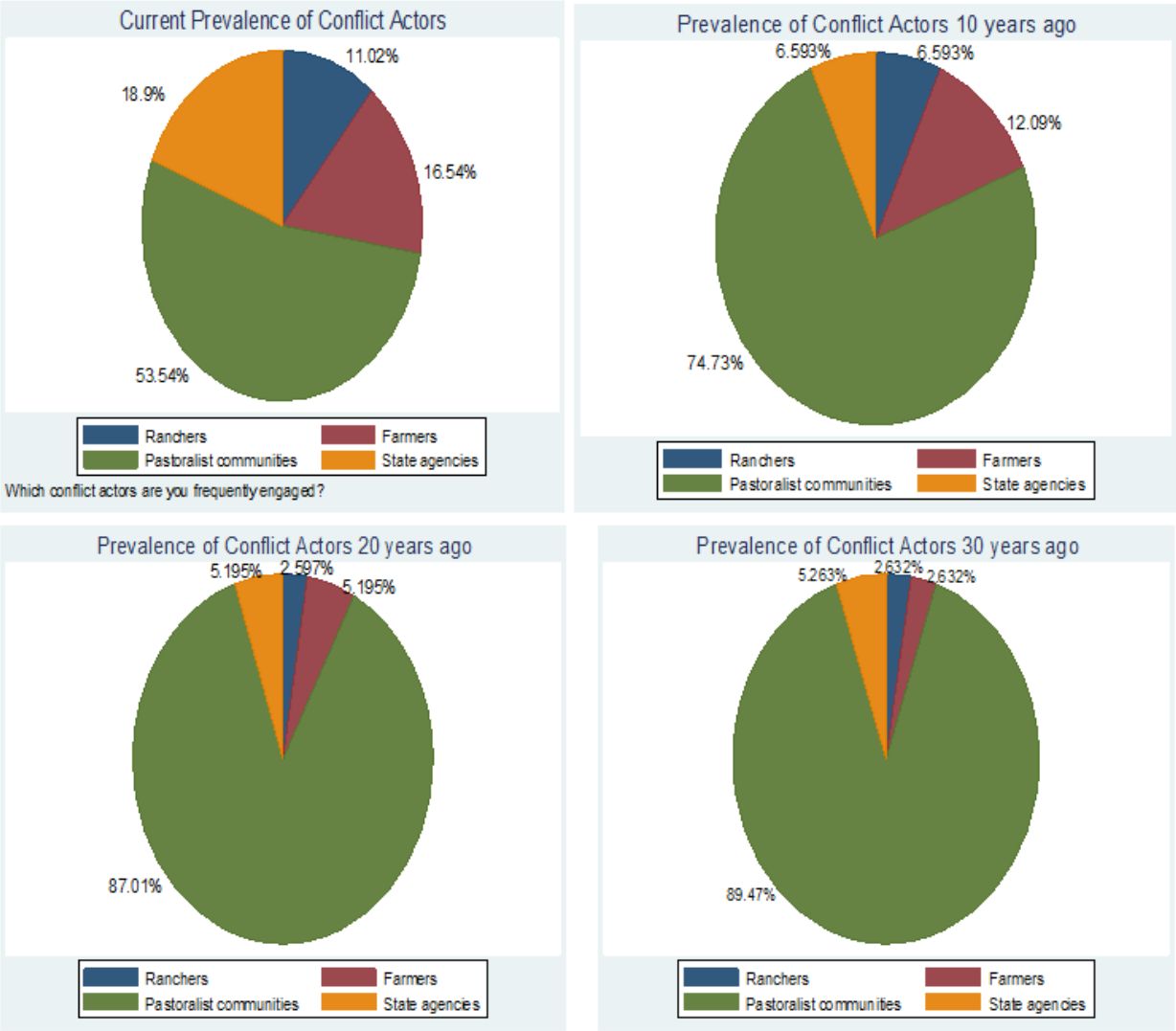


Figure 4. 9: Prevalence of mobility conflict actors

Cases of encroachment into private ranches and farms by *Samburu* herdsmen have been widely reported to result in violent conflict. Usually, the bone of contention is primarily the access to pasture and water resources during scarcity. As a result, state authorities, such as the police, usually seek to intervene by trying to curb hostilities; hence, they become actors in the conflicts. Cases of

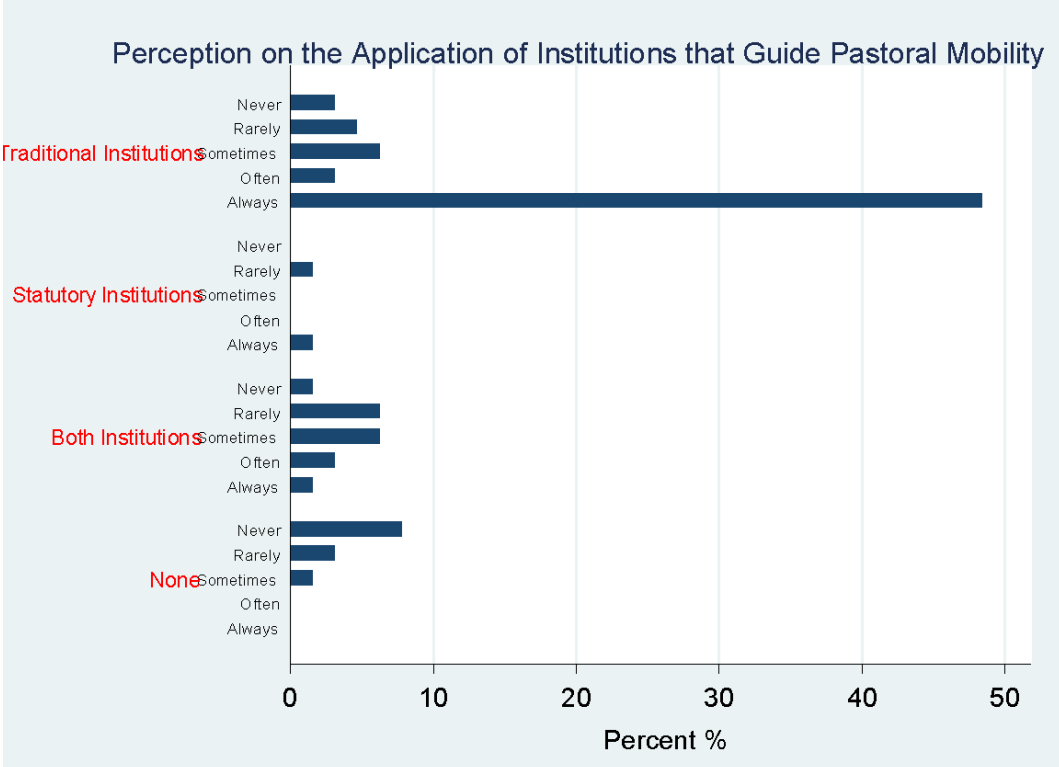
mass police killings include Baragoi and Suguta Valley in Samburu County, which Okumu, (2021) has documented. The prevalence of violence inhibits the potential of instilling cooperation between pastoralists and the various actors through informal resource-sharing practices that once thrived.

> "The Pokot and Turkana have numerously attacked us violently whenever they want to depose us off anything," said a participant in the FGD.

The research found that the Samburu point the Pokot and Turkana for being expansionists and the main aggressors in the contestations over pastoral resources, particularly during the drought situations in their quest for pastoral resources. For instance, the Samburu reported that the *Pokot* and *Turkana* had forcefully occupied grazing lands that have been used by the *Samburu* and geographically in Samburu County for ages. On the flip side, the *Samburu* have numerously been reported to be encroaching into private ranches and agricultural farms in Samburu and Laikipia Counties, especially during the dry seasons, as noted by Mwangi *et al.*, (2020).

4.3.1 Disruption of traditional resource governance by Moranism

As depicted in Figure 4.10, using traditional resource governance institutions was perceived and rated as always. This means that they are the most popular source of authority for approximately (50%) or 34 respondents. Statutory institutions for this research were the formal or legal guidelines, particularly of land tenure. They were reported to be critical for guidance before and when embarking on herd mobility. Nonetheless, the popularity of traditional resource governance is inconsistent as they are ineffective in enhancing pastoral resource cooperation. During the FGD, it was agreed that for the *Samburu,* the community council of elders (*lpayani)* is the custodian of resource governance. For instance, they should guide and negotiate the community's pastoral resource access. However, things have changed.



The value of n=69

Figure 4. 10: Perceived application of institutions that guide pastoral mobility

The research found that traditional institutions were increasingly being disregarded, particularly by the Morans. Contempt for traditional institutions was found to pervade the pastoral mobility issue and other community aspects.

> "The latest crop of morans have lacked proper teachings. They have become degenerates as some abuse drugs such as alcohol and Miraa (khat)" said a local administration officer.
>
> "Nowadays, we, the mothers, have been left to plead with the morans not to steal livestock or conduct revenge attacks; they usually will not take advice from the community elders," said a participant in the focus group discussion.
>
> "If the Samburu and Turkana meet at a resource point, they just combat one another

because of intolerance," said a community leader.

The statement above indicates intolerance among herders, often the morans, amid pastoral resource scarcity. This finding suggests an aggravation of hostilities instead of cooperation in shared adversity. During the FGD, participants agreed that deviant moranism began to manifest when the *lkishami* age set were circumcised into moranism in 2005 and currently, the *Lkumwatu* or *Lkiseku* who graduated into moranism in August 2019. The above information shows how a youthful and critical institution of the *Samburu* community is watering down existent and prospective cooperation.

The study was informed that Moranism was essentially meant to instill a sense of belonging, prestige, and responsibility through the gratification of autonomy and freedom within age sets. In addition, brandishing and possession of weapons such as daggers, wooden clubs, spears, and arrows is permissible. But in modern times, firearms have become almost a necessity among the herder Morans. They graduate from this stage when elders across the Samburu territory have approved the circumcision of another lot of boys. The transition from Moranism happens around the ages of twenty-six to thirty. From here, they are considered mature enough and are at liberty to marry and start families. It was reported that the contemporary crop moranism was deficient in the requisite guidance from older generations of men. Thus, the unsanctioned cattle-raiding culture and abuse of lethal weapons have become rife. The blame was equally apportioned to the older generations of men for poor mentorship.

It emerged from FGD that inter-communal hostilities had intensified in the last three decades due to the disorderly behavior of morans and declining authority of the council of elders (*lpayani*). Though implicitly, the respondents blamed the rebel morans, sympathizer elders and profiteers of violence for watering down gains of cohesion and cooperation. This has borne an escalation in

hostilities within the community and between the *Samburu* and their neighbours, the *Pokot* and *Turkana*.

> "If at all they could listen to us, their parents, not to go for the raids, there would be less suffering and more peace in the community," said a woman community leader. "When a moran possesses a gun, their goal is to be wealthy with money and livestock. Some parents embrace their sons when they bring home raided livestock," said an FGD participant.

Based on the above statements, the study inferred a complex clash of ideology and goals between the progressive and some outdated customary traditions. Introducing the modern-day ideas of market economy prospects and societal coexistence in a desired setting of the rule of law further complicates the situation. These findings are consistent with Abrahams, (2020) submission, that externalities in the pastoralist region of Karamoja in Uganda have gradually contributed to the breakdown of traditional governance structures. Externalities such as the introduction of devolution administrative and electoral boundary demarcation have been faulted for disrupting the established of local institutional governance (Elfversson, 2019).

4.3.2 Transformation from cattle raiding to cattle rustling

The study inferred that the desire to accumulate livestock wealth is mainly fueled by prestige, post-drought herd restocking, or illicit sale. Additionally, the study sought to find out trends in cattle rustling. It was deduced that cattle raiding incentives, motivation, and goals had mutated from cultural practice. In this regard, participants in the FGD agreed that cattle raiding had evolved into a more aggressive and multi-actor, commercially driven endeavor. This differs from the initial practice that was meant to be less adversarial and hardly any fatalities since it was properly sanctioned by traditions.

However, the study found that nowadays, the practice is not sanctioned by the elders' institution (*lpayani*). The (*lpayani*) was reported to be divided, hence certain factions usually approve while others disapprove of raids. During the FGD, participants agreed that some sympathizer elders had been co-opted to purportedly bless the rustlers before embarking on the offensive with the promise of sharing in the spoils.

> "As it stands, the council of elders is divided with one group of elders completely shunning the practice while others support and give blessings to the warriors," said a local women's leader.
>
> "Long ago, the raided livestock used to be taken to the elders for subsequent redistribution, but nowadays, the raiders decide what to do with the stocks" said a local community leader.
>
> "Long time ago, the girls used to sing and dance for the Morans that brought home livestock from other communities, but nowadays, the practice brings us more suffering than pride," said a female participant in the FGD.
>
> "People who support livestock raiding often change their mind when they lose their loved ones," said a male FGD participant.
>
> "In the olden days, cattle raiding did not witness the kind of destruction and human suffering as is the case today because they did not use lethal weapons like the gun," said a local administration officer.

The practice has since degenerated into a sequence of violence and livestock theft that leaves tales of suffering, successive retaliations, and counterattacks. The complexities created by this cyclic violent practice mainly involve the *Samburu* warriors and their neighbors, the *Turkana* and *Pokot,* and the police, who have always sought to intervene. While taking stock of the history of cattle

raiding among pastoral communities in the HoA, coherence is widespread that cattle raiding has turned more aggressive and violent in the last half a century (Abrahams, 2020; Ltipalei *et al.*, 2020). The sophistication of armed conflict has resulted from the proliferation of small arms and light weapons (SALW) through the porous national borders of the frontier territories of Kenya (Elfversson, 2019).

4.3.3 Resource control using violence

The imperative to gain access and control the scarce pasture and water resource points within the study area and beyond has borne the need to acquire sophisticated weapons. The research respondents highlighted resource-rich areas that armed groups of the Samburu, Pokot and Turkana controlled, as shown in Table 4.4. Pastoral mobility is made possible by carrying firearms to guard against violent aggression and predators while providing a sense of security. This endeavor has gradually borne an arms race pitting the Samburu and her immediate neighbors the Pokot and Turkana.

Table 4. 4: Accessibility status of distant drought season grazing zones (Laleta)

Drought grazing zones (*laleta*)	**Communities sharing resource**	***Occupied by Armed groups***	***Deserted***	***Accessible but contested***	***Accessible & Peaceful***
Marti	*Turkana and Samburu*	✓	✓		
Mbukoi	*Turkana and Samburu*			✓	
Kalele	*Turkana and Samburu*			✓	
Nanok	*Pokot, Turkana and Samburu*	✓			
Loibashai	*Turkana* and *Samburu*			✓	
Leparmarai	*Pokot and Samburu*				✓
Nadome	*Pokot, Turkana and Samburu*	✓			

Suiyan	*Turkana and Samburu*		✓
Sira	*Borana and Samburu*	✓	
Laingoni	*Turkana and Samburu*		✓

The fight for the control of areas rich with pastures and water depicts an expansionist campaign by pastoralists to access and utilize resource by force.

> "This area is a battle zone every now and then, day and night," said a household respondent.
>
> "The Pokot have forcefully occupied our dry season grazing zones on the border with them" said a male respondent from Morijo.
>
> "I believe you have heard that our herdsmen have been vandalizing and encroaching into the people's ranches in Laikipia," said a local woman community leader.

Additionally, telecommunication advancements, especially mobile phone use, have enhanced violent conflicts among pastoral communities. Communication becomes faster as attack and counter-attack strategies can be planned incognito without formal physical meeting. Such arrangements can easily go undetected by the other side or by the security apparatus in the area.

> "Mobile communication has its disadvantages. Using mobile phone communication, information is passed on, such as the number of livestock to be stolen and how best to counter resistance from the herders," said a participant in the FGD.
>
> "When the cattle rustlers go to spy for livestock, they do not need to return to pass the information," said a household respondent.

> "There are fellow Samburu elders and mothers who support the course of violently raiding and evicting our neighbors because they benefit from it. If their Moran son brings home the raided cattle, they welcome the idea. Until one loses a loved one from the raiding or retaliatory attacks, they might not discourage their kin Moran to stop it" said a local community leader.

The general exposure to conflict and the concomitant resource scarcity have been found by Sitati *et al*., (2021) to cause vicious cycles of conflict. Additionally, Lind *et al.*, (2020) attribute the lack of proper and institutionalized resource governance frameworks across East African rangelands as the major impediments to overcoming challenges brought about by climate shocks such as drought. The resource mapping activity paints a picture of pastoral resource distribution, access and utilization in the study area. During the resource mapping exercise, all seasonal watering points were reported to have been dry due to the prolonged drought. The perennial water points were reportedly in use but were marred with contestation over access and utilization among the *Samburu* and between other communities, such as the *Pokot* and *Turkana*. The normal grazing zones that are used during the wet season were reported to be depleted, and the idea of preserving *paga*s was no longer feasible. The participants identified the regular and dry season routes; hence, the research found that normal grazing is often done close to the manyatta, especially when there has been good rain. Otherwise, prolonged droughts mean that their livestock, especially the cattle, will have to be in distant grazing fields until it is right to return home.

Distant drought grazing zones (*laleta*) were reportedly at the heart of insecurity and fierce hostilities due to contestations over pastoral resources between the *Pokot, Turkana, Borana, Gabra* and *Samburu,* all jostling for the control of key pastoral resources therein. The research respondents expressed concern about the level of insecurity in areas such as Marti, Mbukui, Nanok,

Nadome, Kalele, Leparmarai and Loibashai, as shown in Table 4.4 and Figure 4.11. These are usually rich in forage and water during dry seasons. Consequently, the *laleta* have been deserted for settlement by pastoralists and can only be accessed by herders with the requisite means to withstand aggression from often hostile armed groups. In the same vein, pastoral mobility conflicts were reported to have had a steady increase in frequency and intensity in recent times compared to the course of the three decades leading to 2022, as will be indicated in subsequent sections.

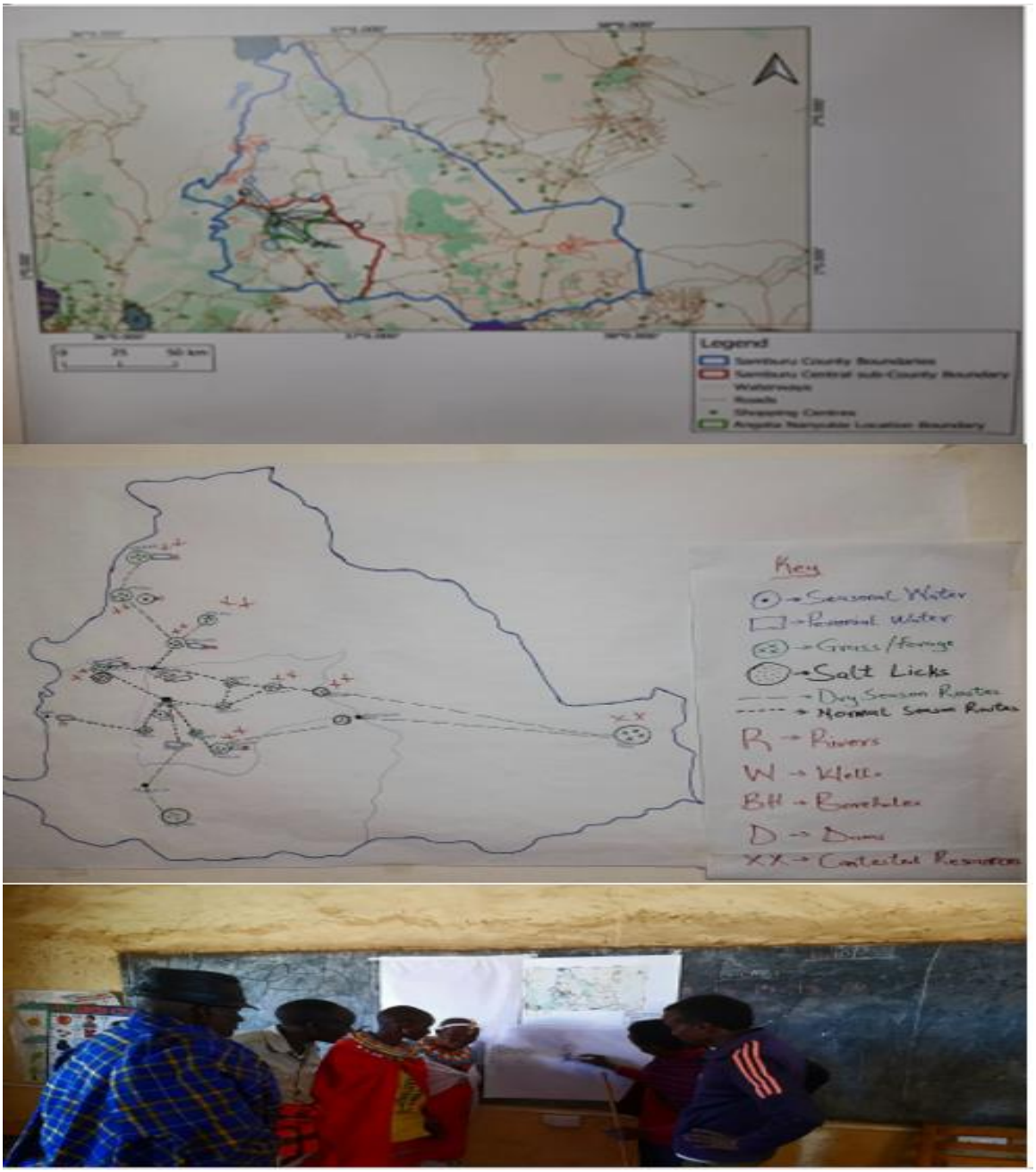


Figure 4. 11: Resource mapping activity

4.4 Livestock insurance strategies

The study sought answers on pastoralists' formal and informal insurance strategies. These are su to help them cope with pastoral resource scarcity while guaranteeing resource cooperation instead of competition and violent conflict. This study used the Index Based Livestock Insurance (IBLI) model to assess resource cooperation. The long-established informal insurance resource-sharing strategies enhance cooperation, even during ecological scarcity.

4.4.1 Social networks in resource cooperation

The theme of the importance of social linkages was replete from the data collected. The study found that social networks are critical in enhancing resource access and utilization. Individual pastoralist households rely on social capital information and goodwill to guarantee a reliable supply of pastures and water for their livestock.

> "Since we are pastoralists and must move, when we get to another village like Morijo, we will negotiate with the elders because they understand that the drought has pushed us. They know it could also happen the other way around," said an FGD participant.

The statement above indicates the importance of having social networks among pastoralists as it enhances resource cooperation. The social networks also cater to the herders' and their livestock's accommodation, supplies, and security. Such essential supplies include food and shelter that their hosts provide. The study found that, often, social networks encompass blood relations, clan members, and friends; one can also leverage the networks of others to secure pastoral resource access rights.

This study found that such informal insurance practices have been institutionalized over time as they are based on altruism and goodwill but are also marked with reciprocity expectations. This finding corroborates Ng'ang'a *et al.*, (2020), who note that social networks among pastoralists form part of the household asset base. The FGD participants agreed that whenever herders find themselves in unfamiliar territory, they should establish proper rapport and equip themselves with the appropriate negotiation skills, thus enhancing resource cooperation. The research respondents acknowledged that the language barrier often challenges the quest for resource cooperation. Across Africa, pastoralists have sought to maintain social linkages within and between adjacent societies to mitigate adverse shocks such as external aggression, environmental circumstances, and disease (Gebeyehu *et al.*, 2021; Nyariki *et al.*, 2005).

However, the study noted that intra and inter-communal links of social networks were being disrupted due to the escalation of competition and hostilities punctuated with self-seeking tendencies such as livestock theft. In this regard, Johnson *et al.*, (2023) and Nyariki *et al.*, (2005) note that the decline of social networks is attributable to the whims of a capitalistic economy that have gradually influenced the pastoral way of life. Insecurity and hostilities in the study area threaten the existing linkages to resource cooperation. For instance, the research found that, unlike before, free movement of herds within the Samburu territory has become difficult because of aggression from fellow Samburu tribesmen, a phenomenon unheard of long ago. The situation could be worse when it involves going to herd livestock in another ethnic community's territory.

Herd Splitting

Herd splitting or *aitaya* in the *Samburu* dialect has been a reciprocal risk-sharing method since time immemorial. Herd splitting among the *Samburu* is recognized as a practical response strategy

against the low availability of pastoral resources. It is a reciprocal approach to managing resource scarcity among pastoralists while maintaining social networks. During the FGD, it was agreed that the common practice is that the physically strong and healthier stocks are driven to distant fields while the emaciated and weak animals are left behind for attentive care, given the limited pastoral resources. In addition, sheep were reported to thrive better in cooler places, such as the peripheries of Kirisia forest, while the goats and cattle may not withstand the cold and hence are sent further to dry areas as they can also browse. In practice, herd splitting involves pastoralists with sheep, sending them to their friends and kin in the greener highlands and the goats and cattle in the drier lowlands.

> "Pastoralists usually trek their cattle to Suguta MarMar where there are minerals that enhance mating," said an FGD participant. "I often send my cattle to Suguta Mar Mar near Laikipia, where I have in-laws" said a household respondent.

These two statements show the importance of the Suguta Marmar area within Samburu County in feeding, nutrition, breeding and enhancing resource cooperation among the *Samburu* community. The study found that herd splitting helps pastoralists' herds extensively exploit the rangelands' dynamic nutritional value, as submitted by Ng'ang'a *et al.*, (2020). The method aims to distribute the grazing pressure on the vast rangelands (Wasonga *et al.*, 2003). The study respondents affirmed that herd splitting involves apportioning part of one's herd to trusted social linkages endowed with surplus water and forage in their localities, as also noted by Gebeyehu *et al.*, (2021). However, due to the widespread scarcity of key pastoral resources and the risk of conflict, the FGD participants agreed that herd splitting had declined in effectiveness and practice in roughly the last decade. Most importantly, herd mobility maximizes rangeland resources while aiding pastoralists to flee from adversities, including conflict-correlated damage (Gebeyehu *et al.*, 2021; Nyariki *et al.*,

2005). Therefore, through its reciprocal incentive, herd splitting qualifies as an informal risk-sharing method that enables intra-communal resource cooperation while enhancing socio-ecological resilience.

Labour pooling

Shared adversity bears the need for cooperation in coping with cross-cutting challenges. Labor pooling as an informal risk-sharing method was hailed for utilizing social linkages in times of resource scarcity. In times of drought and subsequent scarcity, the pastoral labour needs often intensify, hence the call for pooling efforts together.

> "Say that we have a cow that cannot move because it is weak from starvation; the women wake up to go and look for pastures to bring to the cow. If we have weak goats or sheep that cannot migrate with the rest, we arrange for one woman to graze them while another takes care of the children at home. Tomorrow, another one, we take turns," said a household respondent.

Labour pooling usually brings neighbours, kin, and friends together, depending on the nature and intensity of work. Much as individual households are busy trying to salvage themselves from the risk of natural disasters, they still make time for one another, especially given that communal grazing zones have been depleted and become violence hotspots.

Examples of work activities that often require labor pooling were identified during the research. They include the construction or fencing of nursing paddocks for the weak, emaciated, and sickly animals; the lifting of fallen and emaciated animals such as cattle. Labour pooling is also employed when excavating and drawing water from hand-dug wells. Mutual support for one another involves

sharing resources in ‘good’ and ‘bad’ times, hence reciprocity that reinforces long-term relationships, as is also espoused by Gebeyehu *et al.*, (2021).

Kin remittances

Transfer of funds was found to be one of the major contemporary informal risk-sharing methods for ex-ante, during, and ex-post use. These are drawn from income sources often unrelated to pastoralism and emanate mainly from relations and friends, such as those in employment or business. Albeit not widespread, these remittances in the study area help with purchasing fodder, feed supplements, and seeking health services for pastoral livestock. The importance of remittances extends towards catering to other basic household needs such as food and healthcare. The study found that such remittances through social linkages play a critical role in alleviating the adversities of climate shocks while enhancing resilience. These findings are consistent with studies conducted among pastoralists in East Africa (Gebeyehu *et al.*, 2021; Iyer, 2021), where social linkages enhanced the adaptive capacity of receiving households.

Post-harvest crop residue

Plant biomass left behind after crops such as maize and wheat harvest are often used to supplement livestock feed. This practice is also present in some parts of Samburu Central sub-County. The research found that in agro-pastoral areas such as Ang’ata, Morijo and Lkujita villages, cultivated fields are often fenced and usually opened for grazing after the harvested food crop. The residue can also be cut to carry to the homestead. In this regard, the study found that crop residue fodder can also be shared within social networks, as is submitted by Ngigi *et al.*, (2021). It can also be sold to willing livestock keepers, especially by absentee landowners, as is the case in the study

area. As espoused by Muricho *et al.*, (2019), this is a short-term method of solving pasture scarcity while enhancing the resilience of drought-stricken societies.

4.4.2 Shift from collective to household-based self-insurance practices.

In periods of distress such as drought, collective coping methods tend to decline or collapse as more emphasis is placed on individual household coping strategies. The scarcity situation and the distortion of traditional resource governance institutions could perhaps inform this assertion.

> "In this drought situation, people are busy trying to work to save their livestock," said a participant in the FGD.
>
> "The effects of drought on resource availability are everywhere; very few people would be able to accommodate other people's livestock in their areas," said a community leader.

Participants in the FGD reported that many community self-help groups were on the verge of collapsing, as the drought situation persisted. Household self-insurance methods include purchasing fodder supplementation and destocking. A trajectory of abandoning traditional techniques such as reciprocity was also observed among pastoralists in northern Tanzania by Ng'ang'a *et al.*, (2020). The study infers that extended resource scarcity may be attributed to the decline of resource cooperation. A study across diverse settings in Kenya by Ngigi *et al*., (2015), found that group-based coping methods were found to have declined with the recurrence of extreme shocks.

4.4.3 Intensive pastoral labor demands straining informal methods of insurance

The study cites inter alia, the frequency of droughts, the status of dry season grazing zones as contributors to increased labor demands. The study infers that the time and energy required to

realize some pastoral resource scarcity coping methods stressed participation in social linkages. To a certain extent, this finding refutes Ng'ang'a *et al.,* (2016), who submit that group meeting participation intensifies during environmentally harsh periods. Some of the laborious resource scarcity coping methods identified include cut-carry, herd trekking, hand-digging for water, and nurturing weak and sickly animals within the homestead (*manyatta*) to the incremental strain on informal risk-sharing approaches.

Cut and carry as a resource scarcity response approach is practised by both men and women, young and old, depending on the division of roles It involves people trekking for long distances, hiking, and navigating steep terrain. The method also involves fetching and carrying water for the livestock, especially for the sick and weak stocks. The study noted that the cut-carry method is not gender-differentiated, perhaps because it is an obligatory exercise aimed at averting the path to impoverishment as the drought rages on. For women, it is a continuation of their traditional gathering roles, as also noted by Van Anda *et al.*, (2021). It involves cutting grass and shrubs from escarpments and steep slopes that are inaccessible to graze livestock. Therefore, the study infers that the cut-carry method negatively affects cooperation by weakening social linkages.

4.4.4 The influence of informal insurance on resource cooperation

Due to the watering down of traditional resource governance structures, resource scarcity, and multi-dimensional cyclic conflicts in the study area, the study noted poor resource cooperation. Informal insurance practices such as herd splitting and labour pooling have contributed to resource cooperation before. However, the study acknowledges that they are increasingly overwhelmed by exacerbating socio-ecological challenges. The aggravation of intra and inter-communal hostilities between the *Samburu* and their neighbors threatens resource cooperation. In this regard, Chelang'a & Chesire, (2020) note the lack of concrete resource governance institutions and agreements

among pastoralist societies, thus lacking the foundation for resource cooperation. Additionally, Sitati *et al*., (2021) opine that conflict affected settings face greater vulnerability to climate shocks, hence their limited capacity for resource cooperation. However, a study by Gebeyehu *et al.*, (2021) documented instances of resource cooperation between the Nyangatom of Ethiopia, Toposa of South Sudan and Turkana of Kenya. Similarly, Okumu, (2021) cites cooperation between the Samburu and Rendile groups.

4.4.5 Drought prevalence and IBLI

Given the ravaging pastoral resource scarcity resulting from four consecutive rainfall failures as of October, 2022. Pastoralists in the study area have been pushed to seek alternative ways of enhancing resilience. Based on the survey data, a minority of 12 respondents (17%), as shown in Figure 4.12 reported having purchased at least one IBLI premium, including those that benefited from ILRI subsidized coupons. The study infers that the drought problem can potentially ignite interest in the uptake of IBLI. However, the research respondents complained about the low availability and accessibility of IBLI as the window for premium purchases is limited to twice annually.

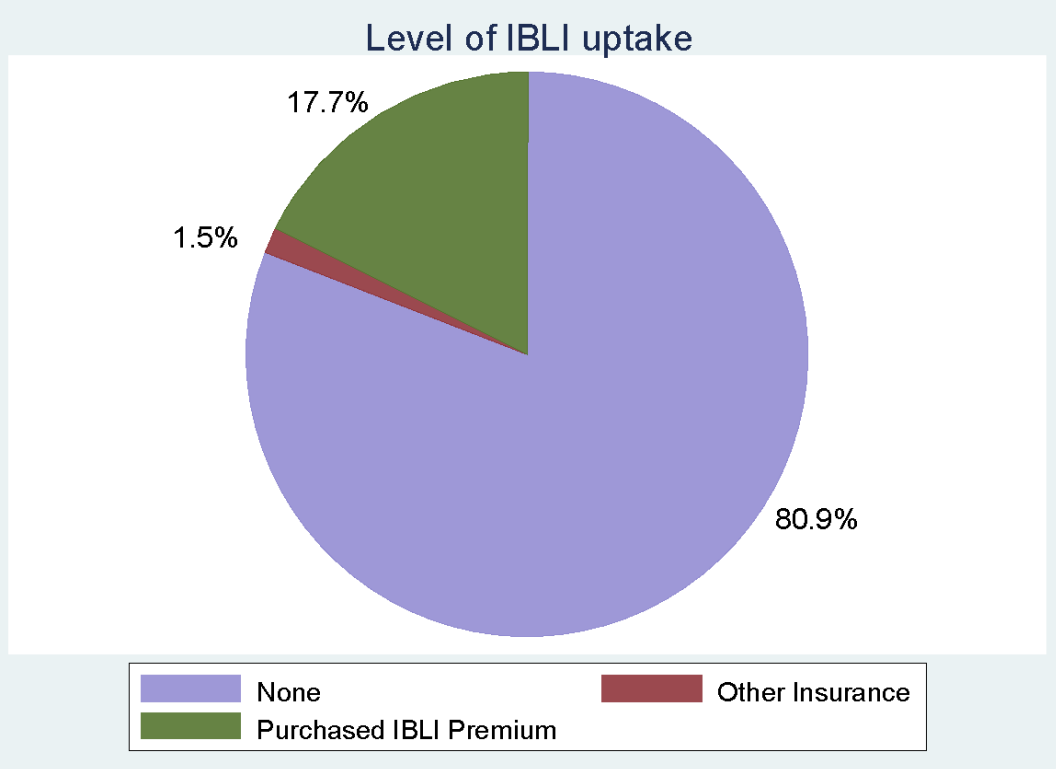


Figure 4. 12: Level of livestock insurance uptake

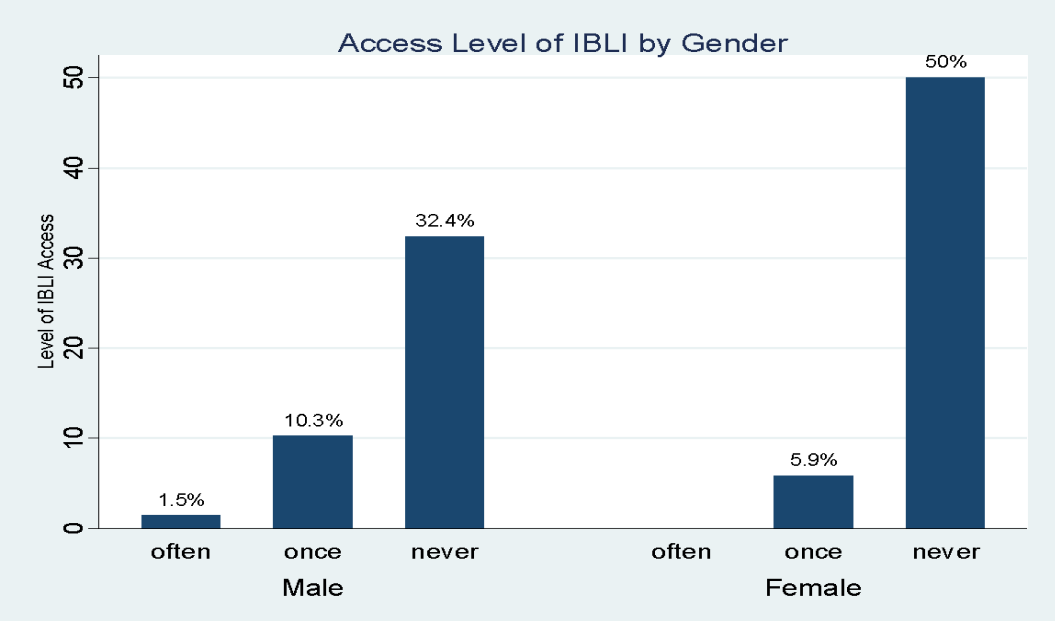
> "We do not see or hear of the insurance people nowadays," said a participant in the FGD. "Yes, I have heard about IBLI, though I do not know how it works; I know that once one subscribes, they will be paid for livestock loss," said a household respondent.

The statements above depict some level of knowledge about livestock insurance in the study area. Thus, the study was informed that in light of the suffering caused by the frequency of droughts and intensity of resource scarcity, pastoralists were ready to try new resilience-enhancing strategies, including IBLI. This depicts the desire for new ways of enhancing resilience, hence the need for increased IBLI awareness among pastoralists. Frequent droughts and its negative impacts on livelihoods, especially livestock deaths, have compelled many pastoralists to explore alternatives. For instance, taking up IBLI premium to avert herd losses. During the FGD,

participants concurred that a paradigm shift was imminent and that pastoralists should be ready to adopt new ways of enhancing resilience. In this regard, Gebrekidan *et al.,* (2019) find that in the Borena zone, many pastoralists would be willing to try livestock insurance if given an opportunity. However, Ng'ang'a *et al.*, (2020) note that ASAL settings of Kenya lag behind other ecological zones in adopting new adaptation methods. Constraints such as insecurity, poverty, and environmental degradation have been cited for the poor uptake of adaptation methods (Ng'ang'a *et al.*, 2020).

4.4.6 Uptake of IBLI, awareness and trust problem

Perceptions about IBLI by the research respondents depicted low levels of product awareness, trust, and misinformation, which can be justified by poor access, as shown in Figure 4.13. The study infers that more targeted product awareness and understanding is required if uptake is to grow.



The value of n=69

Figure 4. 13: Household Access to Formal Insurance by Gender

"Is it like gambling?" asked some household respondents.

The assertion of livestock insurance as 'gambling' by some research respondents is perhaps founded on low awareness. Nonetheless, such sentiments could be legitimate in light of basis risk, where losses incurred are not commensurate to payouts, if any. The FGD participants equally confirmed that some pastoralists in the research area acknowledged livestock insurance uncertainty given their worldview of indemnity insurance, where assessment is done to qualify compensation. In this regard, motor vehicle insurance was cited during the FGD. But most fundamentally, it is the complexities of grasping how IBLI works. These attributes are also affirmed by Jensen *et al.*, (2018) and Oduniyi *et al.*, (2020) as documented in other IBLI pilot sites.

The study's findings on the perception of IBLI are in concurrence with Morsink *et al.*, (2016) and Nshakira-Rukundo *et al.*, (2021), who submit that basis risk could not only portend fiscal losses in premiums paid but also exacerbate the policyholder's vulnerability and exposure. Nonetheless,

this research acknowledges Johnson *et al.*, (2023) assertion that IBLI is designed to enhance fairness, efficacy, and transparency in insurance administration and payout, suppressing the 'gambling' analogy.

The "gambling" line of thought is supported by Chelang'a *et al.*, (2015), who note that pastoral societies are 'oral societies' hence, perceptions are bound to spread widely and enjoy acceptability. Though there is limited empirical evidence on pastoralists' perceptions of climate change Gebeyehu *et al.*, (2021) noted that perception shapes behavioural responses in the form of adaptation choices, processes, and outcomes. The study found low levels of access to formal insurance, as depicted in Figure 4.13**,** with (32.4%) male and (50%) female participants responding never. The study attributes this to low awareness and understanding levels of formal insurance. Subsequently, the low uptake of livestock insurance compounded by the slowed upscale by the concerned lead agencies has created an opportunity for such misconceptions to thrive.

The high prevalence of poverty coupled with fragile adaptive capabilities are ascribed to the drought vulnerability experienced by rural societies in SSA (Adaawen *et al.*, 2019; Kirui *et al.*, 2022). Thus, reactive drought management interventions have gradually proved ineffective over the years, thus exacerbating pastoralism's vulnerability (Adaawen *et al.*, 2019). Nonetheless, livestock insurance is fronted as a proactive strategy for enhancing the adaptive capacities of drought-distressed communities, hence the complementary advantage (Kirui *et al.*, 2022; Will *et al.*, 2021). The study acknowledges that IBLI is a commercial product that requires financial commitment on the part of pastoralists. Affordability and lack of willingness to buy IBLI premiums could perhaps explain the low uptake. This assertion corroborates Nshakira-Rukundo *et al.*, (2021), who submit that the African continent registers the lowest agricultural insurance uptake but acknowledges a slow but incremental growth.

While conflict trends in pastoral areas such as Samburu could tend to derail the possible benefits of livestock insurance, combining the two forms of insurance could better realize cooperation. Alongside drought management approaches (Adaawen *et al.*, 2019), they have fronted the incorporation of conflict management strategies to enhance the sustainable adaptive capacity of such societies.

4.4.7 Well-to-do social linkages spurring insurance uptake

The study sought to appraise the source of IBLI financing among adopter households. Some had derived finances from diverse sources of income such as employment, off-farm income (25%), credit from group savings and loan organizations (12%) with kin remittances topping at 50% and ILRI coupons as well as other subsidies at (12%) as is shown in Figure 4.14. The study inferred that perhaps due to the multifaceted modus operandi of livestock insurance, the uncertainty, and inherent risk aversion, none of the respondents reported having sold livestock to purchase IBLI. The study found that the purchase of IBLI, though limited, was facilitated by informal insurance, essentially through social networks.

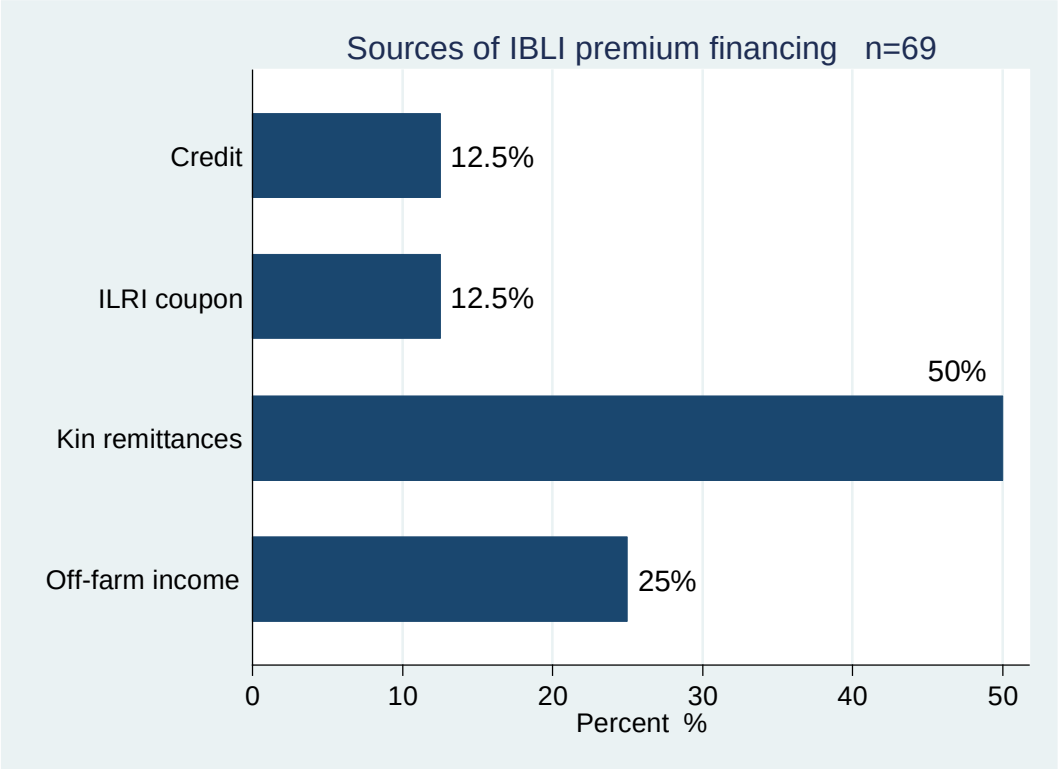


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Figure 4. 14: Source of IBLI premium financing

This finding affirms the complementary relationship between formal and informal insurance (Berg *et al.*, 2022; Mburu *et al.*, 2015). Strong social relationships in any society form the ground for altruistic reciprocity. In this regard, Nshakira-Rukundo *et al.*, (2021) note that the demand, popularity, and attractiveness of agricultural insurance products such as IBLI remain low in low and middle-income nations despite their potency to alleviate poverty. In addition, ASAL zones in Kenya have been found to register the lowest adoption rate of adaptation approaches compared to other ecological zones (Ng'ang'a *et al.*, 2020).

> "I borrowed money to purchase insurance from a savings and loan organization, where I am a member. Unfortunately, I did not receive a payout; hence, I had to sell my livestock to repay the loan," said a household respondent.

The statement above illustrates the significance of group-based approaches to enhancing IBLI uptake, as Ngigi *et al*. (2015) recommended. Scholarly works have recommended product designs such as bundling of IBLI with credit services as incentives for uptake, though they acknowledge the limitations of product bundling (Nshakira-Rukundo *et al.,* 2021). While novel methods are being fronted, their success relies on the absorption capacity of individual households amid other political, environmental, social, and economic dynamics (Volpato & King, 2019). Though social networks are integral in nurturing society, the study found that there is a need to establish the ability of contemporary herd sizes to sustain the adoption of IBLI.

The study found that only those with alternative sources of income could have the purchasing power for livestock insurance. Perhaps the remitters are endowed with disposable income to invest, or they understand livestock insurance better. This finding is in concurrence with a study conducted in Marsabit County, where well-off pastoralists were found to have a higher insurance adoption rate (Kirui *et al.*, 2022). The research infers that the gap between the insured and the non-insured can form grounds to exacerbate further the existing social inequalities with undesirable consequences on informal insurance and resource cooperation. Also, the study acknowledges the submission by Johnson *et al.*, (2023) that some pastoralists may be ready to embrace IBLI and its proposed benefits, while others would ignore it. Such an eventuality could aggravate the already ailing resource-sharing structures.

Consequently, the well-off in the society might purchase livestock insurance and subsequently have large herds, exacerbating inequality in the access and utilization of the limited pastoral resources. Such a hypothetical example would create ground for dissent and contestations over pastoral resources. Also, index insurance's desired anticipatory coping, mitigation, and resilience enhancement goals (Fava *et al.*, 2021) might not materialize at the heart of such inequality.

> "Drought is an equalizer; someone could be wealthy today only to be left with little or no livestock by the drought," said a household respondent.

This statement speaks to the importance of equality in the ex-post recovery process for pastoralists and agro-pastoralists. A scenario where at the end of a drought, it is perceived that some pastoralists recover faster than others would breed greed and grievance hence the deterioration of social order and low adaptive capacity. This finding corroborates Ng'ang'a *et al.*, (2016), who found more trust among 'financially integrated' households even in dryer periods. Similarly, this research hypothesizes that a strong social capital is an ideal breeding ground for instilling cooperation among community members. Therefore, to a great extent, poverty can be a stumbling block in achieving cooperation within and between societies.

4.4.8 Low perception on the role of IBLI in resource cooperation.

The study found that a significant minority of the respondents 12, (17%) reported taking an IBLI premium at least once. In this regard, the role of formal insurance in enhancing resource cooperation remains implicit while recognizing that resource conflicts in the area have multiple causal and trigger factors. As in Figure 4.15 the study found that (49.3%) of non-adopters expressed neutrality while (4.5%) of adopters expressed disagreement on their perception of IBLI's role towards resource cooperation through IBLI. These findings could be attributed to their commercial understanding of IBLI. That IBLI's role is to cover its policyholders against livestock loss and not against conflict mitigation. Also, given the protracted and multi-dimensional nature of conflicts in the area, IBLI's contribution to cooperation was perhaps inconceivable to the study's respondents. The study hence inferred limited expectation that IBLI can help in cultivating resource cooperation while managing existent conflict dynamics.

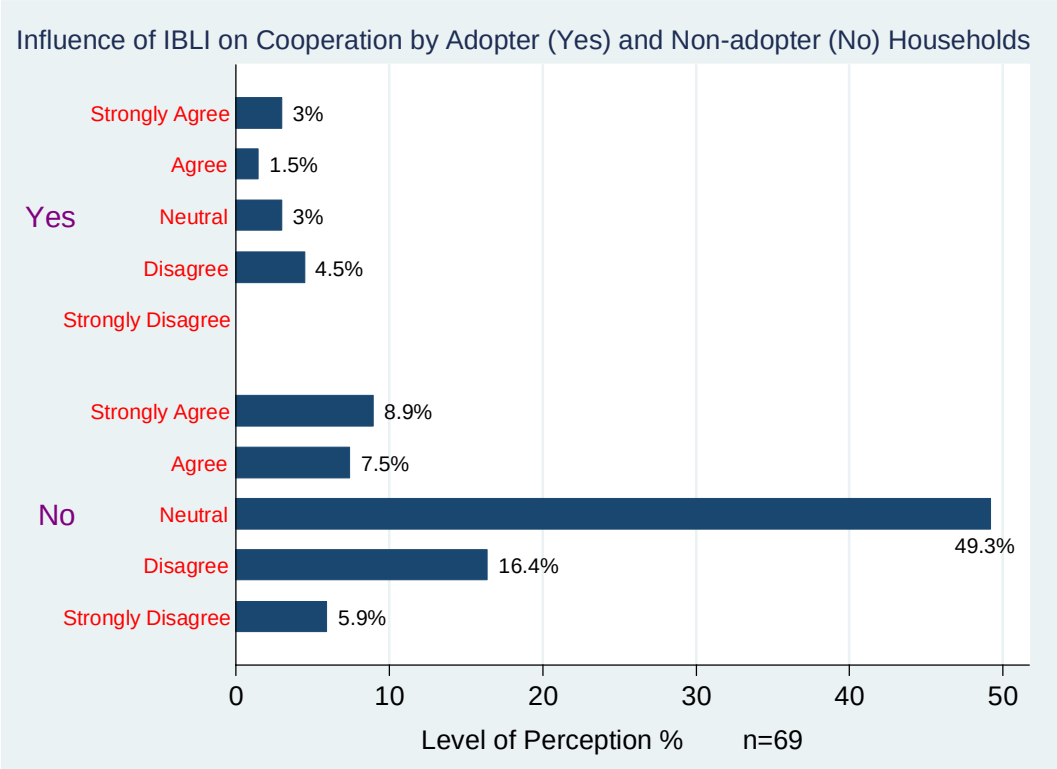

Figure 4. 15: Perception of the Influence of IBLI towards Cooperation

However, the research respondents were able to relate to the contribution of social protection towards cooperation, as shown in Figure 4.16. The study acknowledges that IBLI has previously been partially and fully subsidized by ILRI and GoK, albeit on a small scale. The study likened IBLI to various livelihood and social protection programmes with regards to their influence of cooperation. Hence, there was a question on the perceived cooperation influence of livelihood and social protection initiatives and a similar one on IBLI. Some of the initiatives highlighted during the study include the Inua Jamii cash programme, Livestock off-take programme, free livestock pellets, Hunger Safety Net Programme HSNP, and Kazi Mtaani programme. The study found that of household respondents were confident that social protection contributes towards resource cooperation as depicted in Figure 4.16. The study inferred that the limited awareness and understanding of IBLI challenges the assessment of its contribution towards resource cooperation.

The study submits that the influence of IBLI in relation to cooperation and conflict mitigation will require more time and experimental studies.

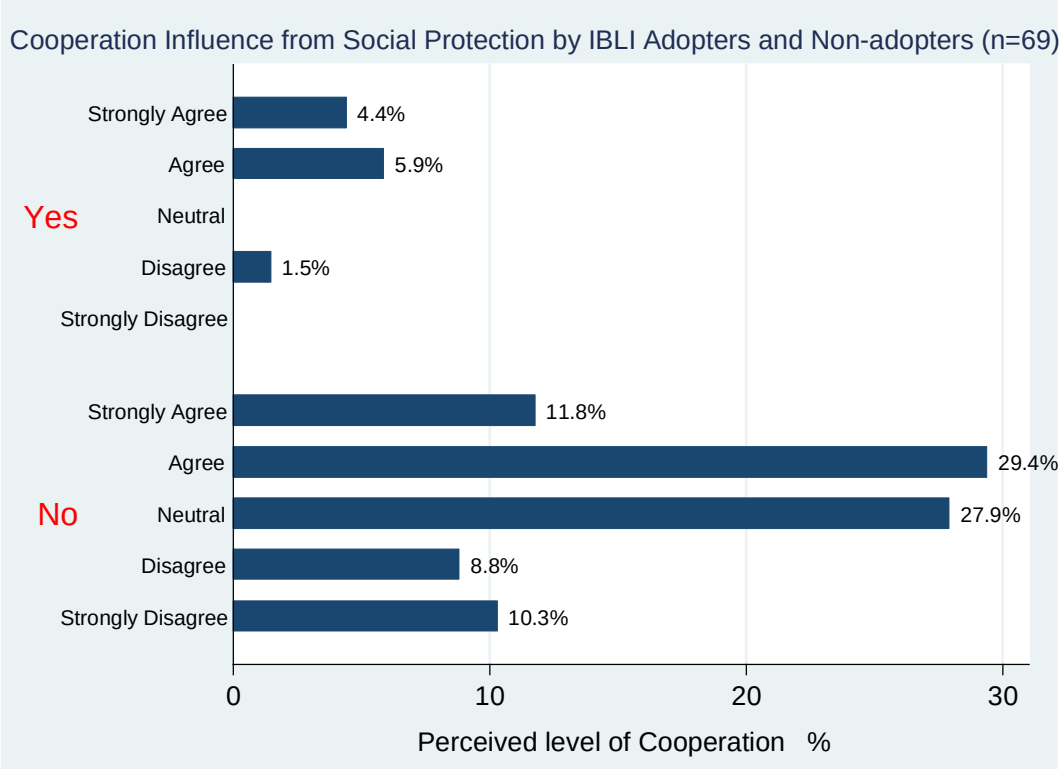

Figure 4. 16: Perception of the influence of livelihood and social protection to cooperation

Nonetheless, the research respondents expressed optimism about the rise of interest and uptake of IBLI in the coming days. Adopters of livestock insurance voiced optimism that it would enhance peaceful coexistence among pastoralists as there would be little or no grievances to form an incentive for the greed to raid or steal livestock for restocking purposes.

> "With our livestock insured, there will be a sense of livelihood security; hence, no one will steal livestock from the other," said a local administration officer.
>
> "I believe it is a good thing; we will embrace it if it comes again," said a participant during the FGD.

The statements above demonstrate an interest in the uptake of IBLI in light of the perceived contribution of social protection initiatives influence on cooperation. Perhaps the interest is informed by the need to enhance their livelihood resilience during extreme shocks. As such, it can be hypothesized that livestock insurance can reduce pastoral drop-out that aggravates inequality, especially one caused by loss of livelihoods. Conditionally, livestock insurance should equally cater to the needs of all in the social strata. The study affirms the immense interest in grasping how livestock insurance works, as it could be the remedy (Matsaert *et al.*, 2011).

5.0 CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study acknowledged that pastoralism's socio-economic and cultural significance over the years cannot be ignored. Pastoralism has been demonstrated to buffer against harsh environmental, political, and economic challenges. This level of resilience has made pastoralism the most widespread land-use system globally (Manzano *et al.*, 2021. This study sought to assess the influence of both formal and informal insurance in mitigating pastoral resource conflict while enhancing pastoral resource cooperation. Primary data was collected, analyzed, and presented using charts, tables, and verbatim quotes from the research respondents based on three specific objectives.

With the unprecedented frequency and extended durations of drought manifested in high temperatures and low and unpredictable precipitation patterns, this study found that pastoralists' SER in Samburu Central sub-County continues to be concomitantly overstretched. This is to the extent of disrupting traditional resource governance institutions and social cohesion while adversely distorting the efficacy of indigenous livelihood practices. Consequently, the inefficacy of informal insurance techniques for pastoralists in the study area waters down the prospects of resource cooperation. In reality, households drop out of pastoralism, sinking further into poverty and exposure to conflictual interactions and the effects of climate change.

While studies find conflict endemic settings such as Samburu Central sub-County to be more vulnerable to adversities of climate change, the study further found an aggravation of contestations during herd mobility, their incentives, goals, and actors. Consequently, the manifestation of pastoral mobility contestations extended not only during wet seasons but also during dry seasons. The study found that worsening conflictual relationships inside and outside the study area could

portend poor pastoral resource cooperation, eventually constraining informal insurance practices such as herd mobility, herd splitting, and preserving reserve grazing zones. From the research, it is apparent that pastoral mobility is highly constrained by the continued manifestation of contestations compounded by other endogenous and exogenous undercurrents, such as the commercialization of cattle raiding, the proliferation of SALW, and negative ethnicity.

Whereas the uptake, upscale, and awareness of IBLI as a formal insurance product were registered as low 17%, the study found perceived optimism in the product's contribution towards pastoral resource cooperation. This optimism was partly pegged on the cooperation contribution of other livelihood interventions carried out in the community. However, the study found that conflict could complicate the cooperation efficacy of formal insurance products such as IBLI. This inference is mainly due to the exacerbating inefficacy of informal insurance practices and institutions that ought to provide the requisite leverage and complementary advantage.

5.2 Conclusion

The household survey respondents rated drought as the most adverse climate shock on the pastoral livelihood in the study area over the past three decades leading to 2022. This widespread and indiscriminate deterioration in socio-ecological resilience (SER) is manifested through the dismal performance of the highly revered local institutions of resource cooperation or informal insurance.

In addition, droughts of more than two seasonal rainfall failures had caused resource scarcity to the extent of causing resource rights inequities and social instability while abetting conflictual and environmentally harmful coping strategies. These factors lead to rapid changes in established herd management, such as herd composition (47.9%), off-taking (45%), and purchasing fodder (72.6%). An increasingly suppressed traditional pastoralism means poor social-ecological resilience capacity and, thus, limited resource cooperation.

Owing to the climate-driven pastoral resource scarcity, changing herd composition, destocking and purchasing fodder, were becoming popular response strategies. While approximately 50% of household respondents identified with traditional institutions, the study notes a decay in social order, with resource competition and cattle raiding as the primary drivers of violent conflict. Other social and political dynamics, such as the apparent discord between the council of elders and the Moran institutions, complicate the resource-based conflicts in Samburu Central sub-County.

Though the uptake, upscale, and awareness of livestock insurance in Samburu Central sub-County remain significantly low at 17%, maximizing its potential towards enhancing the adaptive capacity of the pastoral livelihood is fundamental. Preemptive conflict cautionary measures should be explored to bolster cooperation and peaceful coexistence. The compatibility of formal insurance and risk-sharing approaches at the community level can be harnessed to address trends of conflict, especially during pastoral mobility. To a great extent, reinforcing the informal risk management methods with informal insurance has the potential to enhance socio-economic and ecological resilience. Therefore, existent but effective informal insurance practices such as kin remittances can be harnessed to enhance cooperation.

5.3 Recommendations

The study offers some operational and research propositions for the imperative restoration of resource cooperation for pastoralism in the study area.

5.3.1 Operational

- The study recommends a participatory reorganization of the resource governance institutions with the socio-ecological resilience model.
- Government authorities should enhance services and incentives promoting resource cooperation during herd mobility. Such should include early warning information,

preemptive conflict mitigation, and continued subsidies on livestock insurance to pastoralists.

- Efforts at upscaling IBLI should endeavour to conduct targeted awareness campaigns on the product within social networks.

5.3.2 Further research

- Further research on IBLI designs is needed to assess compatibility with informal social networks and establish appropriate entry points for efficient cooperation assessment.
- Further research on bundling conflict mitigation products and services such as early warning systems with preemptive risk management strategies, is recommended.

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Appendix I: Household questionnaire
Household characteristics semi-structured questionnaire

I ……... do voluntarily accept to take part in this research study.

I understand that I am at liberty to withdraw at any point or decline to answer any question.

I am aware of the purpose and nature of the research, as has been explained to me.

I understand that I do not stand to benefit directly from my participation in this research.

I consent to the interview being audio recorded Yes [ ] No [ ]

I understand that the information I shall provide is for research purposes which shall remain confidential while my identity shall remain anonymous.

Socio-economic & Demographic Questionnaire

Date ……

What is your gender?

Male [ ] Female [ ]

What is your age?

18 – 30 [ ] 31 – 40 [ ] 61 – 70 [ ]

41 – 50 [ ] 51 – 60 [ ] Over 70 [ ]

What is your highest level of education?

Not been to school [ ] Primary [ ] Secondary [ ] Tertiary [ ]

What is your herd size currently?

During which year did you have the largest herd size? How many?

During which year did you have the least herd size? How many if you do not mind?

Objective 1: To evaluate the extent to which climate shocks cause scarcity of pastoral resources

Questions

1. Which are the main climate shocks that have affected pastoral resources in your locality in order of severity? (Text)

2. What is the time difference between droughts today? What was the time difference 10, 20 and 30 years ago? In years

Time difference between droughts	Today	10 years ago	20 years ago	30 years ago
1-2 years				
3-4 years				
5-10 years				

3. How long do droughts last nowadays? How long did droughts last 10, 20 and 30 years ago? In number of seasonal rainfall failures

Duration of droughts	Today	10 years ago	20 years ago	30 years ago
1- seasonal rainfall failure s				
2 Seasonal rainfall failure				
More than 2 seasonal rainfall failures				

4. What is/was the average return trekking distance from the grazing field to watering points during droughts nowadays, 10, 20 and 30 years ago? In Kilometers

Average trekking distance in Km	Today	10 years ago	20 years ago	30 years ago
0-5				
6-10				
11-15				
16-20				
More than 20km				

5. What is/was the status of the dry season grazing area(s) in your locality at this time of the year? Today, 10, 20 and 30 years ago (Tick as appropriate)

Status	**Today**	**10 years**	**20 years**	**30 years**
Under preservation				
Currently being utilized				
Depleted				

In Contestation				

6. What has led/used to lead to change in available forage fields? (Today, 10, 20, and 30 years ago?) Tick as appropriate

Attributes of change in forage	**Today**	**10 years**	**20 years**	**30 years**
Invasive species				
Land degradation				
Land use change				
Other (Specify)				

7. How do/did you deal with water and pasture/browse scarcity due to the climate shocks nowadays, 10, 20 and 30 years ago? Tick as appropriate

Response	**Today**	**10 years**	**20 years**	**30 years**
Purchase of fodder				
Fencing reserve grazing zones				
Encroachment into restricted zones				
Destocking				
Change composition of herd				
Cut and carry approach				
Herd splitting				
Other (Specify)				

8. Which water source(s) do/did you use for your livestock today, 10, 20 and 30 years ago? Tick as appropriate

Water sources	**Today**	**10 years**	**20 years**	**30 years**
Shallow wells				
Pans and Sand dams				
Rivers				
Boreholes				
Springs & Streams				
Traditional river wells				
Hand dug wells				
Other (Specify)				

9. How often do/did you experience flash floods in your locality today, 10, 20 and 30 years ago?

Difference	Today	10 years	20 years	30 years
Twice a year				
Once a year				
Never				

Objective 2: To assess the trends in conflict experienced due to pastoral mobility

Questions

1. What are the major drivers of conflict due to pastoral mobility in the area today, 10, 20 and 30 years ago? (Tick as appropriate)

Drivers of conflict	Today	10 years ago	20 years ago	30 years ago
Competition for scarce pastoral resources				
Size of herd in the same area				
Crossing of territorial boundaries				
Poor inter-communal rapport				
Ethnic polarization				
Cattle raiding culture				
Other (List)				

2. Which factors determine the need for pastoral mobility today, 10, 20 and 30 years ago? (Tick as appropriate)

Determinants of pastoral mobility	Today	10 years ago	20 years ago	30 years ago
1.Availability of pastoral resources				
2.Security				
3.Livestock production				

4.Emergence of livestock diseases				
4.Livestock market prices				
5.Hostilities				
6.Social networks				
7.Pastoral labor				
Other (List)				

3. What are the enablers of the pastoral mobility conflict today, 10, 20 and 30 years ago? (Tick as appropriate)

Enablers of pastoral mobility conflict	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
1.Telecommunication advancement				
2.Proliferation of arms				
3.Low institutional capacity				
4.Poor socio-economic status				
Other (List)				

4. Who are the major actors in pastoral mobility related conflicts today, 10, 20 and 30 years ago? (Tick as appropriate)

Actors in pastoral mobility conflict	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
Ranchers				
Farmers				
Pastoralists				
The state				
Other (Specify)				

5. What would you rate the frequency of pastoral mobility today, 10, 20 and 30 years ago?
   [1] Very rarely
   [2] Rarely
   [3] Occasionally
   [4] Frequently
   [5] Very frequently

Period	**1**	**2**	**3**	**4**	**5**
Today					
10 years ago					
20 years ago					
30 years ago					

6. What are the reasons for changes in pastoral mobility routes in the past 10, 20 and 30 years in order of priority? (Tick as appropriate)

Reasons for change in pastoral mobility routes	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
1.Deserted gazing areas due to hostilities				
2.Presence of armed groups along route				
3.Land use changes				
4.Changes in weather patterns				
Other (Specify)				

7. How would you rate the prevalence of conflict due to pastoral mobility today, 10, 20, and 30 years? (Likert scale)

[1] Very low

[2] Low

[3] Moderate

[4] High

[5] Very high

Period	**1**	**2**	**3**	**4**	**5**
Today					
10 years ago					
20 years ago					
30 years ago					

8. During which periods do/did you experience pastoral mobility conflict scenarios today, 10, 20 and 30 years ago?

Periods of pastoral mobility conflict incidence	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
Beginning of dry season				
During the dry season				
Commencement of wet season				
During forage and water bounty				
Other (Specify)				

9. Do/did you adhere to any rules and regulations (institutions) during pastoral mobility today, 10, 20 and 30 years ago?

[1] Never

[2] Rarely

[3] Sometimes

[4] Often

[5] Always

Period	**1**	**2**	**3**	**4**	**5**
Today					
10 years ago					
20 years ago					
30 years ago					

10. Which institutions are/were they today, 10, 20 and 30 years ago? (Tick as appropriate)

Type of institution	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
Traditional institutions				
Statutory institutions				
Both				

11. Which type of efforts are being employed towards resolving pastoral mobility conflicts?

Efforts to resolving pastoral mobility conflict	**Today**	**10 years ago**	**20 years ago**	**30 years ago**
1. Informal/Traditional				
2. Formal (National Government based)				
3. Formal (County Government based)				
4. Formal (NGO based)				
Other (Specify)				

Objective 3: To appraise how pastoralists have formally and informally shared and/or transferred resource-based risks

SECTION A: Formal Risk Sharing

Questions

a) What is your frequency of access to formal liveligood interventions risk transfer methods against pastoral resource scarcity? (Select one)

[0] All the time

[2] Often

[3] Occasionally

[4] Once

[5] Never

b) Which ones (s)? (Select as applies)

[] KLIP (fully subsidized)

[] Livestock offtake programs

[] Hunger Safety Net Program (HSNP)

[] Other (Specify)

c) Which one(s)? (Select as applies)

[] IBLI

[] Indemnity insurance

[] Other (Specify)

d) Formal risk transfer approaches contribute towards enhancing intra/inter communal cooperation. (Select one)

[1] Strongly agree

[2] Agree

[3] Neutral

[4] Disagree

[5] Strongly disagree

e) Formal insurance approaches contribute towards enhancing intra/inter communal cooperation. (Select one)

[1] Strongly agree

[2] Agree

[3] Neutral

[4] Disagree

[5] Strongly disagree

f) How do/did you purchase IBLI? (Only for those with IBLI experience) Select as applies

[] Credit

[] Sold livestock

[] Kin remittances

[] Off-farm income

[] Borrowed from kin and clan

[] Other (Specify)

Objective 3: <u>To appraise how pastoralists have formally and informally shared and/or transferred resource-based risks</u>

<u>SECTION B: Informal Risk Sharing</u>

Questions

1. How do pastoralists cooperate/assist each other to cope with pastoral resource scarcity?

2. Outline other ways in which pastoralists in your community informally transfer risk in times of pastoral resource scarcity? {*Before, During and After the climate shock*}

[] 1 Livestock transfers

[] 2 Group Saving and Loan Organizations GSLs

[] 3 Remittances

[] Other (Specify)

Appendix II: Checklists for Focus Group Discussion (FGD)
Objective 1: To evaluate the extent to which climate shocks cause scarcity of pastoral resources

Checklist of Questions for Focus Group Discussion (FGD)

Activity: Questions to initiate discussion and filling tables

1) Discuss and state the main climate shocks that have affected the availability of pastoral resources in the 10, 20 and 30 years preceding today in the order of severity.
2) Discuss and state pastoral resources affected by the climate shocks?
3) Discuss how far climate shocks have gone to cause the scarcity of the said pastoral resources.
4) Discuss variations in time intervals in the occurrence of climate shocks in the last 10, 20 and 30 years preceding today.
5) Discuss the duration of climate shock persistence in the last 10, 20 and 30 years preceding today. (Number of seasonal rainfall failures)
6) Discuss the impact of climate shocks on pastoral resource availability in the last 10, 20 and 30 years preceding today.
7) Discuss change trends in the trekking distance from grazing to water point in the last 10, 20 and 30 years preceding today?
8) Discuss the number and sources of water today that have occurred in the last 10, 20 and 30 years.
9) What changes in resource availability have you observed from the effects of drought and floods in the past 10, 20 and 30 years? (Dwindling of pastures, drying of water points, invasive species, environmental degradation, increase in temperature)
10) Discuss status of reserve grazing zones today, 10, 20 and 30 years ago at this time of the year.
11) Discuss factors attributed to the difference in resource availability?

Objective 2: To assess the trends in conflict experienced due to pastoral mobility

Checklist of Questions for Focus Group Discussions (FGD)

Materials and methods: Marker pen, area map, flip charts, note book, audio recorder, exhaustive probing.

Activity 1: Community Mapping

- Develop sketch maps showing the current pastoral mobility routes and their endeavored resources vis-à-vis the past 10, 20 and 30 years.
- Also, indicate resource conflict hotspots over the past 10, 20 and 30 years.

Participants to collectively sketch maps of their village while indicating the mobility patterns for key pastoral resources i.e., water, pasture & browse, salt licks from the past 10 years to date. Discuss and indicate changes in routes and reasons for the changes. A conventional topographic map shall be used for reference during the activity. A stratified resource mapping approach shall be employed with the aim of grouping participants according to gender. The essence shall be to ensure gender relationships to resources are well captured.

Activity 2

1) Discuss the major drivers of conflict due to pastoral mobility in the area; today and in the past 10, 20 & 30 years.
2) Discuss the factors that determine the need for pastoral mobility in the area; today and in the past 10, 20 & 30 years.
3) Discuss the enablers of pastoral mobility conflict; today and in the last 10, 20 & 30 years.
4) Discuss and list the major actors in pastoral mobility related conflicts; today and in the last 10, 20 & 30 years.
5) Discuss the frequency of pastoral mobility today 10, 20 & 30 years ago.
6) Discuss and indicate reasons for changes in pastoral mobility routes in the last 10, 20 & 30 years.
7) Discuss the prevalence of conflict due to pastoral mobility today 10, 20 & 30 years ago. Has it increased or declined? Why?
8) Discuss and state the seasons in which the area experiences pastoral mobility conflict events today, 10, 20 and 30 years ago.
9) Discuss the existence and adherence of pastoralists to any rules and regulations (institutions) during pastoral mobility today, 10, 20 and 30 years ago.
10) Discuss types and examples of efforts used in resolving pastoral mobility related conflicts today and in the last 30 & 10 years.
11) Discuss the effectiveness of the said efforts today and in the last 310, 20 & 30 years.
12) Discuss whether pastoral mobility has led to an increase or decline in resource-based conflicts today, 10, 20 and 30 years ago. What are the reasons?
13) Discuss at what point pastoral mobility results in conflict. Why?

Objective 3 –<u>To appraise how pastoralists have formally and informally shared and/or transferred resource-based risks</u>

Section A: Formal Risk Sharing

Checklist of Questions for Focus Group Discussion (FGD)

Activities

a) How frequently do pastoralists in the locality gain access to formal risk transfer methods against pastoral resource scarcity?
b) Identify and discuss the formal risk transfer methods pastoralists have benefited from to help them cope with pastoral resource scarcity.
c) How frequently do pastoralists in the locality get access to formal insurance approaches against pastoral resource scarcity?
d) Let us discuss how the formal insurance approaches adopted by pastoralists have helped cope them with pastoral resource scarcity.
e) Let us discuss whether the adopted formal risk transfer approaches contribute towards intra/inter communal cooperation.
f) Why? Give examples.
g) Let us discuss whether the adopted formal insurance approaches contribute towards intra/inter communal cooperation.
h) Let us discuss how formal insurance (IBLI) adopters raise the fee to purchase the product.

Section B - Informal Risk Sharing

Checklist of Questions for Focus Group Discussion (FGD)

Activities

1. Discuss informal risk sharing techniques employed by pastoralists to cope with pastoral resource scarcity? {*Before, During and After the climate shock*}
2. Discuss ways in which pastoralists in your community informally transfer risk to one another in times of pastoral resource scarcity. (*Before, During and After the climate shock*)
3. Discuss whether the informal insurance approaches contribute towards intra/inter communal cooperation.

Appendix III: Checklist for Key Informant Interviews (KII)
Objective 1: To evaluate the extent to which climate shocks cause scarcity of pastoral resources

Checklist of Questions to Key informants (KII)

1. Please describe the climate shocks experienced in the area in their order of severity.
2. Please name the pastoral resources that become scarce following the aforementioned climate shocks.
3. How would you describe the drought occurrence in the area today in terms of seasonal rainfall failures?
4. How would you compare pasture and browse availability today to the preceding 10, 20 and 30 years?

5. How would describe the current status of dry season grazing zones?
6. How would you describe the duration of droughts today, 10, 20 and 30 years ago in number of seasonal rainfall failures?
7. Which other factors have affected the availability of pasture for livestock? (Listing)
8. Which other factors have affected the availability of water for livestock? (Listing)
9. Which other pastoral resources have changed in the last 10, 20 and 30 years leading to today?
10. Which other factors do you think can be attributed to the variations in resource availability?
11. Is there anything you would like to add?

Request for their contact details in case there is need for clarification.

Objective 2: To assess the trends in conflict experienced due to pastoral mobility

Checklist of Questions for Key Informant Interviews (KII)

Questions

1. What are the major drivers of conflict due to pastoral mobility in the area today, 10, 20 and 30 years ago?
2. Which factors determine the need for pastoral mobility in this area today, 10, 20 and 30 years ago?
3. What are the enablers of the pastoral mobility conflict today, 10, 20 and 30 years ago?
4.
5. Who are the major actors in pastoral mobility related conflicts today, 10, 20 and 30 years ago?
6. How would you describe the level of pastoral mobility today, 10, 20 and 30 years? Kindly tell me the reasons.
7. Which are the major reasons for changes in pastoral mobility routes?
8. How would you describe the prevalence of conflict due to pastoral mobility today, 10, 20 & 30 years?
9. Have pastoral mobility related conflicts increased or decreased in the area today, 10, 20 and 30 years? Kindly provide reasons and examples?

10. During which periods does the area experience pastoral mobility conflict scenarios today, 10, 20 and 30 years ago?
11. How would you describe the adherence by pastoralists to rules and regulations (institutions) that guide pastoral mobility? Today and the last 10, 20 and 30 years.
12. Please describe the effectiveness of efforts at resolving the pastoral mobility related conflicts today and over the past 10, 20 & 30 years?

Objective 3: To appraise how pastoralists have formally and informally shared and/or transferred resource-based risks

SECTION A: Formal Risk Sharing

Checklist of Questions for Key Informant Interviews (KII)

I. How frequently do pastoralists in the locality get access to formal risk transfer methods against pastoral resource scarcity? Which one(s)? *Eg. KLIP, Cash transfer, Livestock offtake programs etc.*
II. How have formal risk transfer methods helped pastoralists to cope with pastoral resource scarcity?
III. How has the adoption of formal insurance E.g., IBLI helped pastoralists to cope with pastoral resource scarcity?
IV. Do you think that these formal risk transfer approaches contribute in enhancing intra/inter communal cooperation? Why?
V. Do you think that formal insurance contributes in enhancing intra/inter communal cooperation? Why?
VI. How do pastoralists in the area raise resources to purchase of IBLI?

SECTION B: Informal Risk Sharing

Checklist of Questions for Key Informants (KII)

I. Which informal risk sharing techniques have pastoralists employed to cope with pastoral resource scarcity? {*Before, During and After the climate shock*}
II. Outline ways in which pastoralists in your community informally transfer risk to one another in times of pastoral resource scarcity? {*Before, During and After the climate shock*}
III. How do you think the informal risk sharing methods contribute towards enhancing intra/inter communal cooperation?
IV. How do you think that these informal risk transfer approaches contribute towards enhancing intra/inter communal cooperation?