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MAPPING OF CLIMATE SECURITY ADAPTATIONS AT COMMUNITY LEVEL IN THE HORN OF AFRICA

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The Life & Peace Institute (LPI) is an international organisation that supports and promotes bottom-up nonviolent approaches to conflict transformation and positive social change through research, policy engagement, and action.

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PHOTO: The Karamoja.

Foreword

There is a growing and intense debate on whether human security risks related to climate change could become the hard security threats of tomorrow. It is increasingly clear that the impact of climate change in Africa is exacerbating conflict dynamics in several hotspots across the continent, as it increases competition over natural resources while degrading ecosystems and landscapes. Climate change, in conjunction with other macro trends, also affects job opportunities, transhumance and settlement patterns. While its impacts do not necessarily cause violent conflict directly, there is growing evidence that a changing climate intensifies tensions between and within communities and states.

One of the most vulnerable regions to climate change and variability is the Horn of Africa. It is hit by slow and sudden onset disasters including droughts, floods, locust invasions, fresh water salination along the coast, and rising sea levels, threatening livelihoods, food and water security and ecosystems. The region also faces historical conflicts around territory, resources, or ethnic lines, which are now compounded by climate change and the pressure of a bulging youth population with inadequate economic opportunities.

Therefore, it is key to identify and mitigate climate-related security risks at sub-regional, national, and local levels. This report aims to fill a gap in multidisciplinary programs that are responding to the interlinked nature of climate, peace, and security in the Horn of Africa. UNDP and Life and Peace Institute, working under the UN Climate Security Mechanism, have developed this **Mapping of Climate Security Adaptations at Community Level in the Horn of Africa**, with a special focus on Kenya, Uganda and Ethiopia.

Based on evidence collected from the field, the study explores how communities experience climate change and develop coping mechanisms. It looks at possible climate security solutions and shows how all actors must work together to address these threats, as no single community has the answer. By integrating local approaches into existing early warning systems, this report creates pathways for ongoing solutions that can be replicated and scaled up. It is a tool that can inform future programmatic interventions aiming to address climate-related security risks effectively, based on a sound foundation of local knowledge and data, with a strong connection with the needs of a particular region or context.

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PHOTO: Consulting Women Community members in the Karamoja.

Executive Summary

The pathways through which climate and conflict factors are manifested, are determined by the local interplay of exposure to climatic hazards, vulnerability, and the coping capacity of states and communities.

As climate change increasingly impacts the Horn of Africa, it is critical to identify and mitigate climate security risks at sub-regional, national, and local levels. This requires improved knowledge of potentially impactful adaptations that are showing positive results. The goal of this assignment was to fill a current gap in identifying *interdisciplinary* programmatic solutions at the local level that are already addressing the interlinked nature of climate, peace, and security in the various parts of the Horn of Africa.

The study had twin aims: firstly, to identify how communities are experiencing climate change. Secondly, where possible, to identify and map integrated community level climate security solutions to these risks. Given the community level focus, the study focused on the human security implications of various climate security threats and their responses to address the risks.[1]

SITE SELECTION WAS DETERMINED BY THREE MAJOR OVERLAPPING CRITERIA FOR EACH LOCATION:

(i)
Experience of climate variability and extremes.

(ii)
Representative of different Livelihood systems. E.g., pastoralism, agriculture and fisheries,

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and experience and vulnerability to conflict. The final study locations selected included:

ETHIOPIA
Gambella and South Omo

KENYA
Laikipia, Marsabit and the Coastal region

UGANDA
The Karamoja

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1 / Of the seven dimensions of Human Security identified by UNDP (Economic Security, Food Security, Health Security, Environmental Security, Personal Security, Environmental Security, Personal Security, Community Security and Political Security – see United Nations, Human Security Unit (2016) Human Security Handbook, P.7), the analysis did not consider the final element at all, nor health security. The other elements were essentially incorporated in the general perspectives under the three critical dimensions under consideration: Conflict Management, Resilience, and the Environment.

For the purposes of the assignment a climate security adaptation has been defined as:

Initiatives to mitigate, prevent and/or address climate security risks.

In turn, climate security is considered as:

Human security and community conflict risks induced or affected, directly or indirectly, by changes in climate patterns and their interactions with environmental impacts, socio-economic fragility and other macro contextual trends.[2]

The findings and conclusions from the study demonstrate that the challenges facing all stakeholders in addressing climate security are severe in terms of the speed of change that is now being experienced by communities. In addition, the conflation of challenges that arise from the macro trends (such as population and environmental impacts) affecting the different localities visited, in conjunction with climate change, compounds the challenges being faced by communities on the ground. There are, however, ongoing efforts and approaches being adopted by the government and civil society actors at community level which show some promise in their locality, can be built on and developed further. An interesting finding was that all of the different adaptations that were identified had all been introduced either by civil society and NGOs or by government. Adaptations (aside from negative coping mechanisms) that were solely community-devised, home-grown and initiated were not encountered in any of the locations researched. This emphasises the importance of mutual learning and application of ideas from other similar environments.

It is important to note that all of the areas selected for research are located within existing conflict systems and ongoing conflict dynamics, and in the case of the Karamoja, a cross-border conflict system. This has affected the breadth with which potential climate security adaptations have been interpreted. UNDP/CSM differentiates between a focus on climate change adaptations (adaptation and mitigation) and climate security adaptations with the latter specifically focusing on peace and security. However, in the majority of areas visited, the distinction appears somewhat artificial as changes in any of the key dimensions (environment, governance, macro trends, and resilience)

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2 / Not surprisingly, there are multiple definitions of climate security from various actors. For example, see the selection at the following site. https://www.newamerica.org/resource-security/natural-security-blog/climate-security-building-a-community-of-practice/. However, this definition is a blended adaptation drawing on a few elements from several of them to ensure best alignment with the assignment.

can all potentially affect the existing conflict dynamics or indeed induce new conflicts. In this sense the categorisation of adaptations rather represents a hierarchy of approaches to climate security adaptation. This ranges from the most comprehensive and potentially successful to those that are important but are addressing dimensions least likely to affect conflict directly (but still do address other elements of broader human security) in terms of integrating the key dimensions to prevent or address conflict. Thus, for example, the fourth category of resilience strengthening looks to maximise livelihood and food security given changing weather patterns. This category may not appear to influence climate security and conflict dynamics directly. However, food security, for example, is currently a critical factor in the Karamoja playing into and affecting both intercommunity conflict dynamics and as criminal activity. Young men are engaging in raids on kraals to steal household livestock and food. Livestock raiding in pastoralist and agro-pastoralist communities has cultural roots, and was previously clan-based (i.e., between clans within the Karamjong) or inter-tribal (e.g., between a clan of the Karamajong and the Pokot or Turkana), in this context. For a variety of reasons this conflict pattern has changed but contributing factors include unemployment, the loss of pastoralism as a primary livelihood, increasing reliance on household or rainfed agriculture, unpredictable weather and therefore food security.[3]

How much food is available affects this equation.

The mapping identified four major categories of adaptation programming:

1 / HOLISTIC APPROACHES TO CLIMATE SECURITY

These adaptations are generally at scale, have an early warning component, address environmental sustainability, attempt to manage or prevent conflict, and have a resilience aspect developing additional livelihoods.

2 / GOVERNANCE, PEACEBUILDING AND EARLY WARNING

Some adaptations improved policies and governance mechanisms around resolving conflict issues, protecting, managing access, and regulating use of 'the commons,' and natural resources, or preventative early warning systems for conflict or disaster risk reduction. Some community examples include resource sharing agreements, by-laws around cutting trees, and codes of conduct for transhumance and migration.

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3 / There are multiple factors affecting this dynamic including Government disarmament programs which have been a key factor here (as well as the behaviour of the UPDF, reportedly involved in or colluding with livestock raiders as it becomes commercialised), which in turn shifted patterns of interaction between young men from different clans, due to the changed rules around restricted movement of livestock, drought and losses of cattle to other tribes as they could not defend them (no weapons). In the past these young men may have been historical enemies, but now because they have met in urban environments and become friends they collude to raid together (including their own clans) primarily for food or one or two animals that may be eaten in the bush or sold at market.

3 / ENVIRONMENTAL REHABILITATION AND ENHANCEMENT

Recognising that the environment is being rapidly degraded for a variety of reasons, including both climate change impacts and also trends linked to resource extraction and development, both government agencies and NGOs are undertaking rehabilitation work. Examples such as reforestation, mangrove restoration, rehabilitating rangelands, and others that may overlap with conservation options too, like the use of 'tengefus' in the coastal region that provide 'reservoirs' of marine species and opportunities to try and restore degraded reefs.

4 / RESILIENCE STRENGTHENING

Community resilience building adaptations[4] focus on livelihood dimensions affected by climate and environment change, first and foremost. For example, in an effort to strengthen agricultural productivity communities are adopting more drought tolerant and faster growing crops, adding value to them postproduction, or linkages to better markets in addition to other adaptations. Many adaptations also attempt to diversify community sources of livelihoods and find, or develop, complementary sources of income to reduce household and community vulnerabilities.

Community adaptations also did not *always* only fall into one category, rather the adaptations often overlapped these categories. However, for the purposes of identification, activities on the ground can generally be grouped into one of these broad categories.

For almost all the interventions identified there is an underlying question of whether the scale of application of the adaptations encountered is sufficient to have an impact that matches the negative dimensions of the trends being experienced. While in the majority of cases there is insufficient information to say clearly whether or not this scale is being achieved, the observations of stakeholders (including the research team) raise doubts as to the overall efficacy of current resourcing and investment in addressing climate security issues.

A fundamental challenge in addressing climate security in the region is how best to manage complexity. This can result in tensions between differing system needs, approaches and timeframes to achieve effective results.

This often means needing to break down problems into their constituent parts to be manageable (e.g., from a sectoral, environmental or geographic perspective). However, this can result in siloed or sectoral interventions and projects that address the symptoms of specific changes primarily in their

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4 / One alternative approach to these categories would be to have them grouped under the broad umbrella of 'resilience' but the authors have chosen not to do this as they feel this dilutes a much needed emphasis and specific focus on two key elements - (a) tackling conflict and (b) rehabilitating and enhancing the environment.

domain alone, ultimately, reducing the scope of an intervention's potential impact. There are two key implicit assumptions in this approach; firstly, that there are likely to be additional inputs addressing other dimensions of a systems' complexity and secondly and consequentially, that all the interventions will aggregate together positively.

A further challenge in addressing complexity is how to design support that takes into account both immediate and long-term perspectives for change while also contributing positively to peace and social cohesion. Short-term project approaches struggle to address the integrated and interconnected nature of the different factors at sufficient scale and with an understanding of the appropriate long-term timeframes needed for effective interventions.

While resilience programming tends to be more integrated than most types of programming, nevertheless there is still room for improvement, as often (not always), other fundamental dimensions of climate-related security risk management may be missing – be that associated with the environment or conflict. For example, at the coast in Kenya, an approach that mainly considers trying to address environmental issues, although developing additional livelihood approaches such as ecotourism may miss the scale of poverty that drives the degradation challenges, increases the potential for conflict and prevents the environmental interventions from being as successful as they might be. **(SEE BOX 7)**.

The UN's Climate Security Mechanism Toolbox conceptualises an approach to integrated climate security assessments that considers the direct and indirect effects of climate change on security in three dimensions of risks that of climate stressor or shock, levels of exposure to them and vulnerability or coping capacity (or resilience).

From the observations and findings in the separate categories, it is possible to start to identify a range of potential emerging **principles** for climate security programming that could be developed further. In addition there are a number of critical challenges that can best be described as 'wicked problems' that undermine our ability to develop climate security solutions. These require our focus and collaborative effort to evolve innovative approaches to tackle them. These principles include:

▶ **INTEGRATED PROGRAMMING ACROSS THE THREE CRITICAL DIMENSIONS (ENVIRONMENT, RESILIENCE AND CONFLICT MANAGEMENT:** The need to ensure programming covers all three critical climate security dimensions.

▶ **CLIMATE SECURITY PROGRAMMING:** Needs to incorporate a specific peacebuilding component in all programming (both policy and practical implementation).

▶ **NATURAL RESOURCE-FOCUSED IN ADDITION TO POVERTY-FOCUSED:** All programming should be both environmentally friendly and have at its core, an environmental component enhancing the natural resource base as well as attempting to address socio-economic issues.

▶ **LINKING LIVELIHOOD BENEFITS TO CONSERVATION:** Where possible find ways that communities can earn a living from the maintenance and conservation of natural resources.

▶ **EMPOWERING INDIGENOUS RESOURCE MANAGEMENT SYSTEMS:** The development of climate security policies and protocols should empower indigenous knowledge and natural resource management systems.

▶ **MAINTAINING THE VIABILITY OF ADAPTED LIVELIHOODS TO THAT ENVIRONMENT:** Policy and programming interventions should support the maintenance and viability of traditional livelihoods adapted to that environment even if they need to be supplemented by additional livelihood streams.

▶ **ECOSYSTEM AND CONFLICT SYSTEM-BASED PROGRAMMING:** In deciding on climate security programme scope, the focus should be delineated by the parameters and boundaries of key natural resources at stake as well as conflict system parameters (if possible) rather than purely administrative boundaries.

▶ **DATA DEVELOPMENT, LEARNING AND APPLICATION:** In accord with the ecosystem and conflict system-based principles, develop databases that capture appropriate information around, early warning, conflict, Disaster Risk Reduction, and area programming in these systems to inform improved learning and programming.

Across the region there were also found to be a set of five common key challenges or 'wicked problems' constraining efforts to address climate security and that are either undermining or preventing efforts from reaching the scale and level of positive impact that would optimise tackling them.[5] These are:

1 / SCALE OF INTERVENTIONS AND LEVELS OF IMPACT

It is difficult to assess the level of impact that adaptations may be having and whether this is at sufficient scale to have more than and whether this is at sufficient scale to have more than an impact at the household or small community level. The impressions were that while useful and positive the adaptations appear to be more scattergun with only some communities and people benefiting. The overall sense is also that efforts are insufficient to stem the tide against the macro trends in action.

2 / GOVERNANCE OF THE COMMONS AND POLICING

A question of scale also underlies issues associated with some innovative efforts designed to refresh and rehabilitate environments. This is the question of the governance of the commons and policing or implementing agreements made around their management and use. While surrounding user communities may agree on how to manage access and resource use, there are also external users or those who do not agree with the approach or have no other choices to survive. This then undermines efforts to improve the situation for everyone.

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5 / They have been ordered in a rough hierarchy of importance according to the author's opinion. In this regard the order is debateable as it could be argued that point four is a subset of point 2, while points 1,2, and 3 are all of roughly equal importance. If solutions for any of these 5 wicked problems are created, progress is likely to be far more successful.

3 / CLIMATE SECURITY

Approaches associated with addressing the conflict dimensions of climate security at the community level found in the course of the research are most commonly limited to two fundamental approaches; either resource-sharing agreements that may be integrated into programming and 'stand-alone' peacebuilding programming. Both approaches tend to be insufficient in addressing conflict systems. How to improve performance and inculcation of peacebuilding approaches into all types of programming in a more sophisticated way needs to be developed so they can be applied to all interventions implemented within conflict systems.

4 / CONSERVATION VERSUS ACCESS

Similarly, are the issues associated with conservation and resource-focused programming and poverty-focused efforts. Resource-sharing of the commons is the prevalent approach across the region, but this may create conflict which puts huge pressures on all stakeholders. This links to the challenge of how to combine elements such as increasing returns from alternative uses of resources and finding ways to supplement this through additional investment in livelihoods.

5 / COLLABORATION AND INTEGRATION

How to best collaborate with multiple stakeholders to create synergy and practical collaboration rather than empty coordination efforts that don't add value but still take up time and energy with little return, is a critical aspect that requires intentional efforts and the development of new models. This is not a new problem but a failure to improve in this area means that strong climate security programming is unlikely to be achieved easily. Similarly, and related, is the issue of how to ensure knowledge of, alignment and integration between policies from different sectors and levels, and then to apply these policies on the ground. Better vertical and horizontal policy linkage is critical for greater impact.

So, what is clear is that the way forward, aside from significantly increasing scale and levels of investment particularly from international donors, will involve the development of improved approaches that better integrate multi-disciplinary programming efforts to address this complexity. It will involve working effectively with more and across various diverse stakeholders to combine efforts on the ground and in the policy development and application arena. Two further dimensions also clearly need special and urgent attention: firstly, the conceptualisation and development of models and approaches that better integrate conflict and climate change programming, and secondly, the need to focus on rebuilding and rehabilitating the environment and natural resource base on which all stakeholders are fundamentally reliant.

This will require each sector (government, development practitioners and the aid architecture, local civil society, etc.), to be more willing to think holistically and long-term, and be open to working with and learning from others to move beyond working on alleviating the symptoms of changes to addressing their causes.

Section One

Introduction

The pathways through which climate and conflict factors are manifested are determined by the local interplay of exposure to climatic hazards, vulnerability, and the coping capacity of states and communities.

As climate change increasingly impacts the Horn of Africa, with increasing temperatures, and extreme weather events (such as the chronic drought affecting 36.4 million people),[6] it is critical to identify and mitigate climate security risks at sub-regional, national, and local levels. This requires improved knowledge of potentially impactful adaptations that are showing positive results. It also requires the development of mechanisms to create integrated and coordinated platforms that enable data and analysis to be used by stakeholders across the climate and conflict spheres. Such mechanisms would ideally also have a clear integration with existing conflict early warning systems and serve as the basis for the future development of interactive pathways and ongoing solutions found at community level to be highlighted, investigated and taken up at scale and higher levels.

36.4
million people

In the light of these needs, the goal of this assignment was to fill a current gap in identifying *interdisciplinary* programmatic solutions at the local level that are already addressing the interlinked nature of climate, peace, and security in the various forms and shapes in the Horn of Africa.

The study had twin aims: firstly, to identify how communities are experiencing climate change. Secondly, where possible, to identify and map integrated community level climate security solutions to these risks. Given the community level focus, the study focused on the human security implications of various climate security threats and their responses to address these risks.[7]

PHOTO: Water point within a Kaya sacred Forest area in the Shimba Hills, Kenya.

6 / See UNOCHA - https://bit.ly/3BytuNA

7 / Of the seven dimensions of Human Security identified by UNDP (Economic Security, Food Security, Health Security, Environmental Security, Personal Security, Environmental Security, Personal Security, Community Security and Political Security – see United Nations, Human Security Unit (2016) Human Security Handbook, P.7), the analysis did not consider the final element at all, nor health security. The other elements were essentially incorporated in the general perspectives under the three critical dimensions under consideration: Conflict Management, Resilience, and the Environment.

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The Karamoja

MAP 1:
Showing Areas visited for the Mapping Study with conservation areas marked.
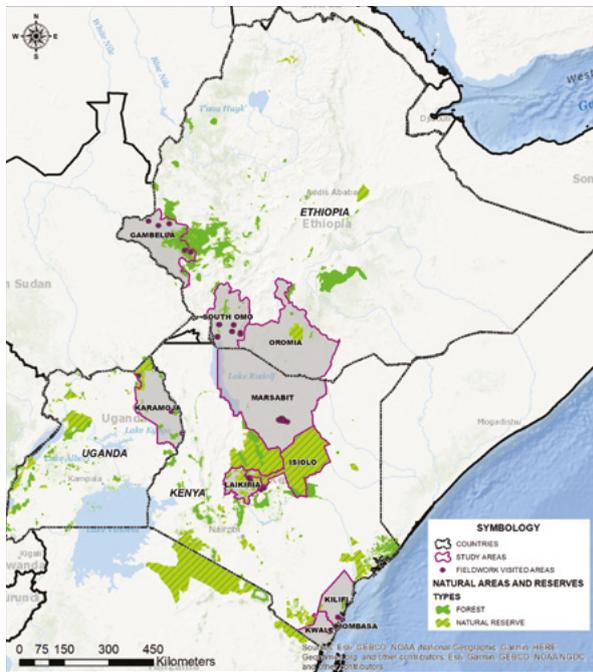
MAP 2:
Showing Areas visited for the Mapping Study with land use Overlay.
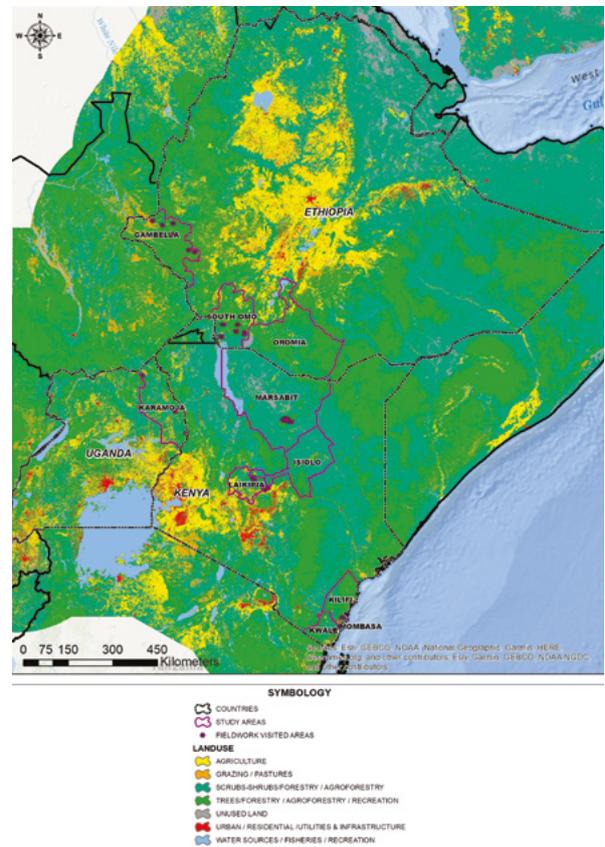
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The report is divided into three main sections: Section one briefly introducing the background, methodology and foundational terminology definitions. Section two outlines the main findings and observations on climate security adaptations across the region. In particular how climate change is being experienced by communities on the ground and the broader impacts on the environment, as well as the complexities of the relationships between climate change and security. Section three looks to identify some commonalities across challenges being encountered (wicked problems), infer some common principles to bear in mind for the future and draw the principal conclusions from the research.

Section Two

Findings and Observations on Climate Security Adaptations

This section presents summarised findings from the research conducted in Ethiopia, Uganda and Kenya on how they are experiencing climate change in terms of their environments and the natural resource base on which they primarily rely for their livelihoods. It then moves to the security dynamics across the sites researched and then to the ways that communities are adapting to climate security challenges. While there are common findings, they should be contextualised based on their local and national dynamics. Deeper analysis expanding on geography, environment, livelihoods, governance and culture are included in individual sections for each locality that are expected to be developed in further reports. This study represents a 'snapshot' based on interviews, focus groups, and researcher photos. While the study focused on climate security related to ongoing inter-group conflict, it was impossible to ignore the linkages with communities' broader human security priorities and needs arising from climate change and environmental degradation.
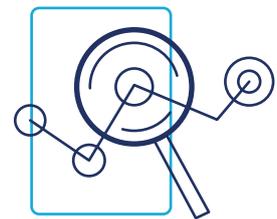
Implications of climate change on the environment in the region

Environmental Change at the Local Level

Every location visited was reported to be and showed degradation of the natural resource base. Physically this would be manifested through water courses being deeper with large sections of riverbanks washed away through flood erosion. Deforestation is also very apparent in some areas. For example, in the Majang and Itang areas of Ethiopia. Other examples included severe water gully erosion in Northern Kenya and the Karamoja as well as riverbank damage along the banks of the Omo river in SNNPR.

The literature supports the feedback from respondents and the observations of the research team on changed and degraded environments. As an illustration, TABLE 1 demonstrates the extent of land use change in Majang, Gambella, with increases in coffee forest, primarily at the huge expense and loss of high forest. There are also significant changes in other types of land cover such as grasslands.

TABLE 1:
Overall summary of change (beginning and end periods only) on major Land Use/Land Cover (LULC) types. The percentage change is calculated is in reference Adapted from P7 Abera et al, (2021)

● 1986 km²   ● 2017 km²   ● % Change

FOREST

	1986 km²	2017 km²	% Change
High Forest	1022.1	545.1	-28.6
Open forest	74.1	88.5	0.9
Plantation forest	0.4	1.1	0.1
Managed coffee forest	8.3	364.5	21.3

CULTIVATED LAND

	1986 km²	2017 km²	% Change
Cropland with trees	77.9	51.7	-1.6
Cropland wo trees	169	267.6	5.9
Agroforestry	0.2	60.4	3.6

GRASSLAND

	1986 km²	2017 km²	% Change
Drained	83.1	89.6	-4
Undrained	74.4	0.0	-4.5

WETLAND

	1986 km²	2017 km²	% Change
Marshes	4.6	5.0	0
Swamps	4.9	6.3	0.1

SETTLEMENT

	1986 km²	2017 km²	% Change
Urban built ups	2.7	7.5	0.2
Rural settlements	27.0	22.0	0.3
Homesteads	7.4	4.7	0.1

WOODLAND

	1986 km²	2017 km²	% Change
Dense	16.1	13.9	-2.8
Open	60.8	40.8	-2.2

BARREN LAND

	1986 km²	2017 km²	% Change
Bare land	37.4	115.6	4.7

Biodiversity has reportedly declined, and productivity of the resource base has also been reduced. For example, respondents noted that rangelands in Karamoja and Laikipia are not as productive for pastoralism, or beekeeping and productivity of forest areas in terms of Non-Forest Timber Products (NFTPs) in Majang (Ethiopia) and the Shimba Hills and along the coast (Kenya) has declined..

These changes are a result of human activity associated with trends in movement, population expansion and changing behaviours, in conjunction with the effects and impacts of altered weather patterns and events. Despite generally not understanding the specific causes of global warming and climate change, in each location, people linked their personal experiences with environmental degradation (e.g., soil erosion, deforestation, land overuse), and changing weather patterns. In each site, people understood and accepted that weather patterns are changing. Prominent and explicit features associated with weather events and climate change, such as floods, shorter and inconsistent rainfall, and changing seasons were clearly articulated. However, the specificities of how such events are affecting ecosystems and specific plant and insect species in each location is not well understood.

The impacts of these changes are profound, as marginal lands or natural resources in some locations may no longer be viable or predictable in terms of their use and are increasingly vulnerable to overuse that could lead to a level of degradation rendering them unusable in the near and medium-term future. For example, along the Kenyan coast where the use of the adaptation *'tengefus'* (community marine conservation areas) is common, informed respondents noted that the coastal waters are being overfished by a combination of local fishermen as well as increasing numbers of fishermen from Tanzania The fisheries are simultaneously being damaged and altered through increased frequency of storms, changing sea levels and warming of waters. As a result, fisheries are degraded to such an extent, particularly close to the coast, that they are near the point of never being able to regenerate to previous levels. Overfishing is occurring to such an extent that the stocks of some species are unable to complete their full life and reproductive cycles.

A parallel example featuring land use, can be seen in the case of riverbank agriculture in Gambella. In previous times, agropastoralists may have used riverbank areas for dry seasonal grazing, as well as for seasonal farming on a relatively temporary basis. However, as pressure on resources increases with shorter rainy and growing seasons, this means reduced availability of good grazing areas with increasing unpredictability and for shorter periods. As a result, people are forced to stay for longer periods of time, than they used to, in the remaining productive areas. In some places farmers not occupy these areas permanently rather than temporarily. The threat of conflict increases dramatically in such conditions, with respondents reporting increasing clashes between herders and farmers along the riverbanks when pastoralists bring their herds to water them, or to use traditional dry season pastures close to the river (now increasingly being farmed).

Typically resource rich locations are also experiencing reduced agricultural productivity, which effectively reduces the overall food production in the region, increasing pressure on all parts of the system. As a result, whereas previous harvests were able to provide a safety net for some during periods of food insecurity, these stockpiles are increasingly stressed along with current food

production. For example, in Karenga in the Karamoja, farming was a source of surplus produce that supplied other parts of the region, but respondents noted that harvests in recent years were only sufficient for their own needs, or surpluses were not as robust.

While these are examples of the findings of this snapshot study, each location is experiencing different impacts on the environment and on the population. Through an intersectional lens, depending on identity factors like gender, location and livelihood, people are having different experiences, facing varying challenges and thus, may have different priorities into the future.

BOX 1:

REPORTED CONSEQUENCES OF INCREASED TEMPERATURES IN THE KARAMOJA

Examples of Impacts that communities in the Karamoja are experiencing from increased temperature include:

- Increased evaporation of water from land resulting in hardening and the drying up of wetlands and marshy areas (also increasing the impact of herds on sensitive pastureland).

- Hardened land resulting in destructive water run-off and water course erosion. The land is unable to absorb rain when hard and when rainfall is no longer soft and falling over long periods of time.

- Increased vulnerability of certain indigenous species of trees (unnamed) to heat, which then struggle and die unable to adapt to the changes.

- There are a variety of reasons for the increase in fires in general, nevertheless, increased wildfires (caused by lightning) have a greater impact and level of rangeland destruction. More intense fires attributed to drier soils, vegetation and lower humidity levels in the air.

- Some interviewed also attributed the outbreak of pests and diseases to increased temperatures in the Karamoja - in particular the Tsetse fly (a vector for Trypanosomiasis), and army worms (which affect most crops but in particular maize).

Identifying the interconnected dynamics of climate implications on the ecosystem

Few respondents were able to connect the situations and changing patterns in different local locations to regional environmental dynamics. The impacts of 'downstream' events in one location are out of sight for another interconnected location (often including conflict – see below on 'referred pain'). A clear example of this and the subsequent environmental challenge is

how deforestation and land use changes in Majang in Gambella, are having an effect on those living in the flood plains at the delta of the Omo River in South Omo and on relationships between communities living in Turkana. In a similar way the downstream impact, for those reliant on river systems in South Sudan, is not realised by those upstream as changing river flow patterns affect erosion, floods, food security, water and land use. Some respondents did make links to these more global effects though. For example, one respondent in Majang attributed the increase in encroachments in his local area to the impacts of climate change in Northern Ethiopia on farmers as an important driver influencing their migration.

Changes over the last twenty years in the environment and in land use in the locations visited are a result of multiple factors in addition to climate change. It is the interaction of the macro demographic, social, economic, and political trends with those of climate change that create the potential for increasingly negative security implications. Land use changes are often driven by the implementation of large-scale development projects such as commercial agriculture, dams, infrastructure projects or simply population growth, in combination with ongoing climate changes.

The cross-border relationship between the Dassenach, who live mainly in Ethiopia but move into Northern Kenya and interact with their neighbours, the Turkana is a good example. The two groups have intertwined histories that include pastoral cattle-raiding, competition over grazing and water, revenge killings and competition over fishing in Lake Turkana. Interlaid with the South Omo region's macro trends such as long-term displacement and villagisation in Southern Nations, Nationalities and People's Region (SNNPR), the development of large-scale agricultural projects, and increased flooding in the South Omo delta (which are attributed to climate change weather events by respondents and affect possibilities for community agropastoralism, recessional agriculture and the viability of pastoralism on the border areas north of Lake Turkana). These dynamics affect the prevailing conflict dynamics by shifting the livelihood options impacting on the Dassenach and therefore the Turkana in Kenya. The Dassanech may need to rely more on livelihood industries like fishing, rather than pastoralism and agropastoralism, which in turn increases pressures on that natural resource and affects conflict dimensions within their relationship with the Turkana.

Environmental degradation and temperature increases are also significantly affecting wildlife. Animals previously common in an area are increasingly struggling to survive due to insufficient food, lack of water and other habitat changes. This was stark in Gambella National Park where some animals are no longer seen due to drying of wetlands. In other areas, animal behaviour is changing. There were reports of increased conflicts between humans and animals over resources. In Karamoja, large animals like buffalo and elephants are reported entering villages abutting the Kidepo park, looking for water

and eating crops. On the Kenyan coast, some species of fish were reported no longer to be found in the shallow water. As water temperature has risen, so they migrate to cooler, deeper water. Impacts on insects and other parts of ecosystems were not reported or were less clear unless a disease was associated with the change, for example, the prevalence of Tsetse fly or army worm and other diseases.[8]

While climate change is affecting large gazetted lands such as National Parks and conservation areas (that may or may not be fenced in), nevertheless the loss of smaller, important local, natural resource areas in the research localities, is reportedly affecting environmental health conditions and their sustainability in each area. For example, smaller local forest areas, critical wetlands, watersheds and water catchment areas, albeit relatively small in size, (for example, a few hectares), are critical for the health of surrounding areas in terms of biodiversity, occasional resource use and mitigating impacts from natural disasters such as floods. Conservation efforts in these smaller local areas are very important as increasing encroachments threaten the environmental viability beyond their immediate surroundings.

THE RELATIONSHIP BETWEEN THE ENVIRONMENT AND STRENGTH OF INDIGENOUS CULTURES

An interesting finding of this research is that locations where indigenous cultures remain socially very strong; the natural environment was in a (relatively) better condition compared to similar locations where cultures have weakened. Tepeth and Pokot societies in Uganda are living in well forested areas and fiercely adhere to traditional resource management practices. For example, if someone cuts down an indigenous tree, the culprit is required to plant ten replacements of the same species and pay a fine at the cost of a goat or bull (as well as maybe having to buy elders local brewed beer). In the case of extreme environmental defiance, individual offenders may be ostracised. In Majang, where participatory forestry management, beekeeping and traditional *'jang'* approaches are prevalent, the forest is in good condition. While on the coast, areas where Kaya Elders are still active and have some control of their shrines (usually important local water sources, watersheds or other such locations) trees are planted and the environment is in a better state.

At the same time, the different locations with these social structures are increasingly under pressure from external people and groups who are attracted by the richness of the resources. This creates tensions within communities and

8 / The evidence regarding the relationship between disease and climate change is mixed and more complex than these perceptions suggest. For example, see Longbottom, J., Caminade, C., Gibson, H.S. et al. Modelling the impact of climate change on the distribution and abundance of tsetse in Northern Zimbabwe. Parasites Vectors 13, 526 (2020).

between them. Often, people entering these communities do not have the same social structures and understanding of ancestral management systems. Those entering may be driven by factors like survival and access to resources, which limits their cooperation with local systems.

Indigenous knowledge is also important for communities' environmental engagement efforts in other ways. For example, local respondents believe that 'seers' in Karamoja are able to predict weather conditions, pest invasions, conflict and other events more accurately than meteorological offices. It is

PHOTO: Indigenous Honey production in Majang, Ethiopia.

https://doi.org/10.1186/s13071-020-04398-3, who suggest that temperature increases reduce the prevalence of Tsetse fly in Northern Zimbabwe, or Nnko HJ, Gwakisa PS, Ngonyoka A,

Sindato C, Estes AB (2021) Potential impacts of climate change on geographical distribution of three primary vectors of African Trypanosomiasis in Tanzania's Maasai Steppe: G.m. morsitans, G. pallidipes and G. swynnertoni. PLoS Negl Trop Dis 15(2): e0009081. https://doi.org/10.1371/journal.pntd.0009081 who find that it depends on a number of factors in Tanzania, while Egeru, A., Opio, J., Siya, A., Barasa, B., Magaya, J. P., & Namaalwa, J. J. (2020). Tsetse Invasion as an Emerging Threat to Socioecological Resilience of Pastoral Communities in Karamoja, Uganda. Sustainability, 12(4), 1599. https://doi.org/10.3390/su12041599 suggest that prevalence is multifactorial and dependent on various reasons, such as the geographic belt and migration of wild animals (eg buffalo and elephant), control efforts, etc.

not entirely clear how they do this, as ostensible mechanisms amongst the Ateker communities are interesting but opaque. For example, Turkana seers may throw sandals and interpret the way they fall, while the Karamojong 'read' the intestines of slaughtered animals. However, they also observe a myriad of subtle natural signs such as the behaviour of animals, flowering of plants, appearance of the sun, moon, clouds, etc., that inform their predictions. These predictions are used to inform decision-making on when and where to move livestock to take advantage of rainfall, emerging pastures, or to avoid conflicts with other clans or tribes. Or the knowledge is used to inform when to plant crops, harvest them or pay attention to protect them.

SUITABILITY OF LIVELIHOOD SYSTEMS TO THE ENVIRONMENT

Several respondents noted the importance of understanding that livelihoods and ways of life in vulnerable areas such as semi-arid and arid lands have developed because they are the most appropriate, sustainable and suited to that particular environment. For example, there is a body of evidence to show that the way that pastoralism is practiced across many parts of the African continent is far more productive and more sustainable than 'modern' ranching systems that dominate in countries like Australia and the USA. Attempts to change pastoral livelihood and lifestyle practices dramatically, rather than strengthening these more sustainable pastoral practices, have failed to produce intended results. There was a common feeling that protecting pastoral livelihoods and maintaining the environment in ways that help continue current livelihood and cultural practices, even if in adaptive form or in combination with other household livelihood options is important. In part, this is because there is a crucial identity dimension to some forms of livelihood. Some fishermen, pastoralists, warriors (in the broadest sense of the word rather than simply fighters), do not want to change or take up alternative livelihoods and see these identities as a critical aspect of who they are and, sometimes, who they want their children to be.

BOX 2:

IDENTITY AND LIVELIHOODS

A classic example illustrating this aspect was given by a respondent on the coast now involved in mangrove rehabilitation and running a restaurant, who said:

"My grandfather and my father were fishermen. They saw the way that things were going (reducing yields) and wanted to ensure that I was not reliant on fishing for my livelihood, so they encouraged me at school. However, I have a friend in a similar position who took the opposite position and his father told him that he would be a fisherman and his sons and grandsons would also be fishermen as that is what we are!"

Climate (In) Security

The relationship between climate change and conflict/security is complex and often indirect.[9] Rather, climate change can exacerbate factors affecting the risk of conflict or the pathways that are known to lead to increased risks of conflict (for example, climate induced displacement may force people to access natural resources and areas that are not theirs, leading to increased competition and conflict with others). The UN has identified five such mechanisms connecting them. This is why many focus on climate change as a "threat multiplier."[10] From the scoping study, the following findings related to climate (in)security were encountered across the three countries.

Natural Resource Based Pathways

As might be expected given the locations for the research, potential pathways increasing climate security risks linking climate change with the natural resource base were the most prevalent and in particular conflict risks over land are significant in all scoping study locations. Respondents associated land disputes with both conflict and the varying impacts from climate change. They also highlighted how political and economic factors resulting in shifting land ownership and land use patterns are affecting conflict. For example, rural to urban migration and displacement from climate disruption in Garissa has created increasing land issues and political manoeuvring around resource capture in the town.[11] Changing land use along riverbanks is another good example of the stresses resulting from land use and ownership. In Gambella, along the Baro river in Itang, agricultural land use used to be temporary during certain seasons but is now used year-round for agriculture. These land use dynamics are straining relationships between land users with a stake in those locations at different times of the year. The overall picture emerging is that productive land will increasingly be at a premium.[12]

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9 / One example of a direct link was given at the coast where diminishing fish catches due to overfishing in combination with climate change impacts (temperature of waters reducing certain types of fish in littoral zone) mean that fishermen have been fighting over fish.

10 / See for example United Nations. Secretary-General (2009). Climate change and its possible security implications: report of the Secretary-General.

11 / This example was not from this piece of research, it comes from recent LPI research though and is apposite – see Life and Peace Institute, 2020, Community Decision-making and Behaviour Change linked to Climate-Related Conflict in Garissa County, FES.

**12 /** D. Abrahams captured this in the title of a recent blog on climate security and Karamoja, entitled "Land is now the Biggest Gun" to be found at https://www.climatelinks.org/blog/land-now-biggest-gun-climate-change-conflict-and-telling-case-karamoja-uganda

PHOTO: Moroto Market – in Uganda – urbanisation as a result of drought and extreme weather events is common in Moroto.

Examples of land use changes influenced by climate change and changing climate security dynamics reported by respondents that are expected to worsen in the future, include:

▶ Drying wetlands are increasingly being encroached on and used for agriculture (e.g., in Gambella, Karamoja, and Kenyan coastal areas that are considered Kaya shrines), which is reducing carbon sequestering locations, increasing uncontrolled flooding and reducing wildlife as well as options for dry season grazing,[13] affecting conflict between pastoralists and farmers.

▶ Deforestation for settlement, agricultural and commercial crop growing (e.g., coffee in Gambella) impacts other land at the location and in more distant places. For example, commercial crop growing is altering the flow in water courses and resulting in flooding in vulnerable downstream areas even as far afield as the South Omo delta and areas in South Sudan close to the Baro river.[14] Respondents in South Omo noted that changes in livelihood coping mechanisms resulting from flooding has affected conflict dynamics between the Turkana and Dassenech.

▶ Changing pastoralist migration patterns due to economic development initiatives, or extractives, blocking transhumance routes, changing land use and increasing agriculture, commercial investment, encroachment into grazing corridors, failed livelihoods resulting in rural to urban migration (examples, Karamoja, Gambella, South Omo, Laikipia, Coast).[15]

▶ Movements of tribes into previously non-traditional areas seeking resources, e.g., Herders from Ijara (in Northeastern Kenya) moving towards Taita Taveta and Tana River. Scarcity of resources particularly water and firewood around inter-county border areas or other locations such as the coast – Kilifi and Taita Taveta water basin and Mombasa.

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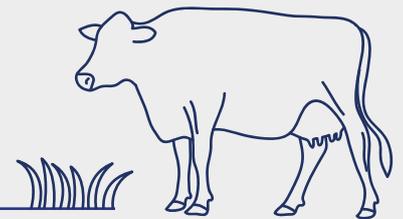
13 / Many rich pastures are set aside within transhumant systems for 'dry season' grazing areas. In other words, they are used when other grazing areas are no longer available. They are usually close to water e.g., along rivers or in wetland areas, which makes them attractive to other people. When there is no one there, as the owners are in other areas with their livestock, they may appear 'empty', not being used, or available to agricultural communities who then move in and use them. This then results in conflict when the herders return. This is due to a failure in understanding their function within the broader pastoral livelihood system as well as increasing pressures on available land. Herders may not use them in the wet season for various reasons such as; they may be the source of livestock disease such as Trypanosomiasis during this period, they are recuperating and there are other grazing resources available. However, in the dry season there may not be any other pastures and water available for herds and so they move to these areas, also allowing the other areas to recover in the transhumant cycle. Disruption to one part of the livelihood system creates problems in other parts.

14 / See for example, Legese, B. and Gumi, B. 2020, Flooding in Ethiopia; Causes, Impact and Coping Mechanisms. A Review, International Journal of Research and Analytical Reviews, (IJRAR) September 2020, Volume 7, Issue 3, for a general review of the linkages between upland and lowland flooding in Ethiopia.

15 / See also Catley, A and Alula Iyasu, 2010, Moving Up or Moving Out? Feinstein International Center, Tufts University.

▶ Changing seasonal patterns of agriculture eroding productivity and making livelihoods more tenuous, for example due to erratic and unpredictable rainfall, shorter growing seasons and increasing temperatures.

▶ Land ownership patterns changed from communal land to enclosed land (examples include Laikipia, Karamoja, South Omo, Gambella). As pastoral systems struggle to remain viable as a family's single source of livelihood, due to the impacts of increasingly severe and frequent drought, people diversify and start to practice agriculture as well. This leads to enclosure of land, and land grabbing of the best land by community elites.

▶ Direct attacks in urban and semi-rural settings in Majang, Gambella, the Kenyan coast (Kilifi and Mombasa), associated with identity, climate-induced displacement, loss of land, and exploitation, linked to deforestation and land use.

▶ Land use competition due to development initiatives, commercial entities, and private households around urban settlements or direct competition over land along river banks.

▶ Also affected by land use practices and climate change is pastoralism throughout the region (as alluded to in some of the bullet points above). A somewhat counter-intuitive example noted in the literature and found to be the case through this scoping study (e.g., see Temesgen, 2010.)[16] is that pastoral conflict increasingly occurs in locations where there are relatively richer resources (the 'resource abundance' dynamic). During drought, pastoralists are scattered looking for pasture. When rain occurs (and therefore in some areas pasture grows) people gravitate with their livestock and thus encounter each other, resulting in an increase in the risk of conflict. In Laikipia and Marsabit this relationship is used by the Northern Rangelands Trust (SEE BOX 3) to inform their early warning mechanisms and try to prevent events predicted by rainfall.[17]

▶ In coastal areas, there is empirical evidence (unpublished as yet) that suggests a direct relationship between low fish catches and increased violence. While there is overfishing due to human overpopulation, climate change is also affecting the fisheries and the health of the coastal and reef ecosystems, in turn affecting fish populations. For example, a combination of factors such as:

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16 / Temesgen, A.K., (2010) Climate Change to Conflict? Lessons from Southern Ethiopia and Northern Kenya, Fafo, Norway

17 / Whether one interprets this to be direct fighting over resources or simply the location where people meet and conflict emerges as a result of historical grievances, opportunistic livestock theft, or because there are few other options in terms of relative resources, is somewhat moot. In previous research in Southern Ethiopia, pastoralists interviewed by the author were clear that in these cases, there are sufficient resources for everyone, so it is not exactly direct conflict over scarce resources which is too simplistic to describe what occurs. (See Richards, S. Bekele, G., Tesfaye, G. and Shimelis, B. 2015, Conflict, Climate Change and Resilience Assessment of the Borana Zone, USAID, Haramaya University.)

damaged and degraded reefs from bleaching events (due to warmer waters), increasing storm events in frequency and intensity, shifting sand and siltation on the reefs and overwhelming littoral zones as a result of higher ocean levels. Patterns of fish distribution are also changed as waters warm (some species flee to colder waters). All these factors together affect fish catches and therefore the human behaviours of fishermen in turn are affected by these changes.


PHOTO: Rangelands in Northern Kenya.

Governance Pathways

Land use issues that are creating and exacerbating conflict are being enabled, in some cases, by governmental policies, politicians' lack of understanding of climate security, and political will. For example, in Gambella, federal investment policy directly affects land use and the potential for environmental damage and inter-community conflicts at local levels.[18] These policies facilitate investors' ability to clear large swathes of land. Investor protection laws also allow contract defaults, which has resulted in environmentally degraded lands without any increased agricultural productivity for the local population. Claims on cleared but abandoned land are impacting inter-group relationships.[19] In addition to the environmental implications for large scale land clearing, feelings of injustice in the community and a lack of accountability and a lack of accountability are manifested in increased social tensions.

The importance of political will is demonstrated in Karamoja, where respondents reported a declining security situation with more small arms in the region and an increasing number of incidents of violence and livestock raiding. This was reported to be a direct result of lack of government political will and interest to continue to tackle the issue, with communities feeling abandoned by the government (no protection, and a failure to fulfil promises of providing services or development assistance). In 2011, the Uganda Government invested in and undertook a large-scale disarmament programme due to the unacceptable levels of insecurity. However, considering the issues to be resolved, national decisions led to large Uganda People's Defence Force (UPDF) relocations to Somalia. This has resulted in drastically reduced protection for communities.[20] Needing to re-arm for their protection has increased community incidents and brings the potential for more violent interactions directly resulting from climate change induced changes (for example if groups change transhumance routes,

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18 / As noted by Siyum Adugno Mamo in 2017, Ethiopia's investment policy stems from Article 40/6 of the FDRE's constitution that notes "government may grant use of land to private investors on the basis of payment arrangements established by law" (Federal Democratic Republic of Ethiopia, 1995). Government leasing of these large areas of land to investors intends "to accelerate the economic development of the country and to improve the living standards" of its citizens, the government (Re-enactment of the Investment Proclamation, 2002). Meckelburg (2014) also cites examples occurring in areas where the Anuak and Nuer conflict with each claiming the same land.

19 / See for example – Adeto, Y. A. and E. Abate. (2014). Conflict Dimensions of Large-scale Agricultural Investment in Ethiopia: Gambela Case Study, in M. G. Berhe (ed.) A Delicate Balance: Land Use, Minority Rights and Social Stability in the Horn of Africa, pp. 166-188., Addis Ababa: Addis Ababa University Institute for Peace and Security Studies. And Siyum Adugna Mamo, 2017, When Large-Scale Land Acquisition Meets Local Conflict: Experiences from Gambela Regional State, Ethiopia, International Journal of Multicultural and Multireligious Understanding, Volume 4, Issue 4. http://dx.doi.org/10.18415/ijmmu.v4i4.84

20 / The UPDF used to provide protection to kraals where in theory community livestock were protected in addition to the deterrent dimension of numerous UPDF camps close to villages. The redeployment of UPDF and previous disarmament of communities meant that there was a subsequent imbalance of power between the Karamojong in Uganda and other surrounding cross-border communities such as the Turkana, Didinga, and Toposa. This has resulted in their being vulnerable to attack and livestock raiding.

move to agricultural areas to feed their livestock or seek water or other resources due to weather pattern changes. They now have weapons which increases the likelihood of violence when encountering other groups if there are disputes).

The linkages between conflict and climate change may not be immediately clear as they may be masked by other factors such as identity and historical grievances. In Karamoja, Laikipia, Gambella and South Omo, the roles that young men may play within a broader interpretation of warrior culture affects their response to various situations.[21] While social patterns across Karamoja are broadly similar, this is not always the case. It was noted that some clans, such as the Pian do not really engage in conflict, even if they are attacked or are victims of raids. In Laikipia there are also cultural dynamics among and between groups (albeit evolving) influencing behaviours.

Historical Grievance Pathways

Some land and natural resource issues are a legacy of colonial times, where ownership, ranching and land use systems were set up at a time when land ownership was (racially) restricted. Recent enclosure of land that was historically 'commons' – where all had access – has set up the foundation for current conflict situations. Historical dimensions of conflict therefore form a background noise as a constant grievance which may emerge in violence when communities are under stress. The same legacies though, may have both positive and negative dimensions. For example, some of these areas are now conservancies for wildlife set up to benefit communities through both immediate ecotourist dimensions as well as carbon payments (SEE NORTHERN RANGELANDS TRUST IN BOX 3). Drought and land degradation exacerbated by climate change has served though to highlight the contrast between the haves and the have nots. It also illustrates one of the key tensions and 'wicked problems' described in Section 3.

Raiding, and revenge killings associated with pastoralist clashes, similarly pastoralist-agropastoralist clashes are primarily linked to historical cultural dimensions as well as issues in locations such as pasture rangelands, and water points. However, links to weather patterns and abundance (rather than scarcity) are changing and shifting locations. Research sites where these types of dynamics are still prevalent include Gambella lowlands, South Omo, Karamoja and Laikipia.

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21 / See for example, Stites, E. & A. Marshak. 2016 'Who are the Ionetia? Findings from southern Karamoja, Uganda', Journal of Modern African Studies.2016 and also Ponsiano Bimeny, Benedict Pope Angolere, Saum Nangiro, Ivan Ambrose Sagal & Joyce Emai (2021): From Warriors to Mere Chicken Men, and Other Troubles: An Ordinary Language Survey of Notions of Resilience in Ngakarimojong, Civil Wars, DOI: 10.1080/13698249.2022.2015215.

Other aspects of violence and conflict reported by respondents appear to be more often associated with crime and poverty, the absence of livelihood opportunities and resources for youth rather than direct climate change linkages (e.g., at the coast there are killings of Kaya Elders, increasing gang violence, increasing competition over land use, and natural resources such as marine resources (e.g., between Kenyan and Tanzanian fishermen) as well as the pathway to extremists (e.g., coastal youth travelling to Somalia to join al-Shabaab).

THE SCOPING STUDY CLEARLY SHOWED THERE IS A NEED TO UNDERSTAND THE CONFLICT SYSTEM AND LOCAL AND REGIONAL RELATIONS

Conflict does not necessarily occur in the place of environmental strain being affected by climate change. This emphasises the challenge that the study identified earlier in this report that most people in the region do not understand how different parts of the environment are impacting others. This is clearly the case for the Turkana when they cross from Kenya into Uganda. They may come to raid cattle independent of anything that is happening with the climate or weather conditions in Uganda. Or they may be forced to cross to Uganda to access water because conditions in Turkana are tight, and so they take advantage of being in those locations to raid cattle. The relationships between locations and their links to the same issues may not necessarily be very clear. A potential example of this was in Karamoja where violence and theft are shifting from traditional large-scale cattle raids (which may still occur cross-border) to smaller scale 'internal' clan dynamics. In this case cattle thefts occur where and when youths from different Karamajong clans (who may have met in urban settings having been forced to migrate there for work or because they no longer have cattle or a livelihood) may in fact work together and collude to steal a few cattle from their own communities, but with associated violence.

An understanding of the linkages between place, environmental and climate changes, and consequences, provides a clearer link to suggestions by respondents that there is a relationship between rising crime in urban environments and rural climate changes. However, this relationship requires further empirical evidence to fully understand the dynamics at play.[22] Conflict may also emerge in new areas, previously relatively uncontested with richer resources such as in Taita Taveta where herders are moving towards Tana River in Kenya. Or in Gambella, where although it is a traditional movement, there were reported to be much larger influxes of Felata herders from South Sudan and further West (some Felata, also called Fulani, may come from as far afield as West Africa). So, conflict shifts form and location influenced by climate change factors.

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22 / The increase in urban crime levels has not been validated and needs crime statistics to verify to what extent the anecdotal evidence of crime rise is correct, let alone the additional direct suggested links with rural to urban migration and its correlation with climate change factors. This would be useful to research further.

Gender Dimensions

Gender dimensions associated with climate security emerged in different ways in different locations as well. The findings across all of the countries tend to show that women are disproportionately adversely affected by climate security than men. Respondents reported increased gender-based violence at the household level in all locations attributing this to issues associated with climate change, mainly due to the additional stresses induced by poverty and insecure livelihoods. In locations with increases in community violence and crime, it is almost invariably the women who experience it more negatively than the men. Although, in the Karamoja, men were reported to be targeted specifically for killing in household raids as they are considered a threat, while women may still suffer considerably from violence. Attackers were reported to ask the question; "Where is the ID?" (i.e., where is the man of the household?) when they enter a house.
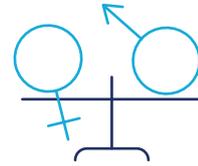
It is usually the role of women to collect water and so during water shortages, this becomes a significant burden as they have to travel further to collect it. This takes more time from their days, as they also have to dig deeper in riverbeds to find it. From a personal security perspective, they also become more vulnerable, especially if there is increased community conflict in the area. Similarly, when livelihoods are under threat, women were reported to be vulnerable to trafficking and sexual exploitation or resorted to survival sex work in urban areas to earn a living.

The increasing importance of land also impacts inequitably on women, in some areas, as they may not have rights to land ownership and can be displaced more easily or pushed off it. In the Karamoja for instance women 'own' the crops but do not own the land. This situation is likely to exacerbate any differences or injustices that women experience around land. In some communities as well, women are not allowed to own livestock either, exacerbating their vulnerability.

The role of women in inciting or encouraging conflict and violence and how that may have changed in the different locations did not emerge clearly in interviews and deserves greater attention. In pastoralist and agro pastoral societies, women often play a role in inciting inter-community conflict and raiding through songs, mocking and taunts, suggesting that men may be cowards if they do not participate, etc. They also play a role in encouraging revenge killings and benefiting from livestock that are taken. With changes in the way these events are conducted (e.g., with commercialised livestock and cattle raiding), it is not clear how this has affected gender roles. This points to the importance of including and focusing on gender analysis in any peace and conflict analyses conducted with respect to climate security programming.

Conflicts Contributing to Climate Change

There is increasing interest in the inverse relationship between conflict and climate change. Where the consequences of conflicts have a significant impact on climate change. These were not so apparent in the research.[23] It is sometimes assumed that war and conflict usually reduce and impede economic development and thus emissions. However, there are other ways conflict can contribute to climate change such as through preventing environmental governance mechanisms working (resulting in pollution and other damage). In the research, it was unclear whether the net impact of changes due to conflict affects possible climate change contributions. The clearest link was at refugee camps for those displaced from conflict (e.g., Itang, Gambella) where multiple camps for South Sudanese are located). Large-scale displacement has impacted on the camp surroundings with deforestation for firewood and construction materials. This affects the environment, increases emissions, reduces available carbon sinks, and secondarily creates conflict between local residents and displaced. From a broader systems perspective, the carbon footprint associated with delivery of assistance is also significant. Bringing goods and providing services from afar has a carbon cost. On the other hand, NGOs also implement tree-planting and energy programs, constructing fuel-efficient stoves, and introducing solar energy options aimed at reducing wood or charcoal burning. To understand the net impacts would require a comprehensive audit.

A further interesting example in the Karamoja, was the new twist to the old-age practice of inter-community raiding: the use of fire. One example noted that the Jie had conducted a raid and then set fire to the area to obliterate their foot marks and also to punish the community further with the loss of crops (5 acres of cassava were burned). Increased numbers of fires (and thus emissions) were also reported to be occurring due to security forces using them to clear areas to improve sight of areas and reduce the possibility of ambushes.

BOX 3:

THE NORTHERN RANGELANDS TRUST

The Northern Rangelands Trust (NRT) consists of 43 community conservancies in northern and coastal Kenya covering 63,000 km² under an umbrella governance model. It aims to enhance people's lives, build peace and conserve the natural environment. Importantly it has community projects supporting livelihoods, works to rehabilitate and conserve the environment

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23 / For a short discussion on this issue see the blog by the Conflict and Climate Observatory sourced at https://ceobs.org/how-does-war-contribute-to-climate-change/. The blog discussed examples such as the environmental damage and increased emissions in the Gulf war resulting from the lit oil wells.

and devotes considerable efforts to maintaining peace with 942 peace conservancy scouts, seven conflict rapid response teams and 125 women and youth peace ambassadors working together.

NRT attribute their highly functioning project to the fact that it is "deeply rooted in the realities of the landscape." The Trust also collects important data to assist in its work and reflects this information in an interactive map. As one respondent working with NRT noted:

"Without our incredible community peace teams, we would have no data at all. It's nice to have but we are focused on the mobilization of the highly respected peace teams within these communities."

NRT attributes its successes to:

- The role of the conservancy model, focused on maintaining continuity and local ownership.

- Investing in good governance including training the Conservancy Board and where necessary establishment of a Board Peace Subcommittee.

- Recognising the role of local peace ambassadors and the level of society these individuals should be recruited from and their reporting lines.

- Good communication with trained operators in the field so data is time relevant.

- A coordinated communication centre with appropriate software and staff training.

- The role of NRT to ensure cross cutting issues and communications across the different parties.

- Local sourcing and intervention whilst recognising coordination requires external partners with complementary skills to enable scale.

As NRT noted: essentially the data is only as good as the source, the conservancy model is an extremely rich source if well-managed, with long term time horizons required (10 years +) and well-coordinated interventions involving all the partners whilst recognising each of their unique roles and skills. Capture these skills and interventions clearly in the partnership, employ the data analytics and outputs to maximise the partners specific roles and it will be a significant multiplier.

Source: Interviews and https://www.nrt-kenya.org

Climate Security Adaptations and Programming

This scoping study defined climate security 'solution' or adaptation as: initiatives to mitigate, prevent and, or, address the climate security risks. In the countries researched, there were a variety of approaches adopted by communities to address climate security issues.

SILOES, INTEGRATION AND CATEGORIES OF ADAPTATION

There are four types of programming identified by the scoping study across the region that are a form of community adaptation to climate security or a key dimension associated with it. The adaptations fit into the following categories:

1 / HOLISTIC APPROACHES TO CLIMATE SECURITY

First, these adaptations are generally at scale, have an early warning component, address the environment, attempt to manage or prevent conflict and have a resilience aspect developing additional livelihoods.

2 / GOVERNANCE, PEACEBUILDING AND EARLY WARNING

Fourth, some adaptations improved policies and governance mechanisms around resolving conflict issues, protecting, managing access, and regulating use of 'the commons,' and natural resources, or preventative early warning systems for conflict or disaster risk reduction. Some community examples include resource sharing agreements, by-laws around cutting trees, and codes of conduct for transhumance and migration.

3 / ENVIRONMENTAL REHABILITATION AND ENHANCEMENT

Third, recognising that the environment is being rapidly degraded for a variety of reasons, including both climate change impacts and also trends linked to resource extraction and development, both government agencies and NGOs are undertaking rehabilitation work. Examples such as reforestation, mangrove replanting, rehabilitating rangelands, and potentially those activities that may overlap with conservation options too, such as the use of *'tengefus'* in the coastal region that provide 'reservoirs' of local marine species and opportunities to try and restore degraded reefs.

4 / RESILIENCE STRENGTHENING

Second, community resilience building adaptations focus on livelihood dimensions affected by climate and environment change, first and foremost. For example, in an effort to strengthen agricultural productivity communities are adopting more drought tolerant and faster growing crops, adding value to them postproduction, or linkages to better markets in addition to other

adaptations. Many adaptations also attempt to diversify community sources of livelihoods and find, or develop, complementary sources of income to reduce household and community vulnerabilities.

Community adaptations did not *always* only fall into one category, rather the adaptations often overlapped these categories. However, for the purposes of identification, activities on the ground can generally be grouped into one of these broad categories.

The best examples of climate security programming and adaptations tended to address issues in all areas simultaneously – the first holistic category is where the overlaps between these key categories were strongest and broadest. For example, an adaptation attempting to address livelihoods, resilience and income generation, based on strengthening the natural resource base and environment, with a peace or security component and a policy or governance dimension aimed at regulating or improving the sustainability of a natural resource base.

Integrated programming, across the whole spectrum of these key issues in a holistic manner was rare (with only three strong examples identified – see table below). Peacebuilding sometimes also incorporates natural resource governance and environmental rehabilitation, but it was rare for resilience programming or alternative livelihood generation to include peacebuilding or conflict management. In one case, a key respondent in Majang noted that a programme working on participatory forestry management had previously incorporated a peacebuilding component, but the programme had since dropped that aspect. As a result, they thought that social tensions had increased significantly.

INTEGRATION OF EARLY WARNING

Early warning mechanisms were underway in some locations but not universally across them all (they were found in Karamoja, some parts of the Kenya coast, Laikipia, South Omo, and in parts of Gambella). They tended to be associated with conflict prevention and response with varying levels of formality (institutionalisation involving government as well as civil society) and investment varying depending on the location. For example, in Kenya and Ethiopia, government agencies have formed peace committees at the local level, while Uganda also has peace committees, but they are set up by civil society organisations (CSOs). Generally, challenges and frustrations associated with such conflict mechanisms are widely known and reported in the literature.[24] However, those that were discussed as part of this scoping study varied in effectiveness with the main factors being relationships and

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24 / See for example; Adan, M. and Pakalya, R., 2006, The Concept of Peace Committees; A Snapshot Analysis of the Concept of Peace Committees in Relation to Peacebuilding Initiatives in Kenya, Practical Action.

trust in government, and directly linked to that, the extent to which rapid response interventions were implemented and successful. Degrees of institutionalisation and composition in terms of who is selected or appointed to be involved in early warning mechanisms and peace committees is also important. Kenya, Ethiopia and Uganda all have varying experiences with conflict early warning mechanisms as well as degrees of integration with the IGAD regional mechanism – CEWARN. In some locations in Uganda, the conflict early warning system has collapsed as field monitors became targets for warriors (providing this type of information may be considered to be effectively informing on their own tribes or clans) and therefore were withdrawn.[25] The best example of early warning integration with other interventions, such as weather, conservation, and the environment was in the Northern Rangelands Trust model in Northern Kenya. Their early warning system is extremely sophisticated while still offering opportunities for improvement **(SEE: BOX 3)**.[26] A common challenge associated with integration of all these aspects is partly associated with the lack of a clear link between the different variables, as noted above.

In Karamoja there were comprehensive committees (relatively newly formed and involving various government ministries, UN agencies, the Red Cross and INGOs) focused on Disaster Risk Management (DRM) situated in local authorities at the district level. These early response mechanisms were aimed at rapid responses and prevention of humanitarian crises associated with drought and food security issues (but not including conflict). However, this type of monitoring and level of organisation did not seem to be as developed in other localities. These committees convene monthly meetings and release bulletins that trigger targeted early response mechanisms to a set of changing surveillance indicators (e.g., market prices, behaviours, weather, etc.).

Early warning weather mechanisms did not seem to be easily available or accessible at the community level aside from the traditional seers in the Karamoja who were considered to be far more accurate with their predictions of weather, conflict and pests than any government warnings. The seers are also integrated in the sense that they incorporate all aspects of early warning into their predictions.[27] In Amudat, also in Karamoja, communities rely on weather data from Kenya through local FM radios rather than the Uganda government. A very active INGO also confirmed that the official weather data instruments don't work and so they were trying to work with government departments to rehabilitate them.

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25 / Field monitors have been from CEWARN in the past, but in some cases have been associated with other organisations – although the term field monitor is that used by CEWARN previously.

26 / Aside from covering a huge area across Northern Kenya, it has teams of peace monitors, a situation room that collects and analyses real time data collection, as well as a rapid response teams.

27 / Mercy Corps and Cecore are bringing together seers and meteorologists to collaborate on improving predictions for communities on such aspects.

INTEGRATION OF PEACEBUILDING AND CONFLICT MANAGEMENT INTO CLIMATE CHANGE PROGRAMMING:

While rhetoric was encountered around integrating peacebuilding into climate change programming, as previously described, successful integration is limited, in part, due to the current conceptualisation of climate security. While the literature expresses linkages in terms of climate change being a driver of conflict or 'threat multiplier', it may more often be non-causal, inconsistent, unpredictable and not necessarily geographically bound in the sense that security implications may occur in different locations to where climate change impacts are most acutely felt (as previously described). Also, conflict prevention early warning mechanisms are attempting to integrate climate-informed indicators of conflict, but there are still capacity limitations in sourcing and integrating meteorological data in the systems. Development and humanitarian actors also tend to resort to the useful but limited 'Do No Harm' or conflict sensitivity approaches which are important but it is clear from this assignment that these tools need to be developed further to be better fitted to address the upcoming challenges of climate security ahead.

As a result, the clearest links between peacebuilding and climate change programming approaches can be made where the issues are obviously co-located. For example, where conflict protagonists meet in the same location or use the same resources such as, exploring resource sharing agreements or joint crossline activities (e.g., dam desilting or rehabilitation of environmental areas like in the Karamoja). However, these types of situations, where there is clear co-location of climate change issues and conflict are relatively rare and so more sophisticated tools that integrate peacebuilding principles into all types of programming need to be developed.

There are also other aspects of peacebuilding and climate security work that need to be considered. For example, in Majang previous NRM work around participatory forest management (PFM) also incorporated a peacebuilding component. Dialogue and mutual understanding were developed between the Majang indigenous people and highlanders around land encroachment, land use and the legalities associated with it. One well-informed respondent noted that the levels of communication and tensions were reduced remarkably between the groups and some encroachments were prevented and withdrawals undertaken as a result. The PFM work is still going on but no longer includes a peacebuilding approach.[28] Respondents' views were that having peacebuilding as a fundamental principle and component significantly enhanced the broader results of the project when it operated in that manner. This suggests that the development sector needs to develop more innovative approaches in this regard.

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28 / This is because the original programme was implemented by an INGO with a peacebuilding background. That funding was ended but the overall programme was taken up by a different donor and implemented by an agency with a different focus – more oriented to market linkages and improving value chains. This has added some important positive dimensions but misses out now on the peace component.

CONSTRAINTS OF CURRENT APPROACHES TO CLIMATE SECURITY:

In addition to the observations above, it is clear that there are a number of critical issues facing the peacebuilding sector and others who wish to employ peacebuilding principles in their climate security work. These include:

▶ Conceptualisation of the interactions between conflict and climate security is still limited in how development and humanitarian sectors address and differentiate between different forms and manifestations of conflict resulting from or linked to climate change beyond immediate resource competition.

▶ The common challenges associated with cross-cutting issues – how to integrate peacebuilding into climate security programming. For example, similar to the use of gender and intersectional lenses, standard approaches include mainstreaming peacebuilding, technical advisory within organisations and use of specialist organisation approaches. All have their limitations, flaws and positives, but they need to be applied to climate security in imaginative ways to develop an optimum approach.

▶ There are still insufficient data sets around conflict, incidents, types of conflict and responses. Accurate and useful open access information sources need to be developed that can be used for analysis, and programme development.

▶ Short-term projectized approaches to peacebuilding are still the fundamental aid paradigm and constrain successful approaches to conflict management, especially those that involve localisation unless true sustainability is built in. The only case where this occurs is with the NRT example where costs of peace monitors and champions are paid for out of carbon credits.

▶ More broadly, approaches are insufficiently holistic to maximise impact in climate security affected areas. While this is usually associated with pragmatic issues of resource and funding constraints, nevertheless, improved approaches and ways to address a range of issues that can more likely develop synergy through the aggregation of multi-disciplinary interventions need to be piloted. (For example, 'portfolio approaches').

COLLABORATION:

There are still considerable shortcomings involved in cross-sectoral horizontal and vertical collaborative efforts to address policy implementation and climate change issues more broadly let alone climate security challenges. The best example to be found was that of the District Disaster Management Committees (DDMCs) in Karamoja, where government actors, UN agencies and NGOs work together on natural disasters and early warning of drought and food insecurity. The reasons in this case, are most likely to be partly because the focus of the work is manageably narrow, focused and to the point. The

other approach that emerged was the well-worn one of an NGO consortium approach. This approach depends on the actors involved, but is usually limited because it tends to mainly involve civil society in the management of the programme. While other actors may take a role (e.g., there may be liaison and collaboration with local government around a particular aspect), the achievement of the goal is not addressed in full collaboration. Other collaborative approaches that emerged and that could be built on further include the user associations that bring people around a common interest (for example the forest users association in the Shimba Hills in the coastal region of Kenya). Multi-stakeholder collaborative approaches are likely to be a critical tool in the future in addressing climate security given the multi-dimensional nature of the work and this is an area that can usefully be developed further to help concerned stakeholders collaborate in more effective ways.

THE LINKAGES BETWEEN POLICY AND CLIMATE SECURITY PRAXIS:

A number of problems emerged during the scoping study identified by respondents and the research team, that create significant challenges to successful application of climate security adaptations. They highlight the disjunct between policy and practice. Examples of these issues include:

▶ The huge gap between national and regional policies and their implementation at local level. This is especially the case for the huge number of climate associated policies at national level but where ministries and actors are unsure of how to implement them and what is required at the local level. Box 4 demonstrates the situation in Majang with the Forest Reserve Biosphere. This long list of policies with relevance to the area, are not well known or implemented at the local level.

▶ The potential to link local sustainable conservation approaches and actions to international carbon credit schemes is not well understood.

▶ Because many policies are written from a sectoral perspective it makes it hard to integrate them in a meaningful manner at community level. There were few protocols or guidelines available at local level to help in the implementation, and application of relevant policies.

▶ The greatest policy need across the region was found to be the development and utilisation of participatory, consultative land use planning frameworks and policies as well as water use frameworks (particularly cross-border). Where such documents were found, they were not being used (e.g., the Majang case again). They have the potential to reduce conflicts, social tensions and improve how climate security is addressed now and into the future.

▶ The majority of policy documents linked to climate change and the environment viewed, do not specifically take into account climate security and conflict dynamics in their formulation.

▶ Regulations and by-laws to protect the environment or shared resources, were not policed or enforced, making it hard to achieve their objectives and may undermine the rule of law.

▶ There are usually good reasons why such local regulations are disregarded. The main two being lack of knowledge and lack of alternative options. Survival was an important imperative in some cases (e.g. cutting of trees and shrubs for charcoal or construction purposes, or fishing in designated conservation areas), though sometimes there were associated identity aspects too **(SEE BOX 2)**.

▶ Indigenous knowledge regarding natural resource management and governance, which used to be a key asset, is weakening and being lost with the passing of each generation. This knowledge is also not often considered for, let alone incorporated into policy.

BOX 4:

**THE POLICY LANDSCAPE INFORMING
THE MAJANG FOREST RESERVE BIOSPHERE MANAGEMENT PLAN**

At National Level

- The FDRE Constitution
- Climate-Resilient Green Economy strategy (CRGE)
- Growth and Transformation Plan (GTP)
- Ethiopia National Environmental Policy
- Agricultural Development Led Industrialisation Strategy (ADLI)
- Agricultural Growth Program (AGP)
- National Biodiversity Strategy and Action Plan (NBSAP) to the CBD
- Forest Development, Conservation and Utilization Policy and Strategy
- Forest Development, Conservation and Utilization Proclamation
- Water Resource Management Policy and Proclamations
- Land Use and Land Administration Proclamations
- Tourism Development Policy
- Ethiopian Organic Agriculture System Proclamation
- Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation
- National Food Security Strategy

At Regional Level

- The Gambella Regional State Forest Development, Protection and Utilization Proclamation No. 65/1999
- The Gambella People's National Regional State Majang Zone Protected Forest Development, Conservation and Utilization Regulation No. 49/2017
- Gambella Landuse and Development Plan (under development)

At the Local level

- Land Use Master Plan (in process of planning)
- Participatory Forest Management (PFM) Programme
- Sustainable Land Management (SLM)

Drawn from the 'Majang Biosphere validation workshop presentation in February 2018'
provided by the Majjan Zonal government to the Research Team

PHOTO: Deforestation in traditionl Kaya forest areas - coastal Kenya.

TABLE 2:
Climate Security Community Adaptations

For the purposes of this assignment community adaptations are defined as: "Initiatives to mitigate, prevent and, or, address climate security risks"

Community Adaptation	Key Features of Examples
Category One – Holistic approaches to climate security Community adaptations that encompass most dimensions of climate security simultaneously (livelihoods, resilience, environment, and conflict).	
1 / Community Rangelands Management and Conservation (Northern Kenya)	The Northern Rangelands Trust includes 43 community conservancies across Northern Kenya (and a part of the coast) and incorporates conservation, conflict management, and provides platforms for sustainable livelihoods directly or indirectly related to the conservation efforts. The conservancies have led to Ca 4,000 ha of rehabilitated rangeland. Conflict rapid response teams. Challenges include, macro trends such as population growth, politicisation of governance, issues around distributions of benefits and accountability, drought and its effects on conflict dynamics and carbon credits (no grasslands as a carbon sink if there is extended drought).
2 / Participatory Fisheries and Coastal management and Conservation (Coastal Kenya)	Coastal fisheries management of up to 270 km of coast in Kilifi, through the development of 'tengefus' (Marine 'Enclosures') that support conservation, and include resource governance mechanisms such as community Beach Management Units (BMUs) and involvement of local authorities and government stakeholders (Fisheries Department) considering by-laws and supporting legislation. These coastal fisheries management systems are supported by government ministries, local authorities, INGOs and also provide a foundation for the development of alternative livelihoods based on conservation (e.g., ecotourism, coral farming and rehabilitation). There are challenges associated with slow and incomplete national and local legislative processes (co-management plans), challenges to compliance, and weak management of by-laws.
2 / Participatory Forestry Management (Coastal Kenya; Gambella Ethiopia)	Participatory forest management in Gambella based on 'Jang' the indigenous Majang peoples' traditional management practices in conjunction with INGO support to enhance alternative livelihoods through honey production and high value spices and improved community farming practices (e.g., improved crop varieties, intercropping etc.). There are challenges associated with scale and level of dividend from the interventions, and significant inter-ethnic conflict over land use. In Kenyan coastal forests (Arabuko and Shimba Hills National Parks) communities have community managed ecotourism initiatives alongside them. Access to the forests allowed for butterfly production and alternative livelihoods. There are challenges associated with increasing populations around the forests reducing levels of benefit compared to the community needs.

Community Adaptation	Key Features of Examples
Category Two – Governance, Policy and Early Warning Improved policies and governance mechanisms to resolve conflict, protect and manage access and use of natural resources, or preventative early warning systems for conflict or disaster risk reduction actions.	
4 / Participatory water governance (Northern Kenya)	Introduction of overarching legislation by government as well as local water laws and Water Resource Users Associations (WRUAs) by NGOs bringing together water users, community forest association members, riparian landowners, and other stakeholders for the purpose of cooperatively sharing, managing, and conserving common water resources. The WRUA manages water use through practices like rationing, environmental management (e.g., tree planting, constructing dykes to stop river bank erosion) and manages community conflicts over water use. The research showed these laws and associations helped reduce water use conflicts.
5 / Resource Sharing Agreements (Karamoja; Coastal Kenya; Gambella and South Omo Ethiopia)	Prevent and manage conflict occurring around shared resources such as rangelands, water, etc. Formalising movement to, and within, particular locations through written community agreements between groups, witnessed and validated by local authorities. In marine environments, formalising sharing of benefits from coastal marine resources with community BMUs, and local businesses such as hotels, etc.)
6 / District Disaster Management Committees (Karamoja Cluster)	Relatively new government-led, multi-stakeholder committees (government, NGOs, UN and multilateral agencies, such as ICRC, etc.) convene monthly meetings and release bulletins that trigger targeted early response mechanisms to a set of changing surveillance indicators (e.g., market prices, behaviours, weather, etc.). The bulletins do not have a conflict focus, but have an interesting potential.
7 / Governance – Transhumance policies, codes of conduct (Karamoja Cluster)	Introduction of policies at regional, national, sub-national and local levels regulating natural resource use; e.g., rangeland management policies. Having such policies provides the foundation for governments to allocate resources for its implementation. Similarly, the introduction of localised transhumance protocols and codes of conduct that incorporate African Union and IGAD frameworks into practical practices at the local level. For example, guiding pastoral etiquette and movement into areas.
8 / Peace Committees and early Warning (Northern Kenya; Karamoja Cluster; South Omo, Ethiopia)	Peace structures at local/woreda levels across borderlands that work with elders and government entities on early warning and other common environment and conflict agendas. For example, initiatives at the Ethio-Kenya border to encourage and facilitate inter-community security councils and peace committees. These face common challenges related to a lack of government and financial support, a focus on crisis management rather than adopting a systematic approach to conflict prevention and resolution, limited diverse representation, and periodic ineffectiveness. Differing cross-border governance cultures also create challenges to scale.
9 / Integration of indigenous and meteorological Early Warning systems (Karamoja Cluster)	An interesting initiative that brings together traditional Ateker seers with meteorologists to consider the science behind the more accurate weather, conflict, and pest/insect predictions of the seers. It is unclear how the adaptation's efficacy and how it may be applied in the future for better planning purposes.

Community Adaptation	Key Features of Examples
Category Three – Environmental Rehabilitation and Enhancement May include climate security elements directly associated with conflict management.	
10 / Environmental peacebuilding in conflict 'Hot Spots' (Karamoja Cluster)	NGO and community identification of the locations of specific conflict 'hotspots', which receive interventions that include peace meetings and trauma healing. NGOs then support the development of agreements and trust between conflicting groups by conducting joint activities on improving the environment at the location (e.g., re-seeding and replanting of trees). Similar activities may involve rehabilitating dams and desilting them, combining peacebuilding and enriching the natural resource base.
11 / Introduction of Mega-dams and their participatory management (Karamoja Cluster)	Government constructed a 'mega-dam' at Kobebe, as a more permanent water resource strategically positioned at the crossing of a number of transhumance routes. Close to a national park it serves wildlife as well and there are wildlife rangers posted here. In addition, a large permanent UPDF post maintains security. A series of water troughs below the dam wall can be filled through locked water pipes. An elected management committee with 4 Turkana, 8 Matheniko members control their use. Permanent settlement around the dam is not permitted, but when groups visit then the committee is mobilised to meet and discuss the situation. Patterns of movement and political will for peace have changed with the elongating dry season, affecting its management.
12 / Rangelands Loss and its Regeneration and Rehabilitation (Karamoja Cluster; Gambella, Ethiopia; South Omo, Ethiopia; Northern Kenya)	Government support to re-seeding and replanting rangelands with indigenous species undertaken by communities. Building in fire breaks to reduce potential impact of wildfires and increase the possibility of their management. Government initiated Rangeland Management committees to manage these areas at the sub-county who can also distribute more seeds to communities and ensure areas under rehabilitation are not used. Introduction of improved tree and shrub management techniques. For example, the selective pruning of trees and shrubs to protect rather than cutting down trees and shrubs so plant life can continue growing, maintaining root systems, preventing erosion and maintaining shade). Similarly, they support additional pasture growing to increase pasture availability for homestead cattle and livestock rather than large herd grazing. In some areas, measures are underway to reduce the impact of Prosopis juliflora, an invasive species affecting the health of rangelands.
13 / Mangrove Rehabilitation and Alternative livelihoods (Coastal Kenya)	Coastal rehabilitation of mangrove areas undertaken by communities with support from CSOs and international funding. Community replanting of mangroves and creating local by-laws for their management to prevent cutting for construction and firewood. Prevention of erosion, storm damage, and loss of biodiverse fisheries. Development of alternative livelihoods based on their conservation. E.G., crab fattening, eco-tourism activities.

Community Adaptation	Key Features of Examples
Category Four – Resilience and Alternative/Additional Livelihoods	
14 / Charcoal Replacement Virtuous cycle (Gambella, Ethiopia; Karamoja Cluster)	Linkages between charcoal production with local conflict systems may be indirect and it is essentially a livelihood option to diversify a household's income streams or to replace a lost primary livelihood like the loss of all livestock due to drought, or cattle raiding, crop failure or a disaster. NGO introduction of fuel saving stoves (in some locations produced and sold locally reduces the need for so much wood and fuel for cooking etc. Introduction of fuel creation machines that can utilise vegetation litter and crop waste products to produce alternative fuel blocks, that burn in a similar way to charcoal, and which can also be sold. These initiatives have a net result of reduced environmental degradation, increased forestation, replaced livelihood to diversify and develop income.
15 / Alternative/ Additional livelihoods – Apiary (All Locations)	NGO introduction or expansion of beekeeping skills for apiaries in rangelands and forested areas. This provides the possibility for developing, marketing, packaging and additional products involving beeswax and propolis, royal jelly. This livelihood has the added value that it also protects the environment. Traditional beehives are lodged in tree forks and as a result people do not cut those trees down. Nor do they cut down surrounding trees and shrubs as they know they need the pollen to produce the honey and people do not wish to be stung and so avoid areas surrounding beehives. Challenges include loss of bees from pesticide use on crops and thus reduced productivity.
16 / Diversification to Environmentally Friendly Farming and introduction of new high value drought resistant crops (All Locations)	NGO and government introduction of drought tolerant and new high value varieties of crops able to offset climate change realities associated with erratic rains, increasing temperatures and shorter growing seasons. Conditions that these crops are adapted to (e.g., sesame, etc.) Resulting in the development of/or meeting the needs of new and emerging markets for high value crops providing new sources of income. Changing farming practices to be more environmentally friendly practices such as soil and water conservation techniques, permaculture, companion planting etc. Changing subsistence patterns to diversify income and increase resilience, e.g., forage development irrigation and storage, cattle fattening, small scale irrigation developments through water pumps, water bund constructions.

BOX 6:

WATER GOVERNANCE

Ngare Ndare Forest sits on the slopes of Mt. Kenya, and straddles Meru and Laikipia counties. The local communities, predominantly Meru and Maasai, rely on crop farming, agropastoralism, and pastoralism. The Ngare Ndare Water Resource Users Association (WRUA) was formed in 2002 as a result of a history of conflicts. A government initiative regulated under the **Water Act of 2016** (see diagram below) it brings together stakeholders comprising water resource users, riparian land users, community forest associations (CFAs), and conservancies around the Ngare Ndare water catchment area.

A Water Resource Users Association (NWRUA) is an association of water users, riparian landowners and other stakeholders who have formally and voluntarily associated for purposes of cooperatively sharing, managing, and conserving common water resources. **Its purpose is to:**

- **Regulate water use**, including water rationing
- **Conserve water sources and maintain the catchment area** (in this case around the Ngare Ndare Forest and environing Mount Kenya ecosystem)
- **Mediate and mitigate water resource conflicts**

The Ngare Ndare WRUA helps reduce water-use conflicts through its peacebuilding sub-committee which mediates water access disputes around water rationing, where communities downstream make complaints against those upstream. Those upstream are accused of water diversion or accessing more water than downstream households. In addition, the WRUA works to rehabilitate the environment through dyke building, tree and Napier grass planting and river bank stabilisation to manage floods, given the increasingly unpredictable rains. The WRUA provides early warning to vulnerable residents near the river in the event of heavy rains to avoid loss of life. It also fences off water resources within the forest, and erects electric fence and beehives at water resources to prevent elephant damage of the water sources.

Sources: Interviews, Government of Kenya (2006) The National Water Resources Management Strategy, Box.

PHOTO: Village reliant on traditional crops.

Section Three

Emerging Principles, Wicked Problems and Conclusions

From the observations and findings above and in the separate categories, it is possible to start to identify a range of potential emerging principles for climate security programming that could be developed further. In addition, there are a number of critical challenges, that can best be described as 'wicked problems' that require our focus and collaborative efforts in order to find innovative solutions.

> **BOX 5:**
>
> **'WICKED PROBLEMS'**
>
> First coined by Horst Rittel in 1973, a 'wicked problem' can be defined as:
>
> - **A social problem that is difficult or even impossible to solve because of its complex and interconnected nature.**
>
> They can be considered quite intractable and may be a symptom of another problem or have various explanations depending on how they are perceived by individual stakeholders.

Emerging Potential Principles to Address Scoping Study Findings

▶ **INTEGRATED PROGRAMMING ACROSS THE THREE CATEGORIES**

Rather than siloed, single sector programming, adopt intentional Integrated programming that is holistic and aims to address the intersection and interlinkages between improving or rehabilitating the environment, addressing improved livelihoods and resilience to climate change and the potential, and realities, for conflict in the location.

▶ **CLIMATE SECURITY PROGRAMMING INCORPORATING A SPECIFIC PEACE BUILDING COMPONENT AND PROGRAMMING ACTIVITIES**

In all programming (both policy and practical implementation) associated with or reliant on the environment, natural resources, land use and ownership that involves different stakeholders.

▶ **NATURAL RESOURCE-FOCUSED IN ADDITION TO POVERTY-FOCUSED PROGRAMMING**

All programming should be both environmentally friendly in orientation and preferably have at its core, a component that enhances, protects and rehabilitates the natural resource base of the location as well as attempting to address socio-economic issues.

▶ **LINKING LIVELIHOOD BENEFITS TO CONSERVATION**

It may not always be possible, but the optimum way to conserve and maintain important natural resources is to find ways that communities can earn a living from the maintenance of the resource. This may be through ecotourism type activities, or finding markets for natural products from the resource base. (For example, the mangrove boardwalks, coupled with crab fattening and management of community restaurants, etc., the Kipepeo Butterfly Centre and larvae collections, the 'Tengefus' and eco-tourism activities such as snorkelling, as well as the community rangeland management and safaris in Laikipia.) These need to be explored as soon as possible in key conservation areas.

▶ **ACKNOWLEDGING AND EMPOWERING INDIGENOUS RESOURCE MANAGEMENT SYSTEMS**

The development of policies and protocols around climate security should aim to empower indigenous knowledge and natural resource management systems and similarly protect and enhance traditional livelihoods that are best suited to those environments.

▶ **MAINTAINING THE VIABILITY OF ADAPTED LIVELIHOODS TO THAT ENVIRONMENT**

Similar to the above principle, ensure policy and programming interventions support the maintenance and viability of traditional livelihoods adapted to that environment. While they may need to be supplemented and additional livelihood streams adopted for diversification and resilience purposes, the existing environment needs to be utilised in the most appropriate ways that enable traditional livelihood patterns to be continued (see for example work on cultural landscapes). A practical example might be ensuring that transhumant corridors are gazetted and maintained without being blocked by developments, or encroached on by farmers or other forms of land use, so that pastoralists are able to move between rangelands

▶ **ECOSYSTEM AND CONFLICT SYSTEM-BASED PROGRAMMING**

In deciding on climate security programme scope, scale and parameters, the geographic focus should be delineated by the parameters and boundaries of the key natural resource at stake in the area as well as conflict system

parameters (if possible) rather than purely administrative boundaries. This will allow the possibility to develop climate security approaches that take into account non-spatial and temporal links as conflict dynamics shift and take alternative forms, as well as maintain the integrity of environmental ecosystems.

▶ **DATA DEVELOPMENT, LEARNING AND APPLICATION**

In accord with the ecosystem and conflict system-based principles, develop databases that capture appropriate information around, early warning, conflict, DRR, and area programming around these systems that can inform improved learning and programming. Ideally such critical locations should have a learning and research unit working alongside programmers (such as the Karamoja Resilience Unit run by FIC and Tufts) to better understand aspects of climate security programming. Although perhaps developed with greater accountability to practitioners so that learning is linked directly to improved practice.

PHOTO: The «Mega-dam» that provides all year-round water in the Karamoja.

Key Wicked Problems Regarding Climate Security

Across the region there were found to be a set of five key common challenges constraining efforts to address climate security and that are either undermining or preventing efforts from reaching the scale and level of positive impact that would optimise tackling them. These are outlined below:

1 / SCALE OF INTERVENTIONS AND LEVELS OF IMPACT

It is often difficult to assess the level of impact that adaptations may be having in different locations or across them and whether it is at sufficient scale to have more than micro-impacts for particular households or small communities. The impression was that adaptations were useful and positive but appeared to be scattergun with only some people and communities benefiting. The impression is also that efforts seem insufficient to stem (let alone turn) the tide against the macro trends in action. Positive examples of adaptations were given in all locations, but scale versus need appears to be imbalanced. Similarly, this may be the case with additional new eco-based livelihoods (e.g., butterfly farming, use of *'tengefus'*.) which suggests choices to be made on how best to support climate security programming and information required to improve the situation. (For example, should there be greater focus on key areas to develop critical masses of intervention for systemic change, and to develop better information about a particular location and environment so that change can be assessed at a more informed level.)

2 / GOVERNANCE OF THE COMMONS AND POLICING

A question of scale also underlies issues associated with some innovative efforts designed to refresh and rehabilitate environments. This is the question of the governance of the commons and policing or implementing agreements made around their management and use. While surrounding user communities may agree with what needs to be done, how to manage access and resource use, there are also issues associated with external users or those not in agreement with the approach, or that have no other choices to survive. This undermines efforts to improve the situation for everyone. An important aspect here is the lack of sufficient complementary or additional livelihoods for these people (assuming they are willing to adopt them – see earlier questions of identity). They may not necessarily be part of the immediate communities standing to benefit from the new resource-based livelihoods (e.g., eco-tourism, etc.). Examples of this issue in the research, include by-laws associated with tree-cutting, or charcoal production, accessing rangelands, conservation community fisheries areas, forest areas, etc.).

PHOTO: Illegal fishing at the Kenyan Coast – Driving fishes into a net.

3 / CLIMATE SECURITY

Approaches associated with addressing the conflict dimensions of climate security at the community level found in the course of the research are most commonly limited to two fundamental approaches; either resource-sharing agreements that may or may not be integrated into various forms of programming and 'stand-alone' peacebuilding programming. Both these approaches tend to be insufficient in addressing conflict systems at sufficient scale to have a sustained impact, or incorporated into resilience, climate change and livelihood programming. How to improve performance and inculcation of peacebuilding approaches into all types of programming in a more sophisticated way needs to be developed so they can be applied to all interventions implemented within conflict systems.

BOX 7:

LOCAL MANAGED MARINE AREAS – *'TENGEFU'*

Marine coastal resources are under threat from many sides including climate change, overexploitation, pollution and development, along the littoral zone. As a result, fish stocks are being drastically depleted and critical habitats including reefs are struggling. As local residents noted; "At low tide, the Tengefu is like a desert. All fish except the octopus relocate to deeper waters."

Climate change affects these environments in various ways; for example, warmer water temperatures affect different fish species with varying levels of tolerance for heat, and coral reefs are susceptible to bleaching events. The beach and littoral zone are also subjected to fiercer storms and beach erosion increases as sea levels rise and weather events become more extreme. This also affects the littoral zone as reefs become shallower with sand being deposited on them covering the coral.

Local Managed Marine Areas (LMMA), locally known as 'tengefus', are an increasingly important approach to try and enhance biodiversity and protect these critical marine habitats, threatened species, and allow stocks to recover. In addition, they aim to enhance sustainable livelihoods and secure collective marine tenure for communities while encouraging additional livelihood streams (such as ecotourism) to be developed.

There are a number of tengefus along the Kenyan coast (see map) with the first established in early 2004/5 when Kuruwitu Conservation Association (KCWA) supported by Oceans Alive was officially registered due to concern at declining fish stocks (in 1999/2000 this was estimated to be annually 5000 metric tons). In 2006 they implemented an initial six-month closure and resulting in an increase in fish numbers and turtles. All the endangered species of the areas were regenerating. The group decided to make it a permanent no-fishing zone akin to a marine protected area. They now have seasonal closures and openings for some species e.g., for octopus farming and harvesting (allowing other marine species to regenerate). KWCA has developed a five-year co-management plan between the Beach Management Unit and county government to ensure sustainable utilisation of fisheries aligned to the requirements of the Fisheries Management and Development Act of 2016.

Source: Interviews, and ICRI, A Brief Note of Community-Conserved Areas Along Kenyan Coast for Coral Reefs Protection and Enhancement of Reef Fisheries (Source of map) found at https://www.icriforum.org/wp-content/uploads/2019/12/Grant_Kenya_Briefing_note.pdf

PHOTO: Coastal 'Tengefu' Area, Kilifi Kenya.

4 / CONSERVATION VERSUS ACCESS

Similarly, and associated with land or resource use, are the issues associated with conservation and resource-focused programming and poverty-focused efforts. Resource-sharing of the commons is the prevalent use across the region, but in a number of locations this creates considerable levels of conflict putting huge pressures on all stakeholders. This in turn links to the challenge of how to combine elements such as increasing returns from alternative uses of resources, and finding ways to supplement this through additional investment in livelihoods for all, perhaps by linking more to the private sector, or tapping into additional global resources such as carbon credits that further incentivise the conservation of these critical resources and recognising their inherent value globally.

5 / COLLABORATION AND INTEGRATION

How to best work with multiple stakeholders to create synergy and active practical collaboration on the ground is a critical aspect that requires intentional efforts and the development of new models. Sadly, the current reality is more usually empty coordination efforts that don't add value but still take up time and energy with little return. This is not a new problem but a failure to improve in this area means that strong climate security programming is unlikely to be achieved easily. Similarly, and related, is the issue of how to ensure there is knowledge of, alignment and integration between policies from different sectors and levels, and then to apply these policies on the ground. Better vertical and horizontal policy linkage is critical for greater impact.
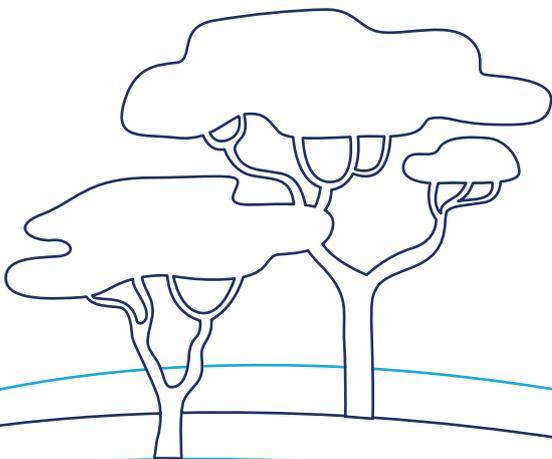
PHOTO: Crab fattening in Rehabilitated Mangroves.

Overall Conclusions

The findings and conclusions from this mapping exercise demonstrate that the challenges facing all stakeholders in addressing climate security are severe in terms of the speed of change that is now being experienced by communities. In addition, the conflation of challenges that arise from the macro trends affecting the different localities visited in conjunction with climate change compounds the challenges being faced by communities on the ground. There are, however, ongoing efforts and approaches being adopted by government and civil society actors at community level that can be built on and developed further which show some promise in their locality. While there were no fundamentally new approaches that emerged from the mapping assignment, nevertheless there were innovative adaptations for those localities that were being introduced. For almost all the interventions there is an underlying question of whether the scale of application of the adaptations encountered is sufficient to have an impact that matches the negative dimensions of the trends being experienced. While in the majority of cases there is insufficient information to say clearly whether or not this scale is being achieved, the observations of stakeholders (including the research team) raise doubts as to the overall efficacy of current resourcing and investment in addressing climate security issues. Although there may also be other limits to adaptation applicability that are not fully understood, such as for example the debate on how many beehives one can develop in any location.

A fundamental tension in addressing climate security in the region is the need to break down problems into their constituent parts and support immediate adaptations (be that from a sectoral perspective, environmental or a geographic one), while also addressing the integrated and interconnected nature of the different factors at sufficient scale and with an understanding of the appropriate long-term timeframes needed for effective interventions. However, siloed interventions and sectors result in projects that address the symptoms of specific changes primarily in their domain, ultimately, reducing the scope of an intervention's potential impact. While resilience programming from NGOs tends to be far more integrated than most types of programming, nevertheless there is still room for improvement, as often (not always), there may be missing one or other of the fundamental dimensions of climate security risk management – be that the environment, conflict, or livelihoods. For example, at the coast in Kenya, an approach that mainly considers trying to address the environmental issues, although developing additional livelihood approaches such as ecotourism may miss the scale of poverty that is driving

the degradation challenges and that prevent the environmental interventions from being as successful as they might be. **(SEE BOX 7).**

So, what is clear is that the way forward, aside from significantly increasing scale and levels of investment particularly from international donors, will involve the development of improved approaches that better integrate multi-disciplinary programming efforts to address this complexity. It will involve working effectively with more and across various diverse stakeholders to combine efforts on the ground and in the policy development and application arena.

Two further dimensions also clearly need special and urgent attention; firstly, the conceptualisation and development of models and approaches that better integrate conflict and climate change programming, and secondly the need to focus on rebuilding and rehabilitating the environment and natural resource base on which all stakeholders are fundamentally reliant.

This will require each sector (government, development practitioners, the aid architecture, local civil society, etc.), to be more willing to think holistically and long-term, and be open to working with and learning from others to move beyond working on alleviating the symptoms of changes to addressing their causes.

PHOTO: Agricultural encroachment in Kaya areas - coastal Kenya.

Summary Recommendations

The findings from this scoping study suggest six important recommendations where the UN and in particular the Resilience Hub can play a key role moving forward in addressing Climate Security in the Horn of Africa:

1 LEAD BY EXAMPLE IN THE DEVELOPMENT AND APPLICATION OF CLIMATE SECURITY EMERGING PRINCIPLES IN ALL UNDP PROGRAMMING

This means developing and modelling cross-sectoral and multi-stakeholder approaches with different institutions and sectors that address climate security issues holistically incorporating components that tackle the three most important dimensions; resilience, environment and conflict in an integrated manner.

2 TAKE A LEAD AS THE CONVENER OF A PORTFOLIO APPROACH IN A CRITICAL AREA OF SIGNIFICANT STRATEGIC IMPORTANCE REGARDING CLIMATE SECURITY

Selecting key areas, such as the Majang Biosphere in Gambella, to adopt a 'portfolio' approach where multiple stakeholders can collaborate together on the different elements of climate security, macro socio-economic trends and policies that are impacting on the area can bring significant value to the field. The UN has the ability to act as a convener and bring potential stakeholders together to develop integrated and holistic activities necessary to achieve broader impact across the ecosystem. In particular, a convenor role would help collate information regarding all climate security activities and interventions in support of complementarity, prevention of duplication and increasing the potential for aggregated impact at scale. A convenor also creates the opportunity for one organisation to be the holder and collator of data for an integrated mapping platform that could be used for early warning, preventative and response actions as well as real-time adaptive programming.

3 SUPPORT THE DEVELOPMENT OF IMPROVED CLIMATE SECURITY CONCEPTUAL MODELS AND PRACTICAL APPROACHES

In conjunction with peacebuilding organisations, develop improved ways of integrating peacebuilding principles into climate security programming. Integration will support management of structural trends and drivers of conflict that are providing the basis for, and exacerbating the impacts of climate change in the region. These models and approaches need to be accompanied by an empirical evidence-base.

4 ADOPT SYSTEMS APPROACHES IN ADDRESSING CLIMATE SECURITY CHALLENGES

In deciding on climate security programme scope, scale and parameters, the geographic focus should be delineated by the parameters and boundaries of key natural resources at stake in the area as well as conflict system parameters (if possible) rather than purely administrative boundaries. This will allow the possibility to develop climate security approaches that take into account non-spatial and temporal links as conflict dynamics shift and take alternative forms, as well as maintain the integrity of environmental ecosystems.[29]

5 SUPPORT AN INCREASED ROLE FOR INDIGENOUS PEOPLES IN CLIMATE SECURITY PROGRAMMING

Recognise, acknowledge and value indigenous approaches and knowledge explicitly. Efforts should be made to empower indigenous communities in key natural resource areas and provide them with specific resources to take a greater responsibility and management stewardship role in their conservation. Lessons from the peacebuilding and development fields on inclusion are accessible and can be integrated into UN programs and funding.

6 LAND PLANNING IN IMPORTANT ECOSYSTEMS IN BOTH URBAN AND RURAL AREAS

Support and invest in consultative and participatory land use planning in areas where there are multiple users and stakeholders involved. Participatory land use planning will help maximise the use of natural resources while simultaneously protecting, maintaining and enhancing the natural resource base, ensuring the viability of endogenous livelihood approaches and minimising conflicts. Then invest in the follow-up and their implementation and regulation of the developed plans at local levels.

7 GREATER INVESTMENT IN EARLY WARNING AND EARLY RESPONSE SYSTEMS

Investment in all types of sustainable early warning and response mechanisms is needed at the community level; weather, conflict, pests and disease prevalence, etc, is needed to assist community planning and DRM. This should enable communities to then triangulate various sources of information – traditional and modern – and act on them. However, there needs to be further development or identification of more nuanced, and accurate, local indicators to improve the reliability of warnings and information for communities.

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29 / This does also mean taking into account even broader global systems as well. For example, in the case of Karamoja, and the Horn of Africa there are other factors at play such as the effects associated with the Indian Ocean Dipole (IOD) which is linked to rainfall and weather patterns, in the Pacific and Australia as well as South Africa. Many respondents did not fully understand how the various impacts of climate change in different environments, such as the Kenyan Coast, are relevant to each other and part of global patterns manifested in different local experiences and impacts.

References

Abrahams, D. (2022), "Land is now the Biggest Gun": Climate Change, Conflict, and the Telling Case of Karamoja, Uganda. Downloaded from at

https://www.climatelinks.org/blog/land-now-biggest-gun-climate-change-conflict-and-telling-case-karamoja-uganda

Adan, M. and Pakalya, R. (2006), The Concept of Peace Committees; A Snapshot Analysis of the Concept of Peace Committees in Relation to Peacebuilding Initiatives in Kenya, Practical Action.

Adeto, Y. A. and E. Abate. (2014), Conflict Dimensions of Large-scale Agricultural Investment in Ethiopia: Gambela Case Study, in M. G. Berhe (ed.) A Delicate Balance: Land Use, Minority Rights and Social Stability in the Horn of Africa, pp. 166-188., Addis Ababa: Addis Ababa University Institute for Peace and Security Studies.

Darbyshire, E. and Weir, D. (2021), How does war contribute to Climate Change?, Conflict and Climate Observatory. Downloaded at

https://ceobs.org/how-does-war-contribute-to-climate-change/

Egeru, A., Opio, J., Siya, A., Barasa, B., Magaya, J. P., & Namaalwa, J. J. (2020), Tsetse Invasion as an Emerging Threat to Socioecological Resilience of Pastoral Communities in Karamoja, Uganda. Sustainability, 12(4), 1599. https://doi.org/10.3390/su12041599

Catley, A. and Aklilu, Y. (2013), Moving Up or Moving Out? Commercialization, Growth and Destitution in Pastoralist Areas. In: Catley, A., Lind, J. and Scoones, I. (eds.), Pastoralism and Development in Africa: Dynamic Change at the Margins. Routledge, Abingdon and New York

International Coral Reef Initiative, (date unknown), A Brief Note of Community-Conserved Areas Along Kenyan Coast for Coral Reefs Protection and Enhancement of Reef Fisheries. Found at

https://www.icriforum.org/wp-content/uploads/2019/12/Grant_Kenya_Briefing_note.pdf

Legese, B. and Gumi, B. (2020), Flooding in Ethiopia; Causes, Impact and Coping Mechanisms. A Review, International Journal of Research and Analytical Reviews, (IJRAR) September 2020, Volume 7, Issue 3.

Life and Peace Institute, (2020), Community Decision-making and Behaviour Change linked to Climate-Related Conflict in Garissa County, Friedrich-Ebert-Stiftung, Nairobi

Longbottom, J., Caminade, C., Gibson, H.S. (2020) Modelling the impact of climate change on the distribution and abundance of tsetse in Northern Zimbabwe. Parasites Vectors 13, 526

https://doi.org/10.1186/s13071-020-04398-3,

Majang Zone Government, (2018) 'Majang Biosphere validation workshop presentation' February 2018

Meckelburg, M. (2014), Large Scale Land Investment in Gambella, western Ethiopia – The Politics and Policies of Land, in M. G. Berhe (ed.) A Delicate Balance: Land Use, Minority Rights and Social Stability in the Horn of Africa, pp. 166-188., Addis Ababa: Addis Ababa University Institute for Peace and Security Studies.

Nnko H.J, Gwakisa P.S, Ngonyoka A, Sindato C, Estes A.B. (2021), Potential impacts of climate change on geographical distribution of three primary vectors of African Trypanosomiasis in Tanzania's Maasai Steppe: G.m. morsitans, G. pallidipes and G. swynnertoni. PLoS Negl Trop Dis 15(2): e0009081.

https://doi.org/10.1371/journal.pntd.0009081

Ponsiano Bimeny, Benedict Pope Angolere, Saum Nangiro, Ivan Ambrose Sagal & Joyce Emai (2021), From Warriors to Mere Chicken Men, and Other Troubles: An Ordinary Language Survey of Notions of Resilience in Ngakarimojong, Civil Wars, DOI: 10.1080/13698249.2022.2015215.

Richards, S. Bekele, G., Tesfaye, G. and Shimelis, B. (2015), Conflict, Climate Change and Resilience Assessment of the Borana Zone, USAID, Haramaya University.

Scott, W. (2021), Climate Security: Building a Community of Practice, New America. Downloaded at

https://www.newamerica.org/resource-security/natural-security-blog/climate-security-building-a-community-of-practice/.

Siyum Adugna Mamo (2017), When Large-Scale Land Acquisition Meets Local Conflict: Experiences from Gambella Regional State, Ethiopia, International Journal of Multicultural and Multireligious Understanding, Volume 4, Issue 4.

http://dx.doi.org/10.18415/ijmmu.v4i4.84

Stites, E. & A. Marshak (2016), 'Who are the lonetia? Findings from southern Karamoja, Uganda', Journal of Modern African Studies. 2016

Temesgen, A.K., (2010), Climate Change to Conflict? Lessons from Southern Ethiopia and Northern Kenya, Fafo, Norway.

Human Security Unit (2016), Human Security Handbook, United Nations.

UNOCHA

https://reliefweb.int/report/ethiopia/horn-africa-drought-regional-humanitarian-overview-call-action-revised-28-november-2022

UN. Secretary-General (2009). Climate change and its possible security implications: report of the Secretary-General. Downloaded from

https://digitallibrary.un.org/record/667264?ln=en#record-files-collapse-header

Wuletawu Abera, Lulseged Tamene, Tibebu Kassawmar, Kalkidan Mulatu, Habtemariam Kassa, Louis Verchot, Marcela Quintero (2021) Impacts of land use and land cover dynamics on ecosystem services in the Yayo coffee forest biosphere reserve, southwestern Ethiopia Published by Elsevier B.V. online

https://doi.org/10.1016/j.ecoser.2021.101338

PHOTO: Alternative livelihood sources - Butterflies at Kipepo - coastal Kenya.

Annex One

Methodology

Overall Approach

The overall approach to the mapping assessment was qualitative in nature, taking a participative, appreciative approach seeking and basing the exercise on the views of stakeholders at all levels while acknowledging strengths and focused on finding improvements and recommendations rather than only seeking weaknesses.

SELECTION OF MAPPING LOCATIONS IN KENYA, ETHIOPIA AND UGANDA.

Site selection was determined by a combination of elements. Firstly, a consideration and initial scanning of the literature, secondly, discussions with local partners and thirdly the utilisation of following three major overlapping criteria for each location:

- Experience of climate variability and extremes.
- Representative of different Livelihood systems. E.g., pastoralism, agriculture and fisheries, etc.
- Experience and vulnerability to conflict being situated within a conflict system

Types of Livelihood zones and systems

Vulnerability to climate change and extreme weather
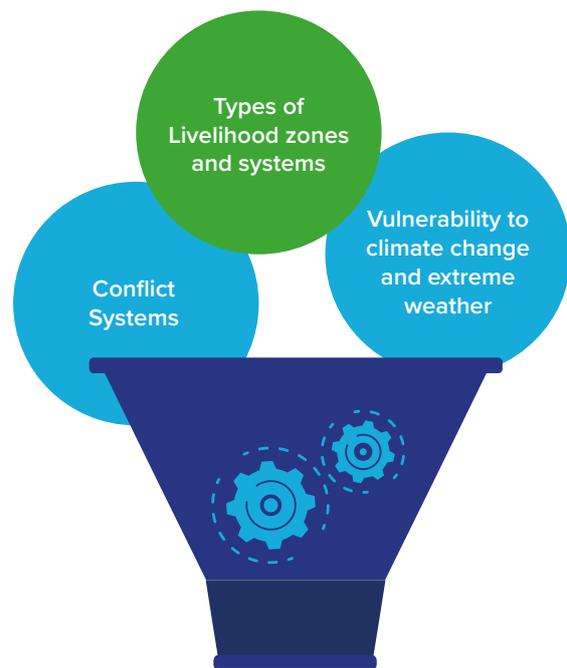
Conflict Systems

Identification of Broad Mapping Locality

When and where possible a cross-border dimension also played a role in the selection of locations, when community adaptations reflected such dynamics, given the conflict and livelihood systems in their location. Such locations. The final factors influencing choice of study locations were the presence of LPI or UNDP partners, the security situation and access factors, the potential for revealing useful insights, and cost effectiveness.

The final study locations selected were:

ETHIOPIA
Gambella and South Omo

KENYA
Laikipia, Marsabit and the Coastal region

UGANDA
The Karamoja

Data Collection Methods

LPI conducted an initial desk review of key documents; both academic and from the grey literature. Key informants were interviewed using a semi-structured interview process and were purposely sampled from community representatives, civil society organizations, as well as government and intergovernmental representatives. These stakeholders were identified through partners, contacts and chain referral sampling. While at the community level, focus group discussions were held with local community representatives and in addition, where possible and appropriate direct observation was also employed. So, the team visited and viewed community solutions on the ground in a number of locations.

To inform the mapping process pictures were taken and GPS Coordinates of the areas with climate-security solutions noted. The intent being to consider what sort of interactive GPS map might be developed to illustrate adaptations.

Limitations and Challenges

SECURITY TRAVEL RESTRICTIONS IN COUNTRY:

Selecting areas that are located in conflict-affected areas, inevitably had an influence on the teams travel plans on a number of occasions in Karamoja, Laikipia and Marsabit, Gambella and South Omo. However, fortunately it was not too restrictive and only meant that a few sites were unable to be accessed when we had hoped to.
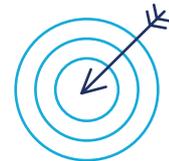
DEPTH OF FINDINGS:

The research team encountered challenges in terms of being able to access sufficient information at a consistent depth and quality. As will be seen in the findings below, it was not easy to find interdisciplinary programmatic examples that spanned multiple disciplines outside of resilience type programming. Nor was it always possible to visit the proposed adaptations due to the challenging environment and distances involved. The team needed to balance the time invested in physically travelling to some of the locations (given that the majority of broader areas visited are not imbued with strong road infrastructures), against the possibility of finding a disappointing example of an adaptation without much to offer interested stakeholders.

QUALITY OF ADAPTATION:

A further aspect to be noted is that the objective of the mapping was to identify climate security adaptations. The assignment was not an evaluation, and so in this regard an assessment was made regarding an adaptation's potential to mitigate climate security and so its inclusion in the report, rather than its actual empirical ability. In conjunction with this aspect, it is important to note that impact and success in some cases is relative. For example, tengefus are not as successful as hoped because the size of the areas being conserved is insufficient to be able to regenerate the fish and marine life stocks at the same rate as they are being fished and overused. There is also encroachment into the tengefus by other stakeholders who either do not agree with the concept of their use as a conservation tool and those who have few other livelihood options and so need to fish in these areas to survive. However, in their absence, the situation would be much worse, and they have been able to increase the biomass being fished.

RURAL VERSUS URBAN ADAPTATIONS:

The broad areas under consideration were mostly rural, the exception being Mombasa on the Kenyan Coast. This has meant that the majority of adaptations also reflect rural environments. The mangrove rehabilitation example is one that was also found in the city, but those interested in urban adaptation dimensions will not find much to nurture their interest in this report. It does also suggest that some additional research in the future, into built-up environments might be beneficial as well.

MAPPING CHALLENGES:

Considerable limitations encountered in this assignment were associated with the intention to develop an interactive map of the adaptations. During the assignment it became clear that the initial aspirations for this aspect of the assignment were overambitious. However, the concept and principles behind the development of an interactive map, remain pertinent for addressing climate security and much was learnt on what is needed in the future to revisit the possibility (see the discussion in Annex 2 below).

PHOTO: Smoking fish in Gambella - additional livelohood sources

Annex Two

Data Collection, Use and Application

Availability of Primary Data

A common problem across all countries and locations is the difficulty in obtaining accurate and updated data at community level to inform security programming. Even for uncontentious topics such as levels of aid or meteorological data, as well more sensitive ones such as conflict. This even extends to primary data from government sources and regional institutions. The team mostly had to rely on searches of secondary sources (e.g., academic or grey literature) to obtain information. Depending on the nature of the data found in these secondary sources, it is often very relevant (with some high-resolution data), but is not always easy to find. The stronger data sets have clear and replicable methods and interesting multi-temporal analysis; nevertheless, there is a need to link this information to the data collected in the field to validate the methods and data sources. Therefore, a combination of primary and secondary sources is likely to reflect more accurately the realities and bridge the gap. In one country, the researchers were informed by the meteorological department that weather data was 'secret' while in others, bureaucracies require long, formal request processes that may or may not result in receiving the information (all these requests are still outstanding at the present time) Equally open access websites with available data for particular areas often have a specific focus or time period that may or may not be helpful.

In other cases, there is simply not the necessary data available to inform programming or decision-making. Or the data is dispersed and not easily found. For example, it proved impossible to find out the scope, scale and prevalence of interventions from the aid sector in different locations, let alone how this fitted with or complemented government or other initiatives. The best practice example in this respect, was found in the Karamoja where the Feinstein International Center of Tufts University runs the Karamoja Resilience Support Unit (KRSU) undertaking research and learning on relevant aspects affecting resilience in the area. While this is a huge and useful resource there is still a potential gap between the production of knowledge and availability of useful research and its application by practitioner organisations, (and donors) that needs to be addressed. However, this is a step forward. An example was how they produced a simple report in 2018, analysing the various projects, donors and areas of implementation across the Karamoja. Ideally, this type of

basic information should be easily available for every year. It was not possible though to find any similar information in other research locations, which in turn meant that our work also heavily relied on 'snowballing' or chain referral sampling to understand what is going on. This also made it difficult to fully understand the scale of what is being implemented, where the needs and gaps are, that could improve the effectiveness of climate security programming in that area.

Conflict data is also challenging. Sometimes it is available through NGO reports but is usually in the form of a weekly or monthly report or sitrep. So, an example was collected of such a report in Karamoja (but not in other research locations aside from those produced by NRT in Laikipia) but this form and type of reporting does not easily help with trends analysis or understanding shifts in conflict locations or forms. Government security agencies and departments don't usually like to share this type of information because it may be considered to reflect badly on them or is considered sensitive for other reasons, and it is not possible to obtain primary data from CEWARN due to their protocols. There are some global reports available (e.g., ACLED data sets and Uppsala data sets) but these are also not available in sufficient detail to inform the design of explicit programmes.[28]

However, the experience from this assignment clearly points to the need to develop consistent open source, aggregated information in a number of areas to improve both the understanding of actors, and their ability to tackle the multiplicity of challenges associated with climate security in an effective manner. This could mean a combination of: opening up sources of information, and identifying relevant data that can and should be collected in such areas. It also suggests that consideration of the type of data to be collected is needed to inform future collaboration, programming and the design of potential approaches to area programming (for example a portfolio approach). An interesting area that has emerged, given the challenges of this assignment, is how one might undertake useful interactive spatial programming that could also incorporate a modelling and scenario approach to inform prioritisation and approaches in the future. This might be particularly important with respect to understanding the broader implications of climate security within systems.

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28 / An additional source of conflict data is the CRD (Crisis Risk Dashboard) from UNDP, a tool that collects and analyses conflict data but it is not openly available.
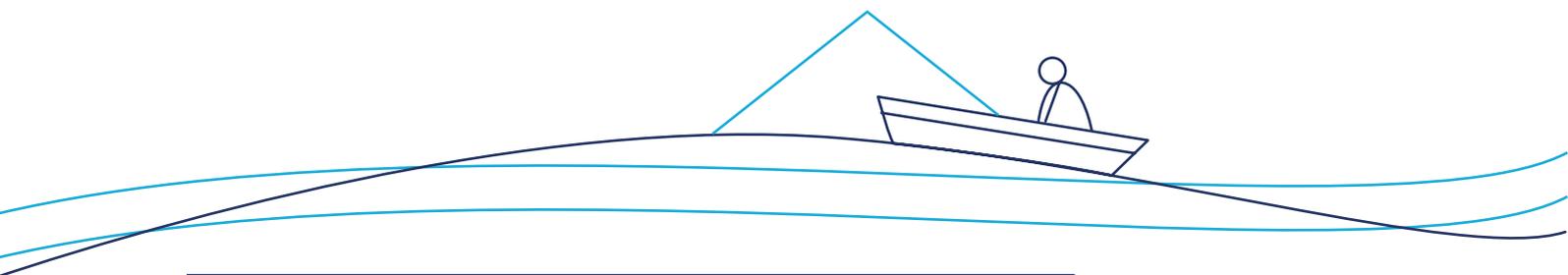
Spatial and Interactive Mapping to Inform Climate Security Programming

Putting aside the challenges associated with primary data availability the potential positive aspects and use for interactive spatial mapping were demonstrated by the Northern Rangelands Trust (NRT) who have such a platform. They have introduced a system of data collection that relies on real-time monitoring and specific data collectors, which enables them to overlay various layers of data, such as weather predictions, sites of conflict incidents, levels of vegetation or forage conditions to consider patterns and issues. This has been very useful for their conservation and protection of endangered species (such as rhinos) work but they still face challenges with analysing their conflict data and trends. Staff reported that better analysis would enable them to use it more effectively for predictive purposes and so prevent more conflict incidents before they occur.

MAP 3: Interactive mapping by NRT showing incidence of conflicts and their locations.
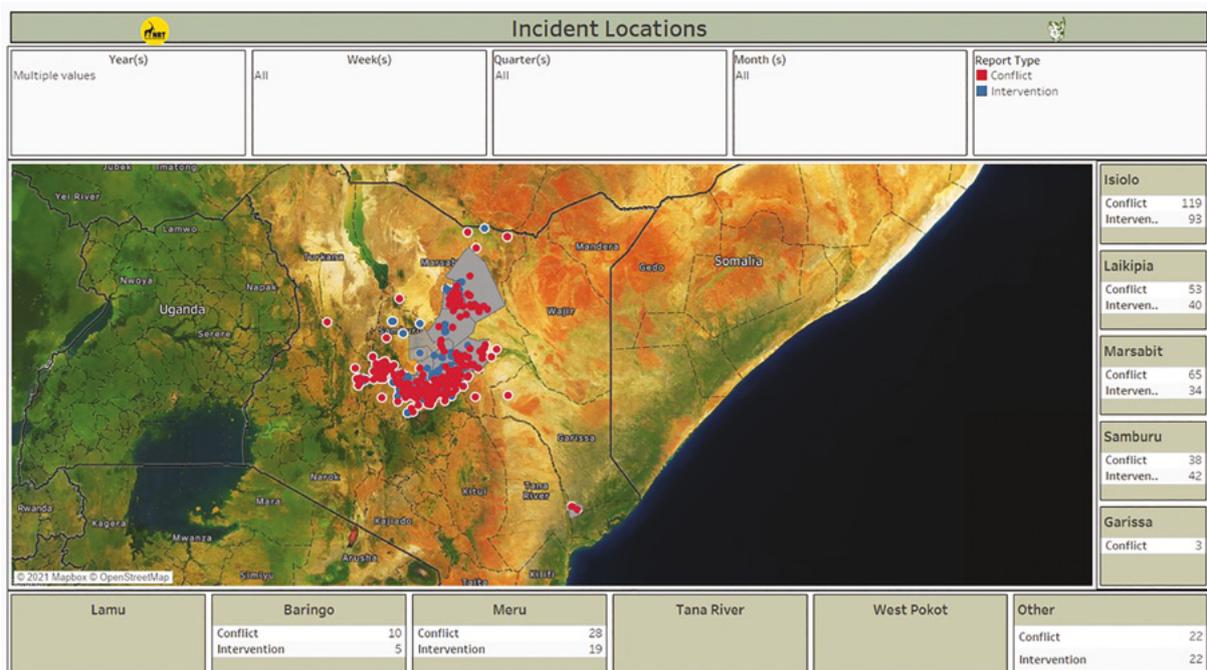
In apparent contradiction to the above point regarding the lack of appropriate data or access to it, there is a huge amount of secondary data available in open-source sites on the internet. This data can serve to illustrate the potential for interactive mapping in climate security programming from several perspectives.

Spatial planning and analysis can serve a useful purpose for programmers to better understand the scale of an issue, trends associated with it. If used with models that enable projections into the future, it may also show how a particular trend may unfold as time goes by. If used wisely this type of information can be used to inform policy formulation. While more complex it is also possible to consider multiple variables at the same time in the spatial arena and visualise any apparent correlations between them. The challenge though, is to understand the impact of these macro dimensions at the local level which can then inform practical programming and interventions to address the issues. This then raises the issues of data collection; what type of data is required and where exactly.

An example of the use of macro spatial data in a location visited during this research is seen for Gambella (note the actual sites visited are identified with green spots). On the ground the research team undertaking the mapping assignment was informed repeatedly by respondents of the issue of expanding farmland encroaching on the forest and the consequential deforestation (and associated conflict issues). It is not easy to see the scale of this process in action at that level. The map created using available datasets (see footnote) illustrates aspects of these trends over the period 2003-2019.[30] This map could be further overlaid with information regarding road infrastructure to assess the correlation of deforestation against ease of access to the area. This type of information could inform where assessments, programming and interventions need to take place – i.e., where are the current hotspots, with follow-up on the ground to understand why this is the case in these locations and how they can best be managed.

30 / Global Cropland Change: SOURCE: UMD, **Cropland extent, loss and gain from 2003 to 2019**. The dataset represents a globally consistent cropland extent time-series at 30-m spatial resolution. Cropland is defined as land used for annual and perennial herbaceous crops for human consumption, forage (including hay), and biofuel. Perennial woody crops, permanent pastures, and shifting cultivation are excluded from the definition. The fallow length is limited to four years for the cropland class. The cropland mapping was done using the consistently processed Landsat satellite data archive from 2000 to 2019. **Dataset Reference**; P. Potapov, S. Turubanova, M.C. Hansen, A. Tyukavina, V. Zalles, A. Khan, X.-P. Song, A. Pickens, Q. Shen, J. Cortez. (2021) Global maps of cropland extent and change show accelerated cropland expansion in the twenty-first century. Nature Food. https://doi.org/10.1038/s43016-021-00429-z, websites to access data: Global Cropland Change | Resource Watch and Global cropland expansion in the 21st century | GLAD (umd.edu)

MAP 4:

Reefs at risk in Kwale and Kilifi, on the Kenya coast comparing the current situation with predictions for 2050 based on climate change and other threats.
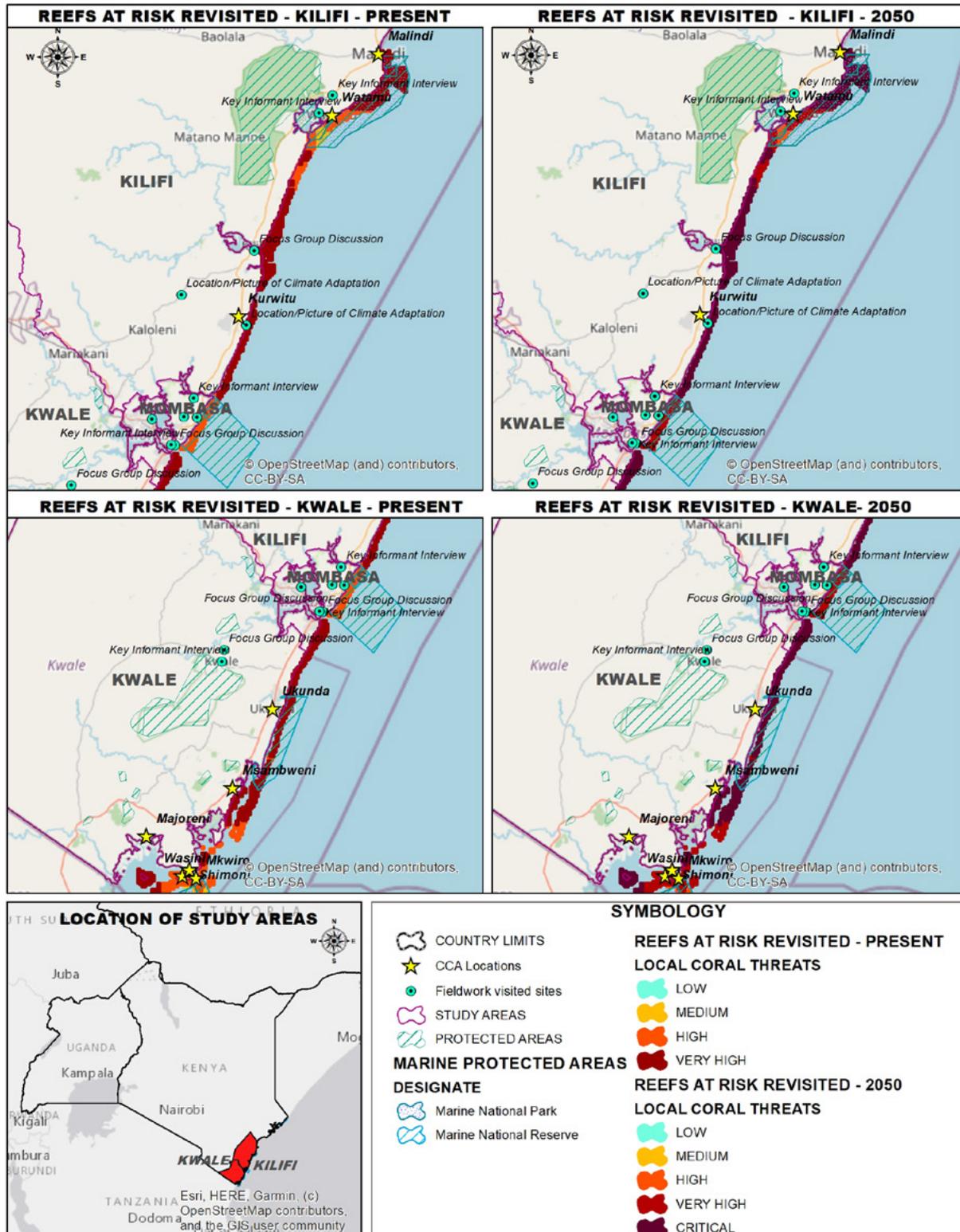
MAP 5:
Gambella changes in Cropland expansion and deforestation ca. 2000-2020.
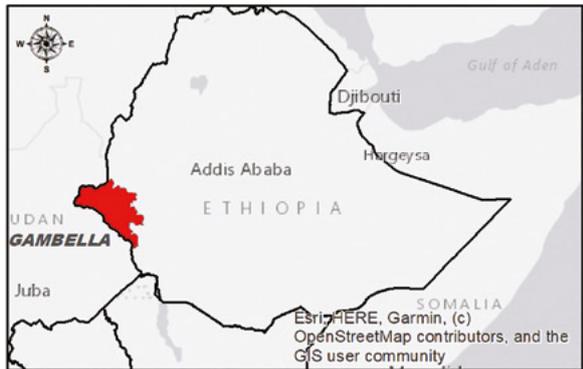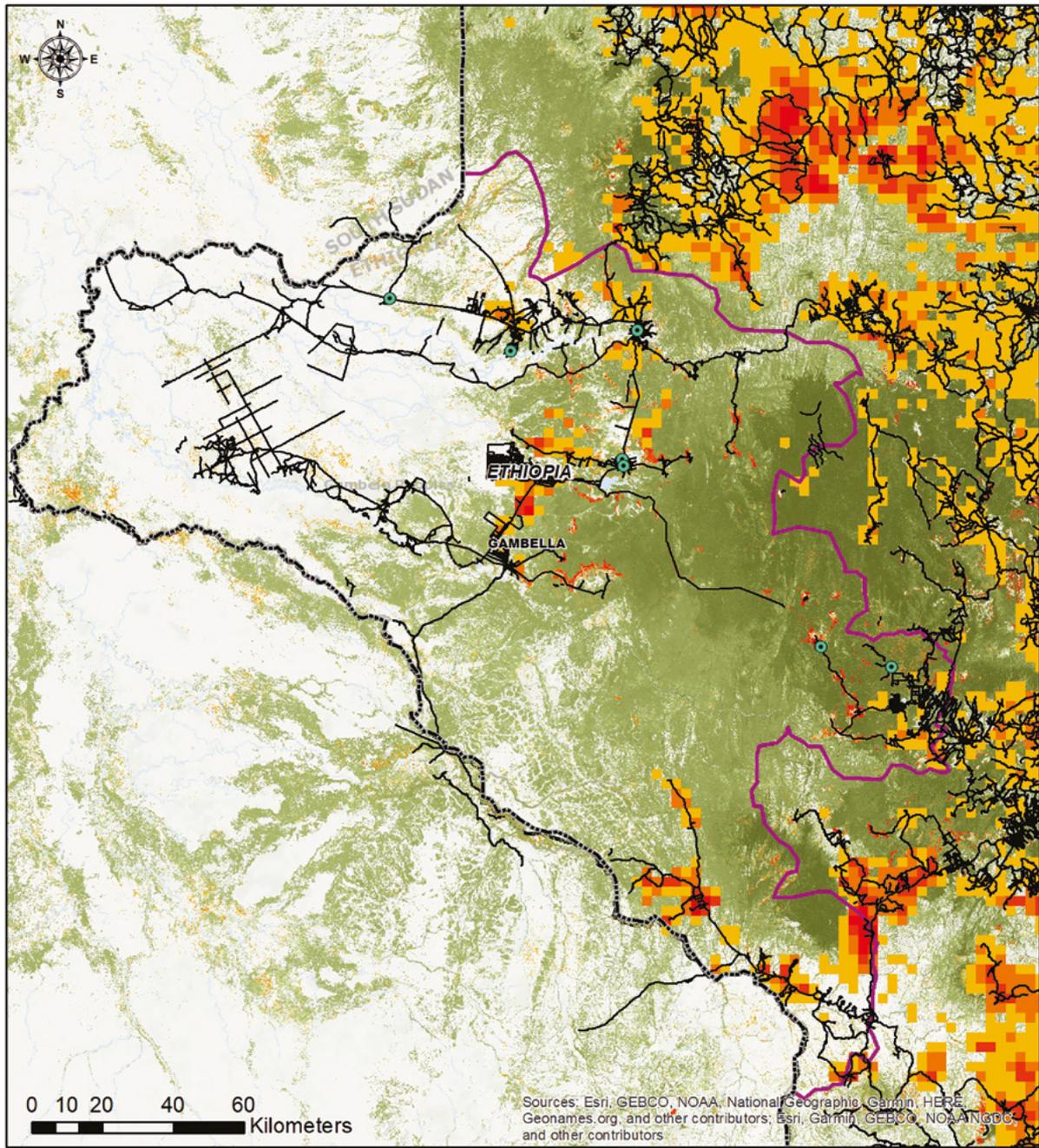
From a predictive perspective and taking another location where this research was undertaken, the map adjacent shows reefs at risk on the Kenyan coast in Kwale and Kilifi. It compares their predicament right now reflected through an index based on a range of threats with their predicted situation in 2050. The index is compiled from threats due to a number of human activities including coastal development, marine-based pollution, watershed-based pollution, overfishing and other destructive fishing practices. The predictive dimension also considers the likelihood of bleaching events, which are associated with increases in water temperature resulting from climate change.[31]

This broader spatial overview, confirms firstly the views of knowledgeable informants, that the majority of reefs along this coastline at this point in time, are under very high threat indeed in terms of their ability to recover. While in 2050 almost all locations are at an even higher category of threat with the majority of the coastline considered at a critical stage. Seeing the extent of this threat from a broader spatial perspective demands urgent action from all stakeholders now if this situation is to be prevented and the health of the reefs recovered to a more manageable level.

A further example to illustrate their potential use in climate security land planning can be drawn from the Karamoja, where a mapping of transhumant corridors, changes in their routes and differing land use patterns could be used to safeguard sufficient rangelands are gazetted and protected to ensure the viability of pastoralism in the area while also pre-empting and preventing potential clashes between herders and farmers who may be tempted to grab apparently unused land in the middle of a transhumant migration route. As one can see from the map below, the expansion of cropland in the Karamoja region has been significant and the trend is likely to continue into the future. In other environments where similar trends are underway, with no protection

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31 / Local Threats to Coral Reefs: Local Threats to Coral Reefs | Resource Watch. Are from many human activities. This dataset describes, individually and in aggregate, the threat from: coastal development, marine-based and, watershed-based pollution, overfishing and other destructive fishing practices. It expresses these threats via an index of low, medium, or high threat severity at a 1 km resolution (the integrated threat index also includes a «very high» category). The dataset was created at World Resources Institute (WRI) as part of the Reefs at Risk Revisited study and represents threats for the year 2011. The coral reef location dataset used was based on 500 m resolution gridded data reflecting shallow, tropical coral reefs of the world. Organizations contributing to the data and development of the map include the Institute for Marine Remote Sensing at the University of South Florida (IMaRS USF), Institut de Recherche pour le Développement (IRD), United Nations Environment World Conservation Monitoring Centre (UNEP-WCMC), WorldFish Center, and WRI. **Frequency of Future Coral Reef Bleaching Events:** Frequency of Future Coral Reef Bleaching Events | Resource Watch. This dataset shows the number of years from 2030 and 2050 decades that coral bleaching is likely to occur from increased water temperature. It relies on a thermal stress model using units degree heating months (DHM) to determine risk of bleaching. A water temperature rise of 2 degrees celsius is equal to the National Oceanic and Atmospheric Administration (NOAA) Bleaching Alert Level 2, where bleaching will likely occur. The final dataset is presented at a gridded spatial resolution of 50 km and shows the number of years each grid cell will reach a DHM of at least 2 during the decade. It was created by the (WRI) in conjunction with Simon Donner at the University of British Columbia. as part of the Reefs at Risk Revisited project to assess status and threats to the world's coral reefs.

of corridors there has been a tendency to increasing levels of farmer – herder clashes. For example, in Nigeria's middle belt. (See Richards et al, 2015).[32]

Interactive maps have the advantage that one can use primary data collected in various ways immediately incorporating both temporal and spatial dimensions in real time. This is much harder to develop using secondary open-source data; likely to present a single comparative snapshot of the variables at stake, rather than the evolving picture that an interactive map can produce. This latter approach has considerable potential to be useful if harnessed to more adaptive programming and preventative approaches if developed with predictive modelling capacity and linked to and incorporating early warning information.

Challenges with the development of practical interactive maps

Nevertheless, to develop such a tool requires addressing several considerable challenges including:

▶ It requires a huge investment in continual data collection in real time and its input into the platform

▶ For the mapping to be useful, the integrity, reliability and timeliness of the data is critical. This is sometimes challenging in conflict environments, where rumours abound and require strong triangulation mechanisms to ensure their validity.

▶ Data collection and collation is also insufficient without strong analysis of it and then linking the analysis to adaptive programming initiatives. This requires a combination of skills that is not common. There tend to be analysts and also programmers but rarely those with the ability to combine analysis with ideas and interventions for sound practical programming.

▶ The sustainability of any such models to generate interactive maps therefore becomes a challenge, as the whole process requires a long-term perspective that does not align with the aid sector's project-oriented paradigm.

32 / See - Richards, S., Dowd, C., Inks, L., 2015. "Referred Pain; Conflict and Livelihood Resilience in Nigeria's Middle Belt", DFID and Mercy Corps, Portland.

MAP 6:

Map of Karamoja demonstrating the impact of increasing cropland and transhumant pastoralist corridors.

DISTRICTS LOCATION

SYMBOLOGY

COUNTRIES
DISTRICTS
DAMS
TRANSHUMANT ROUTES
FIELDWORK VISITED AREAS
PROTECTED AREAS

GLOBAL CROPLAND NET GAIN
PERIOD ANALYZED 2003-2019

0% - 1%
2% - 10%
11% - 25%
26% - 50%
51% - 100%

LAND USE IN THE REGIONS SELECTED
TYPES OF LAND USE

AGRICULTURE
GRAZING / PASTURES
SCRUBS-SHRUBS/FORESTRY / AGROFORESTRY / RECREATION
TREES/FORESTRY / AGROFORESTRY / RECREATION & LEIS*
UNUSED LAND
URBAN / RESIDENTIAL /UTILITIES & INFRASTRUCTURE
WATER SOURCES / FISHERIES / RECREATION & LEISURE

PHOTO: Alternative fuel briquettes.

Recommendations regarding interactive mapping

An interactive mapping approach be developed and piloted in a critical strategic location (from a climate security perspective) such as in the Majang area to be linked with a multi-stakeholder, collaborative, integrated portfolio approach to climate security programming in the region, addressing the three fundamental climate security dimensions: the environmental, resilience, and conflict.

To develop an interactive platform that supports and informs Climate Security Programming the following steps are suggested:

1 Identify a platform that is already developed for such purposes, or design a collaborative platform that is easily accessible, interoperable (i.e., able to exchange information with and interact with other data systems), with a built-in friendly environment that can be used and accessed by a wide range of stakeholders.

2 Stakeholder analysis to identify the various institutions working around the Climate Security topic and data providers.

3 Identify primary and secondary data sources, their scale and temporality of analysis (spatial and temporal resolutions). Additionally, it is recommended to establish the data formats, quality, actuality (i.e., validity), methods and standards used.

4 Build connections, agreements between interested stakeholders, for data sharing, exchanging and updating, to maintain the functionality of the platform. This might lead to regular periodic meetings for consulting and exchanging ideas around the platform.

5 In future stages (once the Interactive mapping is available), the creation of additional services for further analyses, interoperability with other platforms might be developed and defined by the stakeholders involved.

6 An interactive platform requires management, commitment, interaction and collaboration, therefore technical support and stakeholders' involvement in all aspects of its development and maintenance is essential for it to achieve its purpose.

List of Data Sources Reviewed

Africa Borderlands Centre | UNDP in Africa

West and Central Africa — Transhumance Tracking Tool — Mapping of Herders Stranded Along the Central Transhumance Corridor (January 2021) | DTM (iom.int)

Welcome to Digital Earth Africa | Digital Earth Africa

Home — ICPAC

National Drought Management Authority (ndma.go.ke)

Africa_climate_change_strategy_–_revised_draft_16.10.2020.pdf (uneca.org)

Building Peace One Change at a Time | Life & Peace Institute (life-peace.org)

The ND-GAIN Index | PreventionWeb

World Bank Open Data | Data

https://map.unbiodiversitylab.org/location/UNBL

Community-led nature-based solutions | Forest and Farm Facility | Food and Agriculture Organization of the United Nations (fao.org)

Peace and Security | adelphi

NUPI_Fact_Sheet_Sahel_LR5.pdf (sipri.org)

Climate change and what it means for peacebuilders | Life & Peace Institute (life-peace.org)

Mapping the evidence of nature-based solutions for climate change adaptation: Nature-Based Solutions Initiative (naturebasedsolutionsinitiative.org)

Peace Insight — Peace Direct

Kenya — Subnational Administrative Boundaries - Humanitarian Data Exchange (humdata.org)

Uganda — Subnational Administrative Boundaries - Humanitarian Data Exchange (humdata.org)

Ethiopia shapefiles — Datasets — openAFRICA (africaopendata.org)

io_lulc whole collection (digitalearth.africa)

Living Atlas of the World | ArcGIS

Geofabrik Download Server

EarthExplorer (usgs.gov)

WorldPop

Africa — Admin Level 0 — ICPAC Geoportal

Raleigh, Clionadh, Andrew Linke, Håvard Hegre, and Joakim Karlsen. 2010. «Introducing ACLED- Armed Conflict Location and Event Data.» Journal of Peace Research 47 (5): 651-660. Retrieved from http://www.acleddata.com/data/realtime-data. Accessed through Resource Watch, (date). www.resourcewatch.org.

Open Data Sources — ICPAC

East Africa Hazards Watch | EAHW (icpac.net)

PHOTO: Shared clan governance on water points and troughs in Karamoja