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Perils facing Kenyan pastoralists, livelihood innovations and wider impacts: learning from project experience

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ABSTRACT

This paper shares findings from a detailed empirical analysis of seven development projects in Kenya that supported remote pastoral communities facing food insecurity and other difficulties linked to environmental degradation and climate change. The projects sought to address these challenges by trialing various livelihood innovations in partnership with communities. These project activities were assessed using a tailored cost–benefit analysis methodology to identify those offering the best use of scarce funds, thus informing future policy and programming for such areas. This evidence suggests that (a) the difficulties communities face are creating a desperate situation, and (b) some of the innovations trialed hold promise while others are problematic. The evidence presented includes an array of local voices that vividly convey community-level dynamics and prospects. This evidence is set in context using the literatures on human security and its wider impacts, notably migration from the Sahel. This analysis found the circumstances of pastoral communities can significantly impact neighboring regions, with ongoing instability posing a threat while smart interventions that create local opportunities offer more synergistic outcomes. The paper concludes by calling for greater recognition of the options facing such communities and their wider significance as a basis for scaled up support measures.

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Pastoralism; sahel; climate change; human security; migration; livelihood innovations

1. Introduction and conceptual framework

This paper is based on a field study conducted in Kenya in 2016 with support from the UK's Department for International Development (DFID). It examined seven projects delivered by seven charities in remote pastoral and agro-pastoral communities under DFID's Arid Lands Support Programme (ASP) between 2013 and 2016 (Table 1). The ASP targeted four counties (Mandera, Marsabit, Turkana, Wajir) that span a massive area which is home to approximately 3 million people who are among the poorest in Kenya. They also face different types of insecurity, from food insecurity to major climatic shocks to ethnic conflict.

The ASP projects trialed livelihood innovations in partnership with communities. These were assessed using a cost–benefit analysis methodology adapted to this context. This involved detailing observed outcomes using quantitative and qualitative evidence. The result was a rich body of evidence about which options offer the best use of scarce development funds in this context.

Pastoral communities in the Sahel face daunting challenges from threats like food insecurity and climate

change. These communities need livelihood pathways that are viable despite such threats, but identifying promising climate resilient pathways can be difficult. This paper aims to flag promising livelihood innovations for such communities by generating concrete, actionable lessons from trial and error experiences within communities. This includes informing future policy and programming for such areas. The paper's novelty lies in sharing granular evidence on the challenges faced and livelihood options trialed, notably via the voices of farmers and key informants.

Paper sections include methodology, study area, study findings, discussion and conclusions.

2. Methodology

2.1. Cost–benefit analysis (CBA)

CBA is an approach to informing decision making via tabulating the costs and benefits associated with an investment then weighing them up to compare 'with' and 'without' cases. Its power lies in generating

Table 1. The different activities of the seven ASP projects delivered in northern Kenya.

Activities	Charities						
	BOMA	CONCERN	Oxfam	Save the Children	Solidarites	Trocaire	World Vision
Addressing livestock health		X		X	X	X	X
Advocacy / government support		X	X	X			X
Breed improvement (i.e. goats)		X			X	X	
Conflict resolution						X	
Disaster risk reduction planning		X	X	X	X	X	X
Fostering livelihood alternatives			X	X	X		X
Business skills development	X		X				
Microfinance grants / loans	X	X	X	X		X	X
Pastoral field schools		X		X	X	X	
Pasture management / cultivation		X	X	X	X	X	X
Producing livestock feed supplements					X		
Water development		X		X	X		

numeric measures that are intuitive and compelling, since comparing costs and benefits captures the way various entities (e.g. individuals, companies, governments) make decisions. CBA findings can be expressed via a benefit–cost ratio (BCR). If the $BCR > 1$, the investment in question delivers more benefits than it cost and hence may be deemed worthwhile. BCR values can also be used to compare competing investments, since a higher BCR suggests greater benefits delivered relative to costs (Stobierski 2019; Venton 2010; Weller 2016).

A typical application would be using CBA to help governments or businesses make decisions about major investments like infrastructure. In such cases, data on costs and benefits tend to be either available from documents or easily measured (Muzira and Qiao 2021).

Recent years have seen growing interest in using CBA to inform decision making for international development, including projects targeting remote communities (CCAFS 2016). The rationale for using CBA in this context is that effective interventions by governments, donors and charities are needed to help vulnerable communities face daunting challenges, and sound evidence can inform their investments and programming. Applying CBA in this context is challenging, however, since data can be elusive even for basics like income or assets, and interventions can have multiple outcomes.

2.2. Community-based cost benefit analysis (CBCBA)

One CBA methodology suited to such contexts is CBCBA, as it can generate rich evidence on the outcomes of an intervention even in contexts characterized by major data gaps (Venton 2010). To illustrate how it differs from conventional CBA, consider an investment in logging a forest. Analysis via conventional CBA might focus on the cost of felling trees and proceeds from selling timber. By contrast, CBCBA would also look at

effects on livelihoods, soils and biodiversity, then distill quantitative measures where possible while also gathering qualitative data. These two types of analysis could lead to very different investment decisions, with CBCBA better suited to informing decisions in remote communities.

The Kenyan field study was conducted using CBCBA. Data collection involved a literature review, key informant interviews, focus group discussions (FGDs) and transect walks. Data analysis generated BCRs for selected project activities by comparing their costs and benefits, then set these ratios in context using qualitative evidence. Limits to this analysis stemmed from reliance on local testimony, including both approximate numeric estimates and the risk that certain considerations may be overlooked due to knowledge gaps or cultural factors. The steps followed are listed below. For further details, see the study report (Siedenburg 2016).

A. Study objective.

- Assess seven projects trialing livelihood innovations in pastoral communities facing food insecurity and environmental threats to identify promising options and draw key lessons.

B. Research questions.

- Characterize local livelihoods context
- Estimate BCRs of selected project activities
- Summarize qualitative findings on project outcomes
- Glean lessons learnt and recommendations from findings
- Examine wider impacts of these community dynamics

C. Study planning.

- Visited national offices of ASP partners to discuss study design and obtain documents.

- Gathered and reviewed documentation on the study area and projects.
- Determined whether the target population for each project had to be stratified to ensure the population examined was roughly homogenous. Some ASP projects targeted both pastoral and agro-pastoral communities, so these were stratified to enable a focus on pastoral areas. Pastoralist communities were chosen because they predominated in the ASP target area. Where stratification was done project costs were adjusted accordingly.
- Employed purposive sampling to select three study villages per project in consultation with each ASP partner, based on factors that determine ways livelihood opportunities differ across the project area or stratum (e.g. distance from main road or market, access to a water source). Villages were selected to be as representative as possible of the sample frame and included both more and less 'successful' villages in terms of project aims.
- Identified key informants for each project in consultation with field staff. This included field staff and at least one local informant from business, government and another charity.

D. Data collection.

- Interviewed key informants about local context, project outcomes, and scope for scaling up innovations.
- On arrival in each study village, asked village chief to convene a FGD including key subgroups: rich/poor, men/women, old/young, any ethnicities/religions
- Conducted FGD using open-ended questions to encourage villagers to share observations, ensuring each question was addressed by diverse participants. Asked about challenges facing the village, then asked participants to select the three most significant project activities and describe the benefits they delivered relative to pre-project realities. Also asked if other interventions had contributed to the outcomes cited and if any adverse impacts were observed. Collected both quantitative and qualitative evidence.
- Asked interviewees if they consented to using their words in reports, and all welcomed the chance to make their voices heard.
- Conducted a transect walk of the village with the ASP partner and village leaders, asking about points that had arisen in the FGD to deepen understanding and taking photographs.

E. Data analysis for each project.

- Identified project benefits to quantify based on those linked to the focus activities for which the FGDs managed to collect ample quantitative evidence.
- Generated estimates of each quantifiable benefit associated with focus project activities by distilling conservative measures from FGD testimony.
- Generated cost estimates for quantified activities by adding costs to implementing organization including a proportion of overheads, in-kind costs covered by communities, and any costs incurred by other entities also responsible for the outcomes quantified.
- Calculated BCRs for each focus activity based on assumptions about discount rates, expected duration of benefits, and possible problems or boons for the activity. Headline BCRs used core assumptions reflecting the most likely scenario for each activity. BCR ranges used plausible alternative assumptions (i.e. sensitivity analysis).
- Calculated BCR values for the project (or stratum examined) by totaling its quantified benefits then dividing them by the aggregated costs given stated assumptions.
- Contextualize quantitative estimates using qualitative evidence by citing representative comments from villagers and key informants then offering critical observations.

3. Study area

Various facets of the local context are critical to understanding the challenges facing the ASP target communities and the significance of the project activities. Ten facets are flagged based on the literature and input from interviewees followed by representative interviewee comments. These were anonymized to avoid any risk of causing difficulties for interviewees.

3.1. Population

National population growth rates for Kenya have ranged from 2.3% to 3.8% over the past 50 years, with a declining trend over time (WPR 2021). County-level population data suggest significantly higher growth rates in the ASP counties, as reflected in a high proportion of the population being under 30 years old (KODP 2021). Population growth creates opportunities but can also put pressure on natural resources that may prove problematic.

Interviewee comments.

- 'Twenty years ago the population of the county was 300,000-400,000, but this has increased sharply and now stands at perhaps 1.2–1.5 million.' (Trocaire staff)

- 'The human population here has grown dramatically, perhaps doubling in the past 10 years. It would have grown even more if it weren't for the fact that many people have left in search of opportunities.' (World Vision villager)
- 'Over the past 20 years, the population of the village has doubled. Contraception is against both our culture and religion, but failure to use it is also due to lack of knowledge about family planning. We have a saying here, 'Instead of a baby staying inside you, better for it come out, whether to live or to die''. (CONCERN villager)

3.2. Climate change

County-level data suggest the ASP counties are hot and dry, drought-prone, and characterized by unreliable rainfall patterns (KIRA 2014). Climate in the area has been changing, with temperatures rising and precipitation rates falling. Changes have been dramatic in recent years, e.g. droughts used to occur every 10 years but now occur every 2–3 years (Yale 2010). Low and erratic rainfall has reduced available water and pastures, though rains are still good sometimes (FEWS 2021a). These changes could be seen as defining a 'new normal' that makes pastoralism in the area much more challenging.

Interviewee comments.

- 'Rainfall patterns here have changed. Before we had significant rains every six months, but now we can't know when it will rain or not. The winds are stronger than before too, and it also seems hotter. Nowadays even when it finally rains, there is still not enough moisture for the pasture to properly regenerate.' (Solidarites villager)
- 'Twenty years ago the rains were much better and also more predictable. Back then we would get showers for several weeks. Nowadays however it might only rain for one day in the rainy season, but in an intense storm that causes widespread erosion and flooding.' (Trocaire partner)
- 'Until fairly recently, we had two proper rainy seasons. It used to rain regularly during each rainy season, and rains would begin and end at predictable points in the year. During each rainy season we used to get enough pasture. All this is different now. Nowadays, two or three rainy seasons can go by with very little rain, and it almost seems like it is just luck if it actually rains. We ask ourselves, 'Will it rain at this time?' but simply don't know the answer.' (CONCERN villager)

3.3. Pastures

Pastures occupy 26% of the world's ice-free land (UNCCD 2017), and two-thirds of Africa's farms and pastures are degraded (World Bank 2017). Land degradation, or reducing the productive capacity of land, can undermine livelihoods and resilience. Yet degradation can be reversed via environmental restoration measures (Mbow et al. 2019; UNCCD 2016).

Pasture resources have declined sharply in the ASP counties with grave consequences including livestock regularly dying of hunger. Pastures seem to be a key limiting resource in these communities. The importance of land degradation as a threat and environmental restoration as a solution is however often overlooked in these counties. For instance, it was neglected by county-level reports for three of the four counties when listing 'factors affecting food security' (KIRA 2014). Similarly, many villagers blame pasture problems on drought, though some also link them to excessive grazing pressures.

Interviewee comments.

- 'Twenty years ago there was plenty of pasture here, with some grasses two meters high. Back then our animals were strong and healthy, and we didn't see livestock deaths due to insufficient pasture like we do now.' (BOMA villager)
- 'Pasture availability has fallen dramatically due to the poor rains. Our livestock do not harm our grasses or shrubs, the only problem is the lack of sufficient rainfall to sustain them.' (World Vision villager)
- 'There is very little pasture grass here. Ten or twenty years ago there used to be various types of grasses here, but most of them can no longer be found. The only grasses left are tough like weeds and offer little nutrition for our animals. These pastures were destroyed by a combination of poor rains and intensive grazing.' (CONCERN villager)

3.4. Trees

Charcoal is a major source of domestic energy in Kenya, while also generating income for many in rural people. Its production is typically inefficient, however, with 10 tons of wood used to make one ton of charcoal. Charcoal is recognized as a leading cause of deforestation and the government has tried to regulate its production, but this continues and tree cover continues to dwindle (Sola and Cerutti 2021).

Tree stocks in the ASP counties have fallen dramatically over recent years, reducing the availability of

seed pods used as livestock feed and wild foods like fruit. Villagers bemoan such losses but trees are not typically managed or protected, while those in need often fall back on charcoal production to make ends meet. Interviewee comments.

- 'There were lots of trees in the area 20 years ago, but most are gone now ... Many people use trees as a source of cash earnings due to poverty and desperation by selling fuelwood, charcoal or construction wood.' (CONCERN villager)
- 'There were plenty of trees here twenty years ago but now there are relatively few. The main reason is that people cut them down for fuelwood, fencing and to make charcoal. This affects our livestock, since tree pods are an important food for them.' (BOMA villager)
- 'We collect Acacia pods and store them for the dry season, but these are not sufficient for our livestock. When we run out of grasses and pods, there is nothing we can do but watch our goats die.' (Solidarites villager)
- 'Tree planting or creating enclosures to protect vegetation are rare here but Solidarites is experimenting with such options. Communities can also institute bylaws to prevent tree cutting, and this can work.' (Solidarites staff)

3.5. Water

Rainfall in the ASP counties is low, e.g. 393 mm/year in Marsabit county distributed across two peaks. Boreholes are deep, e.g. 245–286 meters deep in one area of Marsabit (Mugo 2020). A majority of the ASP target population has access to a borehole. Water levels are falling due to high demand on boreholes, creating concerns about sustainability, though experience from elsewhere in the Sahel (UNDP/WRI 2008) suggests environmental restoration can replenish local aquifers. Other water sources include water pans and rivers, but many such sources are dry for much of the year and can be polluted due to lack of improved sanitation (KIRA 2014).

The study communities report that water availability has worsened dramatically in recent years and digging wells by hand is no longer viable in most areas. They see boreholes as a solution and these can be effective, but they are also expensive and can progressively deplete aquifers, creating calls for still deeper boreholes.

Interviewee comments.

- 'Twenty years ago, the nearby river had water throughout the year, and there were natural springs here. We refer to this time as 'the years of much

milk'. There was also lots of wildlife, such as giraffes, lions and gazelles. Nowadays, there is little wildlife here and the river typically only flows for a few days after the rains.' (Trocaire villager)

- 'In most parts of the county the water table is so low that people cannot dig wells, and need boreholes with pumps to access groundwater. Water was much closer to the surface 10 years ago.' (BOMA staff)
- 'We have enough water now thanks to water projects, but the water in the village is salty, which is a big problem. The nearest place we can get sweet water is 12 km away, so generally only those who have access to a donkey and a cart use this water. Many of us end up using the salty water and are now having kidney problems.' (Solidarites villager)

3.6. Livestock herds

The four target counties possess high livestock numbers, namely 13M goats, 7.5M sheep, 3.7M cattle and 2.4M camels.¹ Livestock deaths due to hunger have become common, however. One priest working in Turkana county said, 'I had never experienced anything like it. The smell of death was overpowering. Animals were dropping dead in front of me' (Maryknoll Magazine 2016). Livestock deaths are economically devastating for pastoralists, who also have strong cultural ties to their animals. They therefore generally seek to increase herd size where possible, or to restock animals following such losses, even though this could be seen as highly risky under the circumstances.

Interviewee comments.

- 'When rains are not sufficient then pastures will be insufficient and livestock will die. And people here depend on livestock, so they will end up suffering.' (World Vision villager)
- 'Last year I lost 80% of my livestock to hunger. This means I lost almost everything, since this was both my household savings and day-to-day income ... The trouble is there is very little pasture here nowadays, so my animals are skinny and weak.' (BOMA villager)
- 'We are worried that any new goats we buy may die too, but we still want more as a way to minimize our risk. If I have 15 goats instead of 10, then my family is less threatened by drought, since it is more likely at least some will survive. The more livestock I add, the less my family is in danger. Livestock are the basis of our livelihood, so if we lose our animals then we must restock.' (CONCERN villager)

3.7. Malnutrition

Global Acute Malnutrition rates in the ASP counties range from 12% to 25%, stunting rates range from 24% to 66%, and poverty rates range from 84% to 94%. Coping strategies to face this need include skipping meals, selling wood or charcoal, and gifts from relatives (KIRA 2014). Given peoples' reliance on livestock, malnutrition in the area is closely linked to the problems facing pastoralism. Kenya's safety net scheme has a significant presence across these counties, but interviewee testimony suggests it is insufficient to fill the hunger gap.

Interviewee comments.

- 'Due to the reductions in our livestock holdings we sometimes don't have enough to eat, particularly during times of drought, so malnutrition is a problem.' (CONCERN villager)
- 'If our livestock become weak due to drought then we grow weak and simply wait for relief food. At such times our only basis of survival is this relief food.' (BOMA villager)
- 'The few who have enough livestock can sell an animal now and then to buy food, but even these people may not have enough to eat, since they will often share what they get with neighbors due to our traditions of social sharing. Fortunately, we also get help sometimes, notably food aid ... and projects that seek to foster income generating activities.' (CONCERN villager)

3.8. Ethnic conflict

Ethnic conflict is a major problem in the ASP target counties, with clashes centered around competition for scarce pasture and water resources as well as livestock raids between neighboring groups. Competition for resources is exacerbated by worsening climatic shocks (AU 2011; Pavanello 2009; Alio 2013). Another factor is cultural beliefs about warriorhood that frame livestock raiding as a viable livelihood strategy in times of economic stress (Chebunet, Lopeyok, and Laboso Abonyo 2013). The virtual absence of government in some areas also contributes to conflict (TNH 2009). Livestock raiding among Kenya's pastoralists has changed profoundly in recent decades and now often involves guns and extreme violence (Greiner 2013).

Interviewee comments.

- 'During drought we have to take our livestock to other communities in search of pasture, since

otherwise they would likely die. But other communities are seeking these same pasture and water resources, so sometimes we come into conflict.' (CONCERN villager)

- 'The Turkana have a long-running bitter conflict with the neighboring Pokots. This makes it difficult for herders to move freely with their livestock in search of pasture or to access markets, as they fear attacks. People can easily lose their livestock or even their lives due to raiding.' (World Vision staff)
- 'Those involved in livestock raiding and ethnic conflict are the youths. This happens because they do not have activities to keep them occupied. We have schools, but many children don't go due to lack of teachers, food or fees. The only option some see is to try to get rich by stealing livestock.' (Trocaire villager)

3.9. Market access

The Kenyan government seeks to facilitate market engagement by farmers and pastoralists as a way to reduce poverty. For instance, the Turkana district livestock marketing council fosters commercial links with other parts of Kenya and export markets by encouraging traders to visit communities (Guest 2012). Greater commercialization seems to represent a clear opportunity (UNFAO 2014). Testimony from interviewees suggests these communities nonetheless often lack good options for selling livestock due to factors like distance to markets, poor prices, and conflict hampering market access.

Interviewee comments.

- 'The local livestock market is poor. There are few buyers, and when we find buyers the prices they offer are very low. As a result when we sell livestock we don't earn enough to be able to properly feed our families.' (BOMA villager)
- 'Distance to the livestock market is a key determinant of market behavior, because if a herder needs to walk for several days to access a market, his animals may be thin and weak by the time they arrive, which can adversely affect their sales price. The result is that when these pastoralists arrive at the market they may need to accept whatever price is on offer that day.' (CONCERN partner)
- 'In the past, it was very hard to sell livestock in the county, but nowadays we see brokers visiting villages to buy animals, so this is much easier now. Villagers usually sell to these brokers instead of trying to bring their animals to market. But the prices paid to

villagers are unfair. Pastoralists sell based on need, since otherwise they would want to keep as many animals as possible. Brokers know this and can use it to drive a hard bargain.’ (Solidarites staff)

3.10. Government services

Kenya established a system of devolved government in 2010 with the aim of making government more accountable to citizens by decentralizing functions like health care, primary education and roads (Kimenyi 2013). Local service provision nevertheless remains inadequate across the target communities. For instance, the literacy rate in these counties ranges from 10% to 26%, while the ratio of doctors to patients is just 1:500,000 in Turkana county and 1:64,000 in the non-urban parts of Marsabit county (KIRA 2014). Testimony from interviewees suggests other problems include corruption and inadequate support to pastoralism.

Interviewee comments.

- ‘Government services have improved in recent years thanks to devolution. Yet given the county’s size and its poor infrastructure, access to services remains limited for many people. Government still often lacks the necessary resources to deliver services, such as extension agents having access to a motor-cycle.’ (CONCERN staff)
- ‘There has been a big improvement in government services to the county over the past five years. For instance, the whole county used to have just 1 veterinary officer but now has 14 all based at the sub-county level. We also now have para-vets and livestock production officers.’ (Trocaire staff)
- ‘Devolution of government in Kenya has potential to help people escape poverty by bringing services closer to communities and ensuring their priorities are taken into account. Yet one big problem is that ‘corruption has been devolved’. Another is that county governments can fail to consult with communities and thus end up making interventions that don’t work.’ (Solidarites staff)

4. Study findings

Findings included both quantitative and qualitative evidence on ASP project outcomes.

4.1. Quantitative findings

Table 2 summarizes the study’s quantitative findings, namely the BCRs obtained for different ASP project

Table 2. BCR values for the priority project activities under different assumptions.

Project	Activities	Core BCRs	BCRs given other assumptions
BOMA CONCERN	Entire project ³	4.2	2.6–8.4
	Small grants	5.4	2.7–10.7
	Pastoral field schools	2.1	1.0–3.2
Oxfam	Camel meat processing	6.7	3.3–10.2
	Irrigated fodder production	9.1	5.7–18.1
Save the Children	Fodder production	3.9	2.0–6.0
	Village savings and loan association (VSLA) & business development	6.2	3.1–13.3
Solidarites	Feed supplements	0.8	0.8–13.0
	Shallow wells	2.7	2.7–6.6
Trocaire	VSLA & capacity building	2.4	1.5–3.7
	Livestock health	0.6	0.3–1.2
World Vision	Aloe vera products	1.1	0.7–2.1
	Honey production	0.5	0.3–1.0

activities. BCRs generated using the core assumptions ranged from 0.6–9.1, while alternative BCR values are also presented based on plausible alternative assumptions.

These findings suggest some of the project activities were highly beneficial while others were marginal at best. Yet judgements based solely on these measures could be misleading. Notably, some activities with low BCR values may look promising when a fuller body of data is considered, such as by addressing a daunting challenge where progress is needed but slow.

4.2. Qualitative findings

Considering qualitative evidence on these activities alongside their BCR values ensures a more balanced view. Such evidence helps contextualize and interpret quantitative findings, including providing nuance on the significance of different project activities to target communities. It likewise informs conclusions about these activities, highlighting those with particular promise and those that seem problematic.

The qualitative evidence is grouped under seven themes. Each theme is described then elaborated using anonymized representative quotations from interviewees.

4.2.1. Increasing pasture supplies

Since pasture is a key constraint on pastoral livelihoods in the ASP target counties, any activities that increase the quality or quantity of pasture could be important to these communities. Some project activities sought to increase pasture supply via rangeland management, while others actively fostered vegetation growth via pasture conservation areas. Rangeland management fits with the local culture, but traditions like saving certain pastures for dry season grazing are no longer

functioning effectively. Active pasture management strategies, or environmental restoration, may therefore be needed, but would require communities to embrace major changes to their traditional ideas and practices.

Interviewee comments.

- 'It is essential that we find a way to rehabilitate the local environment, since it is needed to sustain local livelihoods, including pastoralism. This is a big challenge, since the culture here is based on free grazing, yet addressing our pasture problems will require abandoning these traditions and restricting grazing in some way.' (CONCERN partner)
- 'Last year I cultivated pasture in a household plot measuring 5 acres, and it grew well. I relied on this pasture in the dry season and was able to sustain my livestock, to the point that I didn't have any deaths from hunger. Before I had this pasture I might have lost half my herd.' (World Vision villager)
- 'Tree pods are very good for goats. If we had enough pods, then our goats might not die in times of drought. Pods make goats stronger than grasses do. Sometimes we gather and store them.' (CONCERN villager)
- 'Goats greatly appreciate tree pods, and those that eat tree pods produce more milk than others. People recognize these benefits, but still view trees as their last priority.' (CONCERN partner)
- 'Finding viable solutions to the pasture problem would require community-led efforts. For instance, community-based mechanisms could be used to protect a given area of pasture at certain times by imposing penalties such as heavy fines or being made outcasts.' (SOLIDARITES partner)

4.2.2. Commercializing livestock production

Pastoralism is the basis of the local economy and culture, and fostering a more commercial approach to it could help revitalize this sector. Notably, buying and selling animals in ways that optimize income would represent a change from current practice that sees livestock often managed based on cultural considerations instead of earnings. Many locals sell animals when they fear they will die or need grain. Yet at such moments animal prices are low while grain prices are high, so trades are disadvantageous. Conversely, animal prices are high when animals are strong following the rains, when grain prices are low. Critically, potential markets for livestock from the area is large, given high demand for livestock products both within Kenya and in the Middle East.

Interviewee comments.

- 'The fact that our communities often get only poor prices affects their market participation, since it makes selling livestock less attractive.' (CONCERN partner)
- 'There are huge opportunities here in marketing livestock. Pastoralists need to sell their animals to meet various household needs...but often sell at the worst possible moment. I follow a commercial model instead. I buy during the dry season when prices are low, because animals are weak and people are worried they may die so everyone wants to sell. Then I sell during the rainy season when animals are strong and prices high.' (World Vision key informant)
- 'Most of the meat consumed in Kenya comes from the pastoral communities, but most pastoral communities are in a desperate situation. A key way to improve the welfare of communities is increased market engagement and securing more value for producers. One promising initiative is the county government's plan to establish an abattoir just outside Marsabit town... This... could see pastoralists get better prices, instead of the value of their animals being largely lost on transport costs and unscrupulous middlemen.' (CONCERN partner)
- 'Government policy could support pastoralism in various ways... Establishing fattening grounds nearby to key markets... could enable herders to fatten up their animals prior to selling them. A system to verify quality standards of livestock... could facilitate sales to other countries.' (BOMA staff)

4.2.3. Livelihood diversification

Pastoralism is the bedrock of their economy, yet livelihood diversification options for these communities are also needed given the looming threats to pastoralism in the area. The ASP projects trialed various diversification options and some showed real promise. Other options not trialed under ASP might also hold promise for these communities, including futuristic prospects like growing algae as supplementary feed or breeding edible insects. For some options, the role of government or donors in creating an enabling environment could be key to their chances of success, for instance by helping people acquire new skills.

Charcoal production is the first livelihood alternative that households in the target communities turn to when they struggle to meet their needs via pastoralism. While it may be effective at generating at least some

earnings, this is essentially a short-term coping strategy that undermines longer-term prospects and climate resilience by degrading the local environment. Charcoal production is thus a deeply problematic option for these communities, so interventions to explore sustainable livelihood alternatives are needed.

Interviewee comments.

- 'Charcoal production was traditionally a shameful activity in our culture. If you are selling charcoal this shows everyone you are poor and lack alternatives. Yet ... it is becoming socially acceptable. For instance, a charcoal producer is now seen as marriageable provided he owns livestock.' (World Vision staff)
- 'Fostering value addition of local products ... could help ensure that they can be sold at higher prices. Value addition for meat holds particular promise, such as producing biltong. Skin and bones could also be the basis of value addition activities, such as producing wallets or knife handles.' (Trocaire partner)
- 'Honey Africa is a Kenyan firm that buys raw honey then processes it. Turkana County could provide to such a supply chain. One way this could work would be for the firm to distribute beehives, then sign an agreement committing to buy their production.' (World Vision staff)
- 'Tree gums and resins could be an interesting livelihood diversification option ... if we had policies and systems ... to support products like gum Arabic or frankincense.' (BOMA staff)

4.2.4. Opportunities within schooling

Schooling in its current form is problematic in the target communities. Paying school fees is often a major challenge, while the benefits of schooling to pupils are not always clear. Schooling is clearly a priority for households, but appears to be seen primarily as a way to secure a formal sector job for a family member, so that their income can help support the household. However, this belief seems misplaced, since few school leavers from the target communities secure such a job.

In order to make school as useful as possible to these communities, the curriculum for the area could perhaps be adapted to the local context, for instance by making it pastoralism compliant and supportive of entrepreneurship. Any revised curriculum could also be made climate smart and gender sensitive, given the importance of these factors as obstacles to progress but also possible opportunities.

Interviewee comments.

- 'Sometimes we have to remove our children from school when our livestock die due to drought. They may be doing well, but if we have no money then we cannot pay the school fees.' (BOMA villager)
- 'Illiteracy levels are high here, since most of us didn't even go to class 1. Even the few who are educated up to level 4 have a hard time getting a job. Only the few who get a degree can get a job.' (BOMA villager)
- 'People need to start thinking along the lines of business, entrepreneurship and delivering goods and services, as opposed to applying for advertised jobs. This is already happening to a point, but this trend could be better supported.' (CONCERN partner)
- 'Ideally, our communities need schooling that is compliant with pastoralism. Currently, our schools use a national curriculum that talks about farming but not pastoralism, so children do not get a sense of what 'best practice' pastoralism looks like. This is a critical oversight and has to change ... Pastoralism is the only obvious way to use these lands, given how dry they are.' (CONCERN partner)
- 'Potentially, schooling could help our children to ... understand commercial approaches to livestock, including keeping smaller numbers of animals and actively maintaining pasture and water resources.' (CONCERN partner)

4.2.5. Addressing causes of conflict

Conflict is a critical constraint on local livelihoods, since instability can undermine economic activity. If households or businesses are worried about insecurity when accessing inputs or selling outputs, this raises the costs of doing business while increasing the risk of failure. For instance, villagers report that pastoralists may avoid trading in certain markets due to fear of attacks by neighboring ethnic groups. Interventions to address the causes of conflict are needed, including creating better opportunities for youths who might otherwise end up fighting and fostering cross-cultural understanding between ethnicities.

Interviewee comments.

- 'Conflict nowadays is no longer about strength and skill, like when fighters used spears and engaged in hand to hand combat. Nowadays they use guns and sometimes even machine guns, so the person who wins is more the one who is best connected and hence has the best weapons ... Today's fighting is no longer about bravery, just shooting from afar,

including killing women and children. This is no longer our culture, and none of it makes sense anymore.’ (BOMA staff)

- ‘Conflict has been a big problem here, but recently things are better ... The youths who used to participate in livestock raiding are now trying to get involved in selling livestock instead. One thing that has really helped these youths are the loans to them from some NGOs ... The only problem is that these loans are small, and hence cannot support many youths.’ (Trocaire villager)
- ‘Business people only invest where there is peace, so initiatives to foster conflict resolution are critical to our future. One good initiative is USAID’s Development for Peace, which brings kids from different ethnicities together via schools.’ (CONCERN partner)
- ‘Hodi is a NGO based in Marsabit that has a ‘Football for Peace’ scheme. It seeks to channel the passions of young people into football instead of fighting, and arranges matches between teams from different tribes.’ (BOMA staff)

4.2.6. Problematic cultural beliefs

Cultural beliefs can undermine community welfare when they no longer fit with the local context. In such cases they might also impede villagers from embracing new strategies or practices that may be a better fit to current opportunities and threats. Two examples of culturally embedded livestock management practices that now complicate the efforts of the target communities to secure their livelihoods are maximizing herd size and reliance on free grazing. While such ideas may have served these communities well in a past when population pressure was low and climate change impacts were not yet observed, the study findings suggest they have become problematic. Findings from the literature also support the idea that climate change can undermine the salience of local knowledge (Adger et al. 2014). Cultural ideas about gender are another potential barrier to addressing looming challenges, since many economic activities and decisions are gendered. Where cultural constructs are found to impede efforts to address major threats to these communities, sustained efforts may be needed to address this.

Interviewee comments.

- ‘Most people in the target communities keep livestock primarily for prestige, which means trying to keep as many animals as possible and then sometimes ending up losing many.’ (BOMA staff)

- ‘Some of us sell during the rainy seasons when our animals are strong and the prices are high, but 95% of people here still follow the traditional model of only selling when they need to in order to meet household needs, so they may get bad prices for their animals.’ (BOMA villager)
- ‘We sell livestock based on our needs, such as buying food ... and make sales whether the prices offered are high or low.’ (World Vision villager)
- ‘We are thinking about our future, but don’t know what God has planned for us. We will see.’ (World Vision villager)
- ‘One problem facing girls is that some families want to marry them off early to receive a dowry. Families receive many camels for a girl, so the temptation for them is great. By contrast, if a girl goes to school, the family may lose out on the dowry entirely.’ (BOMA staff)

4.2.7. Local ownership of interventions

Another major barrier to the success of interventions is ownership, i.e. whether target communities buy into an intervention or instead see it as imposed on them by outsiders. Interventions can enjoy short-term success in the absence of ownership, but it is essential for securing lasting impacts. The changes fostered by project interventions often cease when funding ends, raising questions about how to ensure communities are committed to maintaining target activities or outcomes.

The importance of ownership makes it imperative that interventions are developed in partnership with target beneficiaries. Ensuring interventions are community-led can be done in different ways, however. One option is for project staff to listen carefully to villagers but also speak freely about their observations and concerns, while another is to simply accept villagers’ stated preferences. The study findings suggest the latter approach could be counterproductive, for instance on themes like herd size, gender or livestock raiding. Local knowledge and cultural aspirations nonetheless offer a critical basis for interventions.

Interviewee comments.

- ‘It is important to villagers to see their development priorities addressed ... If they are not listened to, then they can easily feel that they are not being respected and that government or donors are looking down on them.’ (Trocaire partner)
- ‘The project has given the communities insight into their problems ... When asked about environmental

challenges, communities typically emphasize drought and flooding, so then we discuss options to respond to this, such as tree planting and building embankments.’ (Trocaire partner)

- ‘The communities don’t simply develop these [community] plans by themselves. Project staff probe their suggestions and discuss relevant issues in order to make sure the resulting plans make sense.’ (Trocaire partner)

5. Discussion

5.1. Discussion of study findings

The study assessed seven projects trialing livelihood innovations in remote pastoral communities facing food insecurity and environmental threats to identify promising options. All seven projects had strong activities, but some showed more promise than others. Quantified priority activities are described in Table 3.

These activities can be grouped into several broad categories. Some project activities showed great promise for vulnerable pastoral communities and offer

big welfare gains, such as pasture cultivation efforts. Other activities showed promise but need tinkering, such as VSLA schemes and fostering honey production. Finally, some activities seem problematic, such as financing herd restocking given climatic shocks and pasture scarcity.

Several lessons learnt emerge from the field study that suggest ways its findings could help inform programming and policy towards vulnerable pastoral communities. These include:

- Interventions that maximize benefits delivered by securing benefits that persist over time and/or disseminate beyond their target beneficiaries tend to have a bigger impact.
- Low-cost interventions can enhance value-for-money yet higher costs (e.g. for continued institutional support) may be justified if this promises major benefits over time.
- Building on aspects of local culture can help ensure interventions enjoy local ownership and deliver quality outcomes that are sustained over time. Yet departures from traditions (e.g. supporting women

Table 3. Livelihood promise of the project activities.

Project/Activity/BCR	Focus and promise
BOMA/Project/4.2	Provided business opportunities to women that complemented pastoralism. This raised incomes and captured imaginations, but challenges included men upset about being excluded and questions about the efficacy of training on ensuring businesses are viable.
CONCERN/Small grants/5.4	Provided loans for women to launch businesses or buy livestock. Concerns included some using loans for food or medicines & thus incurring interest without raising income, the wisdom of restocking given pasture scarcity, and some saying the focus on women is unfair.
CONCERN/Pastoral field schools/2.1	Supported pastoral livelihoods by treating livestock diseases while also encouraging pasture conservation and commercially-oriented management. Anticipated benefits included fewer animal deaths and increased production of milk and meat, but cultural barriers remained.
Oxfam/Camel meat processing/6.7	Fostered processing of camel meat, which secured a good income and fit well with the local culture. Since camels are highly resilient animals, this option was also climate resilient. The scope for developing camel meat processing and sale is limited, however.
Oxfam/Irrigated fodder production/9.1	Fostered enhanced pasture production in an enclosed area using water from a borehole, which ensured continuous pasture supplies, thus reducing livestock deaths while securing earnings from selling milk, fattened animals and fodder.
Save/Fodder production/3.9	Fostered enhanced fodder production by fencing in areas then regulating their use. Communities took care of enclosures since they valued them, notably for drought periods. Benefits included minimizing livestock deaths and selling milk, fattened animals and fodder.
Save/VSLA/6.2	Providing loans to cottage businesses generated household income for needs like food and school fees, though one concern was that some loan uses may not support repayment.
Solidarites/Feed supplements/0.8	Fostered production of multi-nutrient urea blocks (MUBs) that help livestock metabolize foods, enhancing their capacity to survive drought and increasing milk production. The project demonstrated their efficacy and sold them, but affordability remains an issue.
Solidarites/Shallow wells/2.7	Fostered construction of shallow wells to increase access to water and reduce peoples’ labor burden. One concern was they aren’t protected and could be polluted by waste.
Trocaire/VSLA/2.4	Provided training and small loans to enable villagers to create cottage businesses, which is greatly appreciated by villagers. Yet some used these funds to buy livestock or meet household needs like food or medicine, which could prove problematic as noted.
Trocaire/Livestock health/0.6	Provided livestock vaccinations and disease treatment, which greatly reduced deaths. Livestock diseases are a key concern but many villagers expressed doubts about their capacity to pay for such inputs, which had been provided for free to date.
World Vision/Aloe vera products/1.1	Fostered production of aloe vera soap and lotion that sold well locally. Villagers were keen to ramp up production, including using boiled water to meet quality standards, but challenges included securing needed inputs and accessing bigger markets.
World Vision/Honey production/0.5	Fostered honey production. Villagers were enthusiastic and potential markets large, but challenges included theft and market access. Beekeeping creates incentives to conserve forests, and could thus help secure ecosystem services that underpin local livelihoods.

to start businesses, fostering enclosed pastures) may be needed to secure economic progress, despite such changes being difficult and taking time.

- Thinking in terms of longer-term outcomes could help identify promising livelihood innovations. Reasons include: (a) the challenges such communities face are daunting, e.g. hunger, climate shocks, (b) some promising livelihood options face major obstacles (e.g. the cultural impulse to maximize herd size), so initial results may be modest but gains over time could be large, (c) overcoming obstacles may require sustained support from government or donors, and (d) the longer-term costs of failing to find viable, lasting solutions for these communities could be high for them, their country and others.

Recommendations of opportunities and possible leverage points for future interventions also emerge from the study. These mirror the themes covered in the qualitative findings:

- Increase pasture supplies via environmental restoration
- Support commercialization of livestock production
- Support promising livelihood diversification options
- Harness neglected opportunities within schooling
- Address the root causes of conflict
- Target cultural beliefs that are undermining welfare
- Secure local ownership of interventions

5.2. Discussion of wider impacts

One key question concerns the impacts of these community dynamics on neighboring countries and regions. Critically, do the risks faced create incentives for action to support vulnerable pastoral communities? This question is explored based on the recent literature.

5.2.1. Human security, a timely concept

The concept of security has long been framed as 'national security', or protecting national territory from aggression by hostile states. Human security (HS) is an alternative approach to security focused instead on individuals and their needs. Its premise is that while wars between states are becoming increasingly rare, many people nonetheless now face multiple types of insecurity from threats like hunger, unemployment, disease, social conflict and environmental hazards. Such threats can lead to unstable societies and lack of peace. By neglecting them, the conventional approach to security is failing to protect people and ensure peace. The HS approach seeks to shift policy and analysis towards

such threats to make it better suited to current realities (Liotta and Owen 2006; Olonisakin 2015).

The HS literature flags three types of freedom as key to peoples' lives and aspirations and hence to security in today's world: Freedom from fear (i.e. safety from violence), freedom from want (i.e. basic needs met), and freedom to live in dignity (i.e. access to opportunities and critical services). Pillars of HS include (i) being people-centered, (ii) recognizing interlinkages between different threats and types of insecurity, (iii) making interventions that tangibly improve peoples' lives, (iv) identifying root causes and sustainable solutions, and (v) promoting multi-stakeholder partnerships. HS solutions include both top-down protection (e.g. social safety nets) and bottom-up empowerment (e.g. building peoples' resilience) (UNHSU 2020).

Thinking in terms of HS is highly relevant to Africa given the large swathes of its population living in precarious situations. Efforts to formalize its use on the continent are underway, following the launch of work to develop an African Human Security Index in March 2020. This will be used to measure HS in the African context and foster effective action to achieve the sustainable development goals. The African Union delegate suggested it could also 'advance ... efforts to effectively silence the guns on the continent.' (AU 2020)

The Sahel is at particular risk of HS problems like food insecurity, climate change, conflict and extremism (Cooke and Sanderson 2016). Tracking data for spring 2021 suggest the humanitarian situation in the ASP target counties is grave, with this entire area classed as being in a food insecurity 'crisis' (FEWS 2021b) and climatic factors a key driver (FEWS 2021c).

5.2.2. Human security, food security and climate change

Food security can be key to human security, since hunger creates desperation. A chilling example is poor childhood nutrition. This causes millions of deaths per year, leaves one third of surviving children stunted, and is linked to ongoing health problems, reduced educational attainment and lower earnings (Flowers 2016).

Food insecurity is linked to instability and unrest across the world, as reflected in national level data showing a powerful correlation ($R = 0.91$) between countries with high levels of food insecurity and those characterized by insecurity and conflict (IEP 2020a). Other evidence suggests investments in food security can be effective at promoting stability (Graff 2010), including making populations secure in otherwise unstable contexts (Moran 2017; Alexander et al. 2017). In short, food insecurity is not just a moral stain but also a driver of societal problems.

Human security problems are predicted to be progressively exacerbated by climate change. While climate-driven wars between states are considered unlikely, climate change could cause erosion of the social order and rising violence, intensify migration (GACGC 2007), or contribute to radicalization of populations (EU 2008). A key mechanism for its impact is undermining livelihoods, notably those like farming and pastoralism that depend on distinct climatic patterns. Livelihood problems linked to climate change are especially likely in areas where people are poor and/or face land degradation and resource scarcity. Critically, climate change can undermine food security via such dynamics (Adger et al. 2014).

The fact that large parts of the world now face human security risks that are exacerbated by climate change is increasingly recognized by governments. The US Department of Defense has suggested that 'Climate change poses an immediate threat to national security' and called for incorporating it into 'strategic thinking about high-risk regions' (IISD 2015). A survey of national governments found most had incorporated climate change into their planning as a security threat and also considered humanitarian assistance a responsibility of their military (ASP 2013).

5.2.3. *Extremism, conflict and migration*

One stark manifestation of instability in the Sahel is that violent extremist groups have expanded their reach there in recent years, forming an 'Arc of Instability' stretching from Senegal to Eritrea. Research (Cooke and Sanderson 2016) to better understand this found extremism had devastating impacts for local economies and created vast 'no-go' zones for governments or donors. It also found several structural drivers of extremism, namely (i) most of the population depend on agricultural and pastoralism but land degradation and climate change are undermining their viability, (ii) population growth rates are among the highest in the world, with 60% under the age of 25, and (iii) high levels of deprivation, as reflected in indicators like child mortality and education. The upshot is that youths see a future with few economic opportunities and hence poor chances of marriage or social stature. For them, joining an extremist group offers alternatives.

African Development Bank president Akinwumi Adesina urged continued aid to such areas to avoid worsening insecurity. 'Anywhere you have high levels of ... rural poverty, ... unemployment and ... environmental and climate degradation, you always have terrorists operating,' he said. 'Where you cannot create economic opportunities, these rural areas ... will simply become a recruiting field for terrorists.' Aid is needed 'to create

jobs, support the revitalization of rural areas, and to adapt to climate change, because if we don't then the negative externalities ... for the world are going to be massive.' (Gaffey 2017)

Despite this reality of desperation and need, most Sahelian states continue to tackle extremism primarily via military force. At best, this complicates humanitarian outcomes, but can also aggravate them (Friend 2020). A shift to a human security paradigm by these governments could foster more peaceful, hopeful outcomes (Mhadeen 2018).

Desperate people may also end up engaging in conflict such ethnic violence or civil war, especially where climate change exacerbates drivers of conflict like poverty and resource scarcity (Adger et al. 2014). Notably climate change could lead to a decrease in available food or water, and thus fighting over scarce resources (Chalecki 2007).

The potential significance of any progress towards stability and peace is underlined by a global metric that measures the economic impact of conflict and violence based on indicators like military spending and capital destruction. For 2020, this impact was estimated at \$14.5 T, which is 10.6% of world GDP or \$1909/person, i.e. roughly \$5 per person each day worldwide. Given such costs, just a 2% reduction in the global impact of conflict and violence would equal total overseas development assistance (IEP 2021).

Still another manifestation of desperation is people migrating to a neighboring country or region. Notably, people may migrate from areas where farmers or pastoralists are struggling with grim outcomes like crop failure, livestock mortality or water shortages (Krieger, Panke, and Pregernig 2020). Such outcomes may be triggered by climate change impacts like extreme weather events or erratic rainfall, yet it is difficult to identify any individual as a 'climate migrant' given the complex motivations for migration. Many of the most vulnerable, meanwhile, lack the means to migrate despite any difficulties faced, raising questions about what happens to them (Adger et al. 2014).

5.2.4. *Operationalizing human security*

While resource scarcity and climate shocks can lead to phenomena like hunger, conflict and migrant flows, project interventions and governance can shape outcomes at every step, potentially averting crises. For instance, many projects show ways to avert hunger and need.

One danger of the human security approach is that it could be seen as making things complex to the point where taking action becomes difficult. For instance, the African Human Security Index encompasses myriad

aspects of insecurity and calls for interventions to be based on locally disaggregated data to allow for nuanced understanding of different vulnerabilities and needs across groups (UNHSU 2020). Simple interventions can nonetheless prove effective as illustrated by the ASP findings, including those addressing one local driver of insecurity. Since food security can be central to human security, a key question is whether peoples' access to food remains adequate and secure and if not how this might be achieved.

COVID-19 was not yet a factor in the Kenyan field study, but the pandemic has strengthened the timeliness and relevance of the human security approach. Notably, it is both a health crisis and an economic crisis, with those in precarious situations often worst affected. A high-level Advisory Board on Human Security was launched in late 2020, based on the urgent need to rethink national and international responses to current and emerging challenges such as climate change and pandemics. At the launch event, the United Nations Secretary General said, 'At a moment when people are threatened on many fronts, human security provides a unifying concept for action towards ... sustainable development and lasting peace.' (UN 2020)

5.3. Wider impacts of these dynamics

The dynamics described in the ASP study and human security literature have obvious impacts on vulnerable communities and their countries, but can also impact neighboring regions in various ways.

Clearly, ongoing instability can have wider adverse impacts. Examples include needing to provide humanitarian assistance, coping with rising conflict or extremism, and the fact that desperate communities may degrade their environment and thus aggravate problems like biodiversity loss and climate change.

Conversely, well-designed interventions in vulnerable pastoral communities could benefit not just locals but also neighboring regions, thus transforming these people from problem neighbors into synergistic partners. Examples include economic regeneration creating new investment opportunities and markets and environmental restoration measures helping to combat climate change and build climate resilience.

Various wider impacts are important, but the following discussion focuses on migration, given its centrality to debates about regional impacts and fears that migration flows could rise over time.

5.3.1. Migration impacts

Migration from the global South is high on the agenda of many industrialized countries, including questions

about jobs, crime, race and terrorism. Such concerns have led to a 'politics of fear' driving support for populist politicians (Krieger, Panke, and Pregernig 2020).

Recent migration trends and future projections are worrisome. A combination of conflicts and intractable poverty have caused flows of refugees and internally displaced persons (IDPs) to spike, with numbers rising from 42M in 2007 to 79M in 2019 (IEP 2021). A key question is how many 'climate refugees' are predicted, or those displaced by factors like sea level rise, droughts and erratic precipitation patterns. One study suggested these numbers could reach 1.2B by 2050 and that food insecurity was a key driver (Trimarchi and Gleim 2020). Another suggested such flows could reach 2B by 2100 (McCarthy 2017). Still another suggested IDPs alone could exceed 140M by 2050 (World Bank 2018).

In Europe, rising immigration flows have spurred heated public debates about questions like whether migrants are exacerbating unemployment or depleting funds for public services, with one question being how many each recipient country can 'afford'. These debates also reflect competing narratives on issues like nationalism, compassion, religion, identity and terrorism (Parsons 2016).

One recent study on the economic impact of immigration to Europe considered both refugees (i.e. people fleeing war or persecution) and economic migrants (i.e. those seeking a better life), based on data for 10 countries for the period 2003–2016. It found that immigration generally boosts economic growth and reduces unemployment, though its impact is optimal where economic growth and unemployment are low (Bouoiyour, Miftah, and Selmi 2019). Another study on the economic impacts of migrants on host countries found they typically contribute more in taxes and social contributions than they receive in benefits. It also found that many arrive with valuable skills and tend to be young, thus boosting the proportion of the population that is working age (OECD 2014). Two Australian studies sought to distinguish the economic impact of different migrant groups and found that benefits outweighed costs from year one for skilled economic migrants (AE 2001) and from year 12 for refugees (AE 2008).

A metareview of the economic impact of refugees was conducted based on data from Australia, Canada, Europe and the US. It found that their net economic impact on host countries tends to be positive even when narrowly defined as tax take less social security spending, but that refugees also provide other economic benefits that were difficult to quantify. Realizing these benefits may take time however due to factors like language barriers (Parsons 2016). Another study of

refugees found they face obstacles to employment early on but can be highly successful in time (RCA 2011). Such evidence fits with other findings suggesting migrants can provide needed skills or entrepreneurial activity that creates opportunities for others (Borjas 1994; David, Janiak, and Wasmer 2010) and can help address labor market gaps thanks to being willing to go wherever they find work (Røed and Schøne 2012; OECD 2014).

Evidence on the labor market outcomes of immigration to developed countries for 2020 found that 8.2% of immigrants were unemployed. Those from North Africa and the Middle East were more likely to face difficulties, yet promoting social integration is receiving increased attention in many countries via initiatives like offering language classes and facilitating access to child-care (OECD 2020).

While its overall economic impact on host countries is positive, immigration also imposes costs, notably early on. Providing medical care for refugees is one challenge. For instance, a study of asylum seekers in Germany found a need for support with mental health, particularly for children and adolescents who had had traumatic experiences related to war and physical or sexual abuse (Führer, Eichner, and Stang 2016).

In short, while migration poses challenges for host countries, it also offers economic opportunities. These need to be better understood and managed, given the likelihood migration flows will rise over time. If however migration is a concern to target countries, one possible response is to invest in addressing the drivers of migration in migrants' countries of origin. A 2020 ruling by the UN Human Rights Committee could reinforce this approach. It found that countries cannot deport people who seek asylum due to climate-related threats, which could lead to numerous legal claims by displaced people around the world (Krieger, Panke, and Pregernig 2020).

5.3.2. Environmental dynamics and migration

Environmental variables can be key drivers of insecurity and migration. Identifying correlations between such variables and issues like migration can help elucidate these dynamics. A global metric launched in 2020 tracks eight such variables and their correlation with aspects of insecurity (IEP 2020b). Worrisome trends identified include:

- Population stands at 7.9B but is projected to hit 10B by 2050, with Sub-Saharan Africa growing fastest
- 2.6B people face high or extreme water stress, but this could rise to 5.4B by 2050
- 2B face food insecurity, including 58% of Sub-Saharan Africans, but this could rise to 3.5B by 2050

- Natural disasters like drought displaced 25M in 2019, but their magnitude and frequency is predicted to rise due to climate change

Alarming inferences from these findings include:

- The Sahel-Horn belt of Africa is one of three global ecological hotspots deemed 'susceptible to collapse', with environmental degradation and conflict creating a vicious circle;
- Approximately 1.2B people in high-risk countries face displacement by 2050;
- The world's three key immigration routes due to ecological threat are Sahel/Africa to Europe, South Asia and Middle East to Europe, and Latin America to the US and Canada.

Such projections notwithstanding, the ASP findings and a wealth of other case studies² suggest that environmental restoration measures can offer levers to reduce insecurity, and therefore mitigate phenomena like migration. Notably, pasture management can profoundly affect local livelihood and welfare outcomes in pastoral communities while also being something communities can influence.

6. Conclusions

Empirical findings from a field study conducted in northern Kenya are summarized, including facets of the local context, outcomes of seven grassroots projects working with vulnerable pastoral communities, and lessons from this experience. These data vividly illustrate the acute dangers facing the pastoral communities examined from factors such as climate change, then provide concrete guidance on future interventions to support such communities based on the project activities trialed. The study findings are then discussed based on aspects of the literature. This includes situating the challenges facing these communities within the literature on human security, then considering the wider impact of dynamics within such communities, notably on migration. The result is a powerful argument in favor of targeted investments in these vulnerable communities as a way to avert adverse outcomes for them and others while also embracing the scope for more synergistic interactions between neighboring regions.

Notes

1. Data were provided by Trocaire project staff, stemming from estimates tabulated by Kenya's State Department

of Livestock based on data from the national census of 2009.

2. Two institutes that publish on such options are World Agroforestry (ICRAF) - CGIAR and International Livestock Research Institute | better lives through livestock (ilri.org)
3. BOMA does not gather cost data on activities, so the project was analyzed as an integrated whole.

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