



Climate Change Vulnerability and Adaptive Capacity in Garissa County, Kenya

Table of Contents

List of Acronyms

Executive Summary	1
Introduction	2
Climate Change Vulnerability and Adaptive Capacity: The ALP approach	3
Climate Change in Kenya's Arid and Semi-Arid Lands	3
Pastoral Livelihoods in Kenya's ASALs.....	4
Garissa County: A Snapshot	5
Climate Change in Garissa County	6
Climate Change Vulnerability and Adaptive Capacity of Pastoralists in Garissa County	7
Climate Change Vulnerability and Adaptive Capacity of Garissa's Agro-Pastoralists	11
Reflections and Recommendations	13
Conclusions.....	16
References	17

List of Acronyms

ACCRA	Africa Climate Change Resilience Alliance
ALP	Adaptation Learning Programme
ASALs	Arid and Semi-Arid Lands
CBA	Community-Based Adaptation
CBO	Community-Based Organization
CVCA	Climate Vulnerability & Capacity Analysis
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
GCM	General Circulation Model
IGA	Income Generating Activity
IPCC	Intergovernmental Panel on Climate Change
KARI	Kenya Agricultural Research Institute
KCCWG	Kenya Climate Change Working Group
KMD	Kenya Meteorological Department
LAC	Local Adaptive Capacity
NCCAP	National Climate Change Action Plan (Government of Kenya plan)
ODI	Overseas Development Institute
PSP	Participatory Scenario Planning
RCM	Regional Climate Model
SSA	Sub-Saharan Africa
WUA	Water Users' Association

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Cover page photo; Domestic use of camels within Garissa county includes water transportation ©2006, Georgina Cranston

Executive Summary

In Kenya's arid and semi-arid lands, livelihoods are dominated by pastoralism. Pastoral communities are accustomed to dealing with drought and erratic rainfall and have traditionally utilized systems and practices that minimized the impact of climate-related shocks to their livelihoods. Recently however, the impacts of climate change have combined with other environmental, economic and political factors to create a situation of increasing vulnerability for poor and marginalized households. The situation is particularly serious for women, who face additional social, cultural and political constraints to resource access and adaptive decision-making. In response, some households have transitioned into an agro-pastoral way of life, combining the traditional livestock rearing with crop production and other economic activities. While this shift represents an innovation for these communities, it has also exposed them to new risks and a different set of challenges in securing their livelihoods.

In Garissa County, the impacts of climate change are already being felt by communities, who are seeking ways to adapt to the changes and to build resilient livelihoods. The Adaptation Learning Program for Africa (ALP) is working to increase the capacity of vulnerable households to adapt to climate change and variability. As part of its community-based adaptation process, ALP conducted participatory research and analysis on climate change vulnerability and adaptive capacity with six communities in Garissa County in 2011. Based on this analysis, this document explores the impacts of climate change on livelihoods in pastoral and agro-pastoral households, using the villages of Shant'abaq and Kone to illustrate the realities of climate change in vulnerable communities. It also aims to highlight the existing adaptive capacity within these communities and the issues that constrain people's ability to put this capacity into action.

Key insights and recommendations from the analysis include:

Vulnerability to climate change is influenced by multiple, inter-connected factors.

Increasing exposure to climate shocks and stresses is only one dimension of increasing vulnerability to climate change in Garissa County. The adaptive capacity of pastoralists and agro-pastoralists is dynamic, affected by a range of social, environmental, economic and political variables, many of them beyond the control of the community. Analysis of vulnerability must go beyond exposure and sensitivity to climate impacts, to explore the different dimensions of adaptive capacity and identify barriers that communities face in applying their existing capacity to respond to climate impacts. This leads to identification of adaptation options that reinforce and build upon existing adaptive capacity.

Informed, adaptive and forward-looking decision-making is central to adaptive capacity.

Poor people in Garissa County are in an ongoing process of making decisions to sustain their livelihoods in the face of multiple, evolving challenges. Climate change is among the most serious of these challenges, exacerbating existing

problems, exposing people to new and evolving risks and creating further complexity in decision-making. In order for people to respond to and anticipate changes and to engage in adaptive decision-making, they require information, knowledge and skills that enable them to actively address climate risks to their livelihoods. Adaptation efforts must aim to facilitate access to information and the development of the skills and knowledge needed for adaptation, while also working with institutions and policies to ensure an enabling environment for local adaptation efforts.

Adaptive capacity is shaped by gender.

Within communities and households, women and men have differing levels of adaptive capacity. Somali society places limitations on women's voice, movement and participation in public and household decision-making, which in turn creates constraints on their adaptive capacity. This limits the ability of families and communities to realize the potential contribution of women's specific knowledge and skills to adaptation efforts. Analysis of vulnerability and adaptive capacity must uncover these differences and build understanding of the specific roles, responsibilities and challenges faced by women and men in securing their livelihoods and adapting to climate change.

Climate change is a driver of changes in gender roles and relations.

As the impacts of climate change become more apparent and households are increasingly required to shift from their traditional livelihood strategies and practices, there is potential for changes in gender roles and relations. These changes have both positive and negative implications, with the potential for increased empowerment of women, but also the possibility of repercussions for women as they move beyond traditional roles and responsibilities. Adaptation efforts must take these ongoing changes in gender relations into account and facilitate dialogue and negotiation within communities to enable positive change for women and avoid potential backlash.

Diversification of livelihoods is an important strategy for building the resilience of the most vulnerable women and men to climate change.

Having multiple options for securing food and income provides people with alternatives when one strategy fails. However, in the absence of the necessary information and support, the effectiveness of diversification as a strategy for building livelihood resilience may be limited. Engaging in new activities requires new skills and knowledge. New activities may also involve new risks and create additional pressures on ecosystem services. These must be understood in order to ensure the right mix of strategies in the household livelihood portfolio. CBA actors must support communities to make decisions around diversification in an informed and forward-looking manner, taking into account existing and future stress on resources, equity in access to resources and opportunities and changing climate risks over time.

Resilience may look different from wealth.

In Garissa County, wealth is determined based on the number of livestock owned. Households that are perceived to be rich are those that own the largest numbers of livestock. These households are also assumed to be more resilient, however they may be highly sensitive to climate-related shocks and stresses due to their reliance on livestock for income and food. Agro-pastoral households, with a mix of livestock rearing, crop production and other income generating activities, seem to be more resilient as they have more options available to them. In order to facilitate risk management and adaptive decision-making, there may be a need to overcome traditional perceptions of wealth and to build understanding of the value and locally-specific characteristics of resilience.

Access to climate information is critical for adaptive management of livelihoods.

In order for the communities in Garissa County to effectively adapt to climate change, their wealth of indigenous knowledge must be complemented with scientific and technical information that enables adaptive decision-making. The ALP analysis demonstrated a need to create demand for this information and to help community members to understand the value and necessity of using scientific information for planning, whether short-term seasonal planning or longer-term livelihood decision-making. Facilitating access to climate information on an ongoing basis is fundamental to building adaptive capacity.

Appropriate governance is essential for sustainable management of resources and risk management at community level.

Pastoral communities traditionally had systems and practices that enabled them to manage climate variability and recurrent shocks in the form of droughts. Sadly, with changing social dynamics and recurrent crises, as well as new approaches to policy, governance and development in the region, these systems have been eroded and there is increasing focus on individual household needs as well as more reliance on external support. Adaptation efforts in pastoral areas should aim to revive and strengthen these traditional systems, linking them to modern governance systems and formal institutions and enabling them to operate in a way that is equitable and effective. These recommendations are applicable to CBA initiatives in Garissa County and beyond.

Introduction

Communities in Sub-Saharan Africa are already experiencing the impacts of climate change in a very real way. These impacts, including rising temperatures, more erratic rainfall and increasing frequency of droughts and floods, have critical consequences for livelihoods, particularly for the poorest households in rural areas. These households are heavily reliant on the land for their food and income security, making them highly sensitive to climate-related shocks and stresses. Poverty, social and political marginalization and limitations on access to information inhibit the capacity of poor women and men to adapt to their changing context and environment. Despite this, vulnerable people across the region are taking action to manage the risks that climate change poses to their



Taking care of livestock in Garissa, ©2011 John Van Mossel

livelihoods, and are demanding right action by governments and other actors to support them in these effort. The goal of the Adaptation Learning Program (ALP) is to increase the capacity of vulnerable households in sub-Saharan Africa to adapt to climate change and variability. The programme works with communities and other stakeholders, both civil society and government, to ensure that Community-Based Adaptation (CBA) approaches and actions for vulnerable communities are incorporated into development policies and programmes in Ghana, Kenya, Mozambique and Niger. ALP is designed to achieve large-scale impact, both within the four target countries and more widely across Sub-Saharan Africa. This will be achieved by demonstrating innovative models for CBA in all four countries, disseminating the tools and methodologies in practical ways so that they can be easily applied by other institutions and by influencing national and international policy frameworks and financing mechanisms for adaptation to ensure that they enable CBA.

In Kenya's arid and semi-arid lands, communities are accustomed to dealing with drought and erratic rainfall. Recently however, climate change has combined with other environmental, economic and political factors to create a situation of increasing vulnerability for poor and marginalized households. The situation is particularly serious for women, who face additional social, cultural and political constraints to resource access and adaptive decision-making. Based on participatory research and analysis conducted by ALP, this document explores the impacts of climate change on livelihoods in pastoral and agro-pastoral households in Garissa County, using the villages of Shant'abaq and Kone to illustrate the realities of climate change in vulnerable communities. It also aims to highlight the existing adaptive capacity within these communities and the issues that constrain people's ability to put this capacity into action. Recommendations are provided for enabling and empowering both women and men to take action on adaptation.

Climate Change Vulnerability and Adaptive Capacity:

The ALP approach

ALP's CBA approach is grounded in analysis of climate change vulnerability and adaptive capacity. Vulnerability to climate change has been defined by the Inter-governmental Panel on Climate Change (IPCC) as 'the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.' ALP's analysis aims to facilitate better understanding of these different dimensions of vulnerability by communities and other stakeholders, enabling local actors to develop strategies and plans for adaptation that anticipate and respond to climate change while also addressing the underlying causes of vulnerability. Recognizing that community members are already employing critical knowledge and innovative strategies to manage climate risks to their livelihoods, ALP places particular emphasis on the adaptive capacity dimension. From the ALP point of view, adaptive capacity refers to communities' ability to demand, access and use climate information (as well as other types of information) to identify, assess and choose adaptation options; to innovate in response to evolving challenges and opportunities; and to make forward-looking and flexible decisions that enable them to adapt to a changing climate. Adaptive capacity is grounded in the asset base available to communities for their livelihood and adaptation actions. It is strongly influenced by governance and entitlements that enable or constrain appropriate action to respond to climate change.

ALP is particularly focused on understanding and responding to gender differences in adaptive capacity. Differences in roles, access to information, control over resources and power in household decision-making mean that women and men have different abilities and opportunities to take action on adaptation to protect and enhance their livelihoods. Consequently, gender is a critical factor in understanding vulnerability to climate change. ALP's analysis therefore aims to expose gender-related issues that influence adaptive capacity, creating a foundation for CBA planning that promotes gender equality and women's empowerment.

The Adaptation Learning Programme (ALP) is a five-year programme that began in 2010. The programme is implemented by CARE International in four countries in sub-Saharan Africa: Kenya, Ghana, Mozambique, and Niger. ALP receives financial support from the UK Government (UK Aid), the Danish International Development Agency (DANIDA), the Government of Finland and the Austrian Development Authority.

In Kenya, the ALP research, analysis and community-based adaptation initiatives are taking place in six communities in Garissa County, in the drylands of the north-eastern part of the country. Saka, Balich, Kone and Nanighi are located along the Tana River and are characterized as agro-pastoral communities, while Shant'abaq, and Fafi Plains are pastoral communities located further from the river. The program is also engaging with county-level government stakeholders and civil society organizations active in the area. As part of its CBA process in the targeted communities, ALP undertook participatory research and analysis of climate change vulnerability and adaptive capacity in the target communities in 2011. The research yielded useful insights into the factors and changes that influence vulnerability and adaptive capacity of different communities and groups in Garissa County. This report reflects on these findings, linking them to the broader knowledge base on pastoral livelihoods and climate change and providing recommendations for policy and practice for CBA in Garissa and beyond.

Climate Change in Kenya's Arid and Semi-Arid Lands

Kenya's climate shows significant variations across the country's area. Hotter temperatures are experienced in the lowlands and the coastal zone, with cooler temperatures in the highlands. The average temperature in the coastal region is 29°C, compared with 15°C in the central highlands region. Temperatures are fairly steady throughout the year, dropping by about 2 degrees between June and September. Since 1960, the mean annual temperature in Kenya has shown an increasing trend at approximately 0.21°C per decade, for a total increase to date of approximately 1°C. There is evidence of increasing trends in the frequency of hot days and nights along with decreases in the number of cold days and nights. Temperature increases have occurred most rapidly in March, April and May, with slower changes in the June to September period. Rainfall patterns also vary significantly across the country. Along the south-eastern border with the Indian Ocean is a narrow coastal band with a relatively wet climate.

To the west are Lake Victoria, the East Africa Rift valley, and the highlands, which are the wettest and most fertile part of the country. In between and stretching to the north is an expanse of low-lying, arid and semi-arid lands (ASALs), which comprises approximately 80% of Kenya's total land area. There is considerable variability in the timing, duration and intensity of rainfall, from location to location, from season to season and from year to year. The arid parts of the ASALs receive between 125 and 500 mm of rainfall annually, while the semi-arid regions receive between 400 and 1250 mm. This is in contrast with the highlands, which receive up to 2000 mm a year. More than 70% of the total annual rainfall occurs during the season of long rains in March to May, with another 20% falling in the short rains in October to December. Inter-annual rainfall variability is influenced by the El Niño Southern Oscillation (ENSO), with El Niño episodes bringing above average rainfall and La Niña bringing drier conditions. The high variability in rainfall in Kenya means that drought and flood events occur relatively frequently. Records show that moderate droughts have typically occurred every 3-4 years, with a major drought occurring every ten years on average. Since 2000, prolonged droughts have become more common. Floods also occur on a regular basis.

Drought and flood events have a significant impact on Kenya's development progress, causing damage to infrastructure and other assets, economic losses, food insecurity and, in the worst cases, famine. It has been estimated that these events cost about 2.4% of Kenya's GDP each year. Future climate projections for Kenya based on General Circulation Models (GCMs) suggest that the mean temperature will continue to rise, with an estimated increase of 1.0 to 2.8°C by the 2060s and up to 4.5°C by the 2090s. Further increases in the frequency of hot days and nights, and decreases in cold days and nights are also predicted. For rainfall, the models project an increase in mean annual rainfall, up to +48% by the 2090s. The increases in total rainfall are expected to be largest in the October to December period, with the largest proportional increases in January and February. The proportion of rainfall coming in heavy events is expected to increase by 1-13% by the 2090s. The 1-day and 5-day rainfall maxima are also projected to increase, by up to 25 mm and 3-32 mm, respectively. It is noted, however, that the influence of the ENSO creates uncertainty in climate projections in the East Africa region. The increasing variability in rainfall is expected to increase the frequency and spread of droughts and flash floods. Given the existing climate variability across Kenya and the localized nature of rainfall patterns in particular, predicting how national-level projections will manifest in different parts of the country is critical for decision-making, yet quite difficult to achieve.

As part of the process of developing the National Climate Change Action Plan (NCCAP), the Government of Kenya has undertaken some initial efforts to downscale climate change projections using Regional Climate Models. This work is in the early stages, however some conclusions have been drawn that are relevant to the ALP research. The downscaled projections suggest that the arid and semi-arid region in the north east of the country is projected to experience less warming than the rest of the country, with a negligible increase in March to May temperatures in this region compared to the baseline period. Further, the northeast of the country is projected to receive less rainfall on an annual basis. This analysis contrasts with the projections based on GCMs, however it does line up with the trends in rainfall observed in the region since 1960. The Government of Kenya has concluded that the greater part of the country comprising the arid and semi-arid regions is expected to become significantly drier.

Pastoral Livelihoods in Kenya's ASALs

Livelihoods in Kenya's ASALs are dominated by pastoralism. Pastoralists are mobile livestock herders who gain more than 50% of their incomes from livestock and livestock products.

Kenya's herders raise a range of livestock that includes cattle, goats, sheep and camels. They practice differing levels of mobility, from sedentary herds that move within a locality, to transhumant herders who move between particular locations on a regular basis, to nomadic herders who have high mobility without regular patterns. With limited surface water and localized groundwater resources across the ASALs, pastoralists are heavily dependent on rainfall and rainwater storage for their domestic and livestock water needs. Further, livestock nutrition and productivity are reliant on the availability of pasture, which is significantly influenced by rainfall. This means that they are highly sensitive to erratic and uncertain rainfall and to drought.

However, pastoral livelihood systems are inherently adapted to the harsh and unpredictable climatic conditions of the ASALs. Decisions about herd size and composition are made based on the environmental and climatic conditions within the range area. Mobility is an essential adaptive strategy, enabling livestock herders to access water, pasture and other critical resources and services by moving with their animals to areas where these resources are more abundant. Pastoral communities have well-developed coping strategies that they employ to manage shocks, including herd splitting, building up herd sizes as a buffer against shocks and loans or redistribution of livestock and other assets to family or community members. Traditional institutions play an important role in facilitating sustainable management of land and water resources, mitigating conflicts and promoting mutual support and collective action during times of crisis.

Unfortunately, pastoral communities in Kenya's ASALs face a number of challenges that constrain their ability to employ these systems effectively. Increasingly erratic rainfall and more frequent droughts have undermined the efficacy of traditional strategies to predict and manage these shocks and stresses. Population growth and allocation of land for other purposes such as tourism, urban development and refugee camps has led to increased competition over land, at times leading to conflict between different communities and between humans and wildlife. Inadequate maintenance of infrastructure such as roads and water points along the migration routes makes movement much more difficult for the herders and their animals. This is exacerbated by poor planning by both government and development actors, including haphazard creation of water points, settlements and relief food distribution centers. Some government policies also favour sedentarization, including policies around basic education, which has an impact on mobility and reduces the labour available for herding livestock. The insecurity in Somalia has also limited cross-border movement and increased insecurity and conflicts. Further, unsustainable management of land, water and



Garissa landscape, ©2011 Tamara Plush/CARE

other natural resources has led to rapid deterioration in ecosystem health and reduced quality and availability of critical resources for livelihoods. These issues are exacerbated by climate change, which acts as a driver of environmental degradation, for example, through increasing soil erosion due to increasingly variable rainfall. Climate change may also be a driver of poor resource management, as people resort to increasingly unsustainable coping strategies to manage recurrent shocks to their livelihoods.

In the face of these challenges, an increasing number of households are transitioning out of nomadic pastoralism into other livelihood strategies, notably crop production. Often the household will continue to keep some livestock, but the herd is managed in a different way. As described later in this report, the shift to agriculture may have some positive results in terms of providing new sources of food and income, but it may expose people to new risks and it may have negative consequences in terms of land use management. Other vulnerable households are relying increasingly on non-land-based sources of income such as casual wage labour, salaried jobs and remittances. These strategies are potentially less sensitive to climate impacts, however they often involve migration to urban centers, either temporarily or permanently. The impacts of the decision to migrate on the workers and on the families left behind are not yet well understood. Diversification of livelihoods is an important strategy for building resilience to climate change, but it must be done in an informed and empowered way in order to be effective.

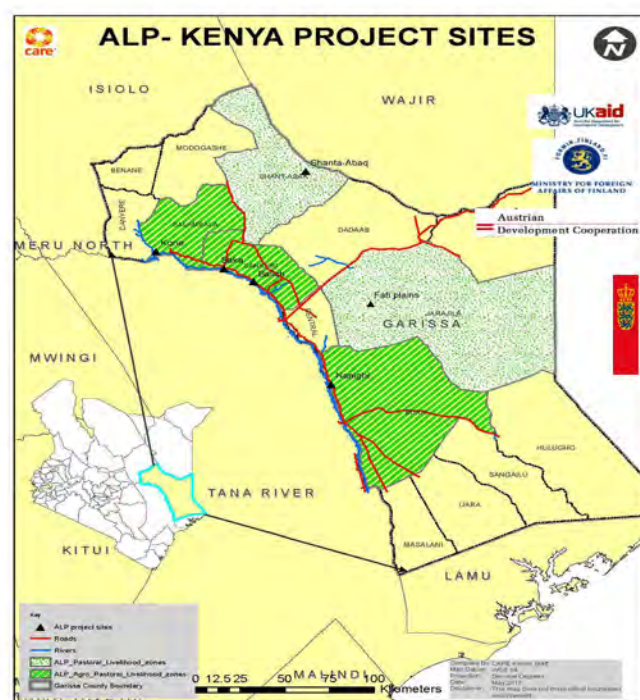
The situation of Kenya's pastoralists clearly demonstrates how the impacts of climate change interact with political, economic and social dynamics, not to mention deteriorating ecosystem health. The combined effects of these changes places pastoralists in a state of vulnerability and uncertainty, with more frequent shocks and fewer resources with which to manage them. Adaptation efforts must therefore address immediate risks to pastoral livelihoods, while also putting in place systems, structures and processes that enable resilience in the longer-term. To be effective, these efforts must be locally-driven, addressing the specific context and concerns of particular communities and of different groups within these communities. Participatory analysis of vulnerability and adaptive capacity is a critical step in ensuring adaptation is relevant to the local context, needs and priorities and in informing local decision making. The following sections present findings, insights and recommendations based on the analysis conducted by ALP in Garissa County.

Garissa County: A Snapshot

Garissa County is one of three counties in Kenya's North Eastern Province. Garissa covers the southern part of the North Eastern Province, bordering Somalia to the east and Lamu County to the south. The Tana River runs along the western border with Tana River County. Garissa is low-lying and flat, with very little surface water other than the Tana River and a few seasonal rivers that only flow during the rainy seasons. The northern and central parts of the county also lack ground water, making them highly inhospitable during dry periods. The county has a low population density (14 people per km² relative to the national figure of 66), with the inhabitants concentrated in small pockets around water points and centers where markets, hospitals, schools and other services are found.

Garissa is the major urban centre of the county and is a destination for migrants who are seeking employment, including people driven off the land by drought and other shocks as well as Somali immigrants. Roads in the area are of low quality and are usually impassable during the rainy seasons. The communities in this area are predominantly ethnic Somalis, with small minority communities, mainly the Malakote and Munyoyaya. The region is defined by Somali culture, characterized by strong Islamic and oral traditions and livestock as central to the way of life. The minority communities share the Islamic religion, however they have traditionally incorporated farming to a greater extent than the Somalis. Many households are polygamous, consisting of one male head of household with several wives. As such, household size tends to be larger than the national average. According to local government data, poverty levels are high in Garissa County, with estimates of households classified as poor ranging from 60-68% in the districts where the research was conducted. This was confirmed by the ALP research, which found that 63% of households were characterized as poor or very poor. Most households face food shortages between May and July, and very few have cash savings. Education levels are low, although there is some evidence that the younger generation is better educated than their parents. Women generally have lower levels of education compared to men.

There are two major livelihood zones in Garissa County: the agro-pastoral zone in the western part of the county, which is a strip of land 1-2 km in width along the Tana River, and the pastoral zone, which covers the rest of the county. Across both zones, livestock production is the most important livelihood strategy, sometimes combined with crop production in the agro-pastoral zone. Other sources of income include unskilled labour, trade and commerce, salaried jobs, remittances and charcoal production. Communities rely on communally-owned land for livestock grazing, farming and other livelihood resources including firewood, non-timber forest products, charcoal, honey and medicinal products.



ALP Kenya project sites

Given the reliance on livestock, the number of animals owned is an important indicator of wealth. The table below shows the average number of livestock owned by the sample households within the different wealth ranks. Among the households identified as very poor, 18% own no livestock.

Table 1: Average Number of Livestock per Species across Wealth Ranks

Wealth Rank	Average Number of Livestock per household					
	Cattle	Donkey	Goat	Sheep	Camel	Poultry
Very Poor	2	1	18	7	1	5
Poor	5	1	22	7	3	3
Fairly Rich	7	1	29	9	3	3

This important asset is also highly sensitive to climate-related shocks and stresses. In 2010, most of the surveyed households lost some of their livestock. For cattle, donkeys and poultry, the average number of animals lost was greater than the average number currently owned, suggesting that some households lost more than half of their livestock in a single year. Some of these losses were attributed to disease, however the drought that occurred that year was also a significant factor, leading to starvation of animals due to lack of fodder. Relative losses were lowest for goats and sheep, reinforcing the perception that these species are more resilient.

A number of different types of community-based organizations (CBOs) exist throughout Garissa County. All of the ALP communities have Water User Associations, which are responsible for managing water resources, and Peace Committees, which are instrumental in conflict resolution. Other organizations found in the communities include women's groups, youth groups, self-help groups, community support systems, religious groups and relief committees. While these are perceived to be important social resources, participation of surveyed households in these institutions is relatively low, with only 35% of the interviewed households having at least one member participating in a community group. While many of these organizations require women's participation and may even have women in leadership roles, in reality their decision-making power is perceived to be minimal.

Garissa County hosts the Dadaab Refugee Camp, which is home to over 400 000 refugees fleeing the conflict in Somalia. The camp has had a significant impact on the environmental and social context in Garissa. The influx of refugees has significantly increased pressure on land and water resources, leading to accelerated ecosystem degradation, while the movement of people and arms has increased security concerns in the area within and around the camp and in Garissa town.

Majority of people in the ALP target communities believe that the climate is changing in their area.

Climate Change in Garissa County

The North Eastern region is characterized as a semi-arid zone, experiencing a hot, dry climate and high rainfall variability, with dry periods interspersed with periodic short, heavy downpours. The average annual rainfall across Garissa County is approximately 435 mm, but the rains are described as "very unreliable". Generally, the short rains (September-December) are more reliable than the long rains (March-May). The area experiences high temperatures, with the average temperature ranging from 20 to 38°C. The hottest months are September, January and March, while the period from April to August is relatively cool. The overwhelming majority of people in the ALP target communities (97% of survey respondents) believe that the climate is changing in their area.

The table below shows the ways in which the believe the climate is changing.

Climate Change	% of Survey respondents
It is becoming warmer	37
It is becoming colder	13
Temperatures are more unpredictable	11
It is becoming dryer	63
It is becoming wetter	2
Rains are more unpredictable	29
Longer dry periods	8
Shorter rainy seasons	21
More frequent drought	33
Strong winds are more common	14
Natural disasters are more common	20

Rainfall data from the meteorological station in Garissa provides some insights into the rainfall patterns in the area. According to the Kenya Meteorological Department, the normal range of variability is +/- 25% from the normal, determined based on data from the 1961-1990 period. Between 1990 and 2010, the March-May rains were more than 50% lower than normal in ten of the years, compared to only four years in the 1970-1989 period. This supports the communities' assertion that the climate is becoming dryer. Heavy rainfall (more than 50% more than normal) was experienced every 3-5 years over the period from 1990-2010, showing a trend of high rainfall variability and frequent extremes.

The communities also note changes in other environmental indicators, notably the loss of particular grass varieties and reduced availability of grazing land. Almost all of the survey respondents (94%) stated that they are worried or extremely worried about climate change. Despite this, only 37% stated that they had used climate information in planning their livelihood activities and only 28% indicated that they had changed their activities or done anything new because of climate change. It is clear that communities in Garissa County are already exposed to climate change, notably in terms of its impacts on rainfall patterns and the frequency of drought events. While some studies indicate that changes in precipitation in Garissa County will be less than in other parts of the country, it is expected that uncertainty, variability and extremes will continue to characterize the climate in this area. If current drying trends continue, exposure to droughts will increase. The impact this has on women and men in pastoral and agro-pastoral households will be determined by the sensitivity of their livelihoods and on their adaptive capacity. These issues are discussed in the following sections.

Climate Change Vulnerability and Adaptive Capacity of Pastoralists in Garissa County

The pastoralists of Garissa County live and move in arid areas in the east and north of the county, away from the Tana River. The most important livestock species is cattle, but they also raise goats, sheep and camels. Nomadic pastoralism is the predominant livestock production system in the area. Livestock production is the primary source of income for the majority of households (80% of surveyed households in Fafi and 60% in Shant'abaq). After livestock, the next most important source of income is unskilled casual labour, representing the main income source for 13% of households. Some crops are also produced, but this is limited to the dry riverbeds and is generally only for household consumption. Among the pastoral households surveyed, no income was derived from crop production. Over 50% of the households are identified as poor or very poor.

There are clear gender roles in livestock rearing in pastoral communities. Herding the livestock is typically seen as the responsibility of men, who care for the livestock, move with them to water sources, slaughter the animals and take them to market. Older women may take responsibility for smaller animals and poultry, but this is generally limited to activities within the homestead. Younger women may be tasked with collecting fodder and occasionally with taking small animals to water points. The women of the household are usually in charge of milking cattle, sheep and goats (but not camels). They may also take livestock products such as milk, meat and butter to market. In female-headed households women are involved in

all aspects of livestock rearing. Overall, it emerged that women contribute much more to livestock production than their male counterparts are willing to acknowledge.

Given their dependence on livestock, the livelihoods of poor pastoral households are highly sensitive to the impacts of climate change, particularly erratic rainfall patterns and increasing frequency of drought. In the pastoral communities of Shant'abaq and Fafi, almost 90% of households surveyed had been affected by a natural disaster. Of these, 93% cited drought as the disaster that had affected them, and the overwhelming majority cited loss of livestock as the main impact on their lives. Given the importance of livestock for pastoral households, it is not surprising that the impacts of drought are framed in terms of the consequences for livestock. In addition to loss of livestock, focus group participants mentioned reduced livestock productivity, degradation of pasture, lack of water and increased incidence of livestock disease. These impacts in turn are seen to lead to reduced income, increased debt, unemployment, high food prices and undernourishment of children.

Pastoral households are adjusted to the reality of drought and as such have well-developed coping mechanisms that they employ to manage these events. In line with the division of labour along gender lines, women and men identify different strategies for dealing with drought.



Honey sales in Garissa, ©2013 Nicola Ward/CARE-ALP

The men of the household, generally seen as the primary income earners, engage in off-take of livestock, migration to find pasture, petty trade and migration for wage labour. Possibly linked to their role in fodder collection, female participants noted the importance of supplementary feeding for livestock during drought periods. Women also highlighted the need to engage in income generating activities to supplement income in times of crisis.

Activities currently practiced include vegetable trade, sale of milk and other dairy products and charcoal production and sale. Remittances from family members who have migrated for paid work also play an important role in keeping the family going during difficult times.

Traditionally, pastoral communities had support systems that provided critical safety nets in times of crisis. The Zakat system, based in Islamic law, is a form of social assistance, wherein better-off households provide contributions to support poor households in the community. Friends and relatives may also provide gifts of cash or food that help poorer families in times of scarcity. In the past, a community compensation system was in place to assist households who had lost their livestock to drought, however as these events have become more frequent and intense, this practice has fallen off as there are less livestock available across communities. Ayuttas, or 'merry-go-rounds', are savings and loans groups based on monthly contributions from members, primarily women. These systems are also affected by drought, which inhibits members' ability to make their monthly contributions.

Adaptation efforts must aim to facilitate access to information and the development of the skills and knowledge needed for adaptation, while also working with institutions and policies to ensure an enabling environment for local adaptation efforts.

The issue of mobility is a critical one for pastoral households. Migration with herds to areas with pasture and water is an important strategy for dealing with erratic rainfall and drought, and represents an efficient approach for managing scarce resources in arid areas. In the traditional Somali grazing system, the rangeland was divided into areas for wet season grazing, dry season grazing and areas reserved for grazing in the event of drought. However, this system

has been abandoned due to political pressures related to the establishment of governance systems that do not recognize and empower elders and traditional institutions in managing rangelands. As a result, the efficacy of mobility as a strategy to manage changing availability of resources has been eroded, leading to increased reliance on other strategies such as off-take of livestock and wage labour.

Women in pastoral communities face particular constraints in managing these changes. The strong cultural, religious, and traditional beliefs and practices of the community in Garissa have generally marginalized women. In addition to being considered the head of the household and consequently the main decision-maker, men generally dominate the control of resources important for household livelihoods, including livestock, land and water resources. They also control the income and other benefits that accrue from these productive assets, however these benefits are seen to support the entire family, thereby placing high value on the male contribution to the household. Consequently, women tend to have less power in decision-making related to livelihoods and risk management, which limits their individual adaptive capacity as well as the resilience of the household and the community more broadly.

The inherent adaptive capacity of Garissa's pastoralists, expressed through traditional systems of mobility, rangeland management and social assistance, has been undermined by a combination of environmental, economic and political factors, which has increased their vulnerability to a changing climate. The social and cultural dynamics within communities and households place restrictions on women's adaptive capacity, further increasing vulnerability at household and community level. For these communities to prosper in the face of climate change, systems and services must be put in place that enable them to utilize and further develop their adaptive capacity, reduce risks to livelihoods and manage their land, water and livestock sustainably. These systems and services must also empower pastoral women to realize their potential as decision-makers and drivers of positive change within their households and communities.



A herdsman watering his animals using water delivered by a water tanker during a drought period in Garissa County,
©2011 Eunice Musyoka/CARE-ALP

Shant'abaq

The community of Shant'abaq is inhabited by just over 10 000 people in 1228 households. The majority of people in the community are ethnic Somalis and of the Muslim religion. Almost 60% of sampled households in Shant'abaq identify as poor or very poor by the local characterization of wealth, determined primarily based on number and type of livestock owned. Almost 90% rely on pastoralism for their livelihoods, however unskilled labour and salaried work also represent increasingly important sources of income for some households in the community. Community members in Shant'abaq are keenly aware of the impacts of climate change on their livestock, and consequently on household livelihoods. Almost all of the survey respondents feel that climate change is affecting their livestock production, causing increased difficulty in finding water for their animals, reduced availability of pasture, increased animal diseases and lower productivity of livestock. A significant number of community members also link climate change to the collapse in livestock markets. Camels are perceived to be the most resilient species to climate change impacts, while cows are believed to be the most sensitive.

Community members are highly aware that climate change is occurring. The most common impacts cited include warmer temperatures and drier conditions.

The landscape surrounding Shant'abaq is flat and featureless, with grasses and shrubs. It is located along the Merti Aquifer, which provides a source of water during the dry season when seasonal pools and rivers are not available. This aquifer also provides a water source for the Dadaab refugee camp, located not far from Shant'abaq. The bulk of land within the community is communally-owned.

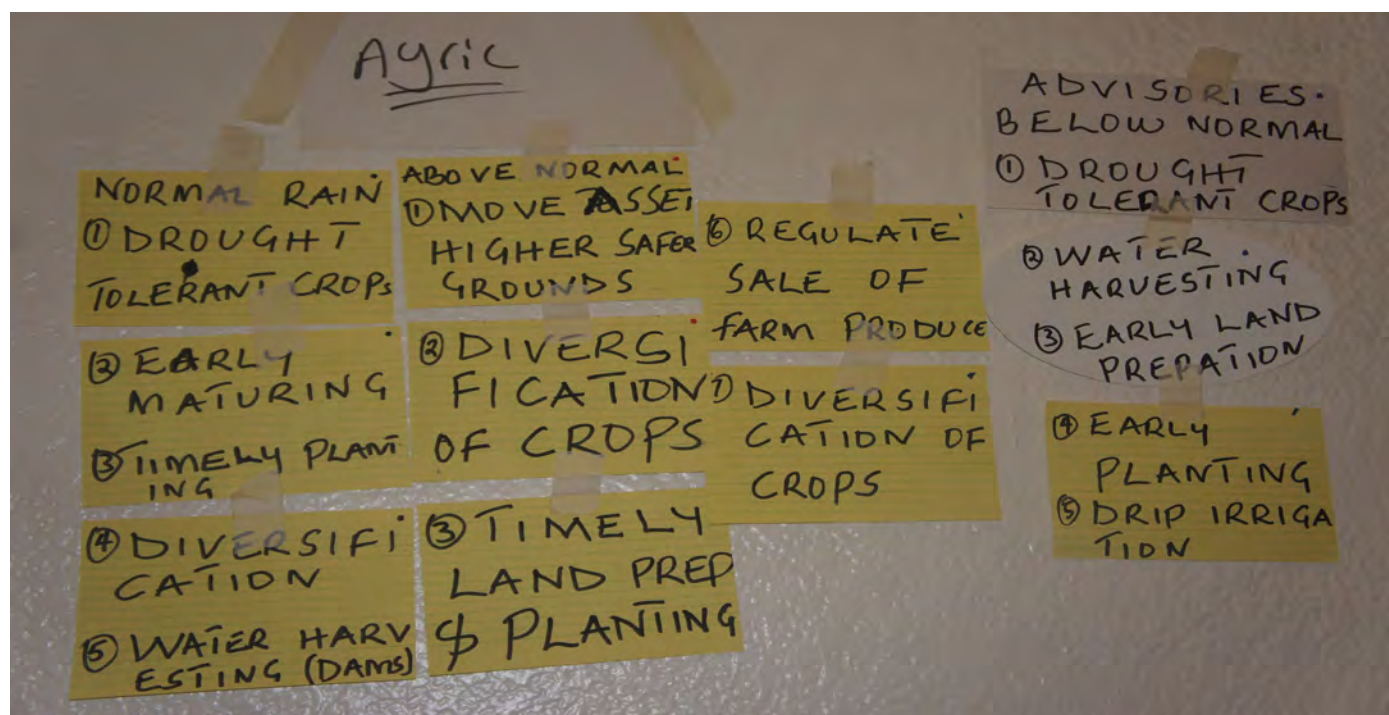
Important services available within the community include a school and a dispensary. CBOs active in the community include a Water Users' Association, a youth group, a peace committee and a land and environmental management group. The Elders Council, comprised almost exclusively of men, leads decision-making and settles conflicts within the community.

Shant'abaq is located 150 km from the town of Garissa, which is the major market hub for the area. Garissa has a regional livestock market, which is used by the people of Shant'abaq for livestock trade. It also has other markets that serve as a source of cereals and other food products, which are purchased by local traders and then sold to the community in local markets. Access to the market is fairly good in the dry season, but in the wet season access is impeded by rain damage to the roads.

Livestock is considered to be the most important livelihood asset by community members. Goats and cows are the most commonly owned species, owned by 90% and 60% of surveyed households, respectively. Donkeys and sheep are also relatively common. Only a handful of the households own camels. In terms of numbers, goats are the most popular species at an average of 25 animals per household, followed by sheep at 10 animals per household. Households that own cows, donkeys and camels tend to own smaller numbers of animals. Some households have small businesses, which are also considered to be an important financial resource.

A large majority of surveyed households have debt, and the majority of these debts are held by traders.

Almost all of the households who have debts used the credit to buy food, clothes or other household items. A handful used it for education. Less than 15% of households have cash savings. Over 60% of households had sold off assets, usually livestock, in the previous three months to buy food or pay for daily expenses.



Advisories for agriculture sector during March April May 2013 Participatory Scenario Planning, ©2013 Joseph Ndiritu/CARE-

Because land in Shant'abaq is communally-owned, decisions on land use are made collectively, led by the Elders Council. Women rarely have inputs into these decisions, although some men may consult unofficially with their wives. Some CBOs, such as the Water Users' Association, have representation of women in their membership, however decision-making is largely driven by the male members. Consequently, men are making decisions about resources such as water, which are critically important for women's role in household livelihoods. Control of livestock, the most important household asset, rests primarily with men, who determine the number of animals to keep, search for water and pasture, choose when to cull and sell and decide how income from livestock will be spent.

In the past, the people of Shant'abaq employed a well-established system of livestock production and sustainable land management that worked in the harsh environment where they live. This system applied vital knowledge of animal health and nutrition, of the land and rangeland management practices and of environmental indicators for weather patterns and other factors driving decision-making. This knowledge is critical for climate change adaptation, however it has been undermined by decades of recurrent shocks, as well as poorly designed development interventions and emergency response systems that have devalued local knowledge and longer-term aspirations.

Community members are highly aware that climate change is occurring. The most common impacts cited include warmer temperatures and drier conditions. All but one of the survey respondents indicated that they are worried or extremely worried about climate change. Livestock production is perceived to be the most vulnerable livelihood activity, subject to increasing animal disease, more difficulty finding water and decreasing availability of pasture.

More than half of the respondents have received information on climate change, with radio or TV programs as the most common source of information. Some also indicated they'd received climate change information from relatives or friends or at the mosque.

In 2011, very few community members in Shant'abaq stated that they had felt it necessary to use climate information for planning or that they are doing anything differently to respond to climate change.

Only 35% of survey respondents indicated that they are planning for the future. The reliance on credit and sale of assets to meet basic needs, as opposed to investment purposes, highlights how close to the edge the poorer people of Shant'abaq are existing. This limits their ability to innovate in their livelihoods or to plan for the future as they are generally focused on immediate needs and priorities. However, when asked what they would like to do to manage the impacts of climate change, the potential for innovation emerges. Community members identified a number of ideas to manage the impacts of droughts, including diversification of livelihoods to non-land based income sources, replanting pasture grasses, water harvesting and storage systems and irrigated farming. They also called for a return to traditional rangeland management practices, with wet and dry season grazing zones. Focus Group participants emphasized the role of savings and credit in enabling these activities. From an

adaptation point of view, access to climate information is also critical to enable forward-looking planning and adaptive decision-making.

ALP is working with community members in Shant'abaq to respond to the issues identified through the analysis. Acting on concerns about reduced availability of pasture and loss of particular grass species due to recurrent drought, ALP is collaborating with the Ministry of Livestock to build capacity of community members to engage in pasture development. This includes training and technical assistance on practical aspects of pasture re-seeding, as well as provision of seeds for pasture regeneration.

To improve access to climate information for decision-making, the program has facilitated seasonal Participatory Scenario Planning (PSP) processes, designed to enable community members and other local stakeholders to use seasonal climate forecasts and information on climatic uncertainty for decision-making. The PSP process brings together meteorologists, community members, local government departments and local non-governmental organizations (NGOs) for collective sharing and interpretation of climate forecasts. Participants develop scenarios based on consideration of climatic probabilities, and discuss the potential implications of the different scenarios for livelihoods. This enables agreement on plans that take into account the risk and uncertainty inherent in forecasts to manage risk and take advantage of opportunities. The process leads to advisories that outline locally-relevant and actionable information, with responsibilities agreed among local actors. These advisories are communicated widely to community members through a number of different channels, including radio, religious leaders and government departments. The advisories have generated increased interest in and demand for seasonal climate forecasts by community members in Shant'abaq. The PSP process has also led to improved confidence in making simple but important decisions about livelihoods, for example to harvest and store fodder for animal feeding during dry periods.



Savings & loan group, ©2011 Tamala Plush/CARE

Climate Change Vulnerability and Adaptive Capacity of Garissa's Agro-Pastoralists

In the past twenty-five years, settlements have been established along the banks of the Tana River, in what is termed the agro-pastoral zone of Garissa County. These communities have been established by families who have transitioned out of nomadic pastoralism into a more sedentary way of life. In many cases, the decision to settle was triggered by loss of livestock caused by recurrent droughts in the region. The households in these communities practice an integrated livelihood system of livestock herding combined with crop agriculture, both rain-fed and irrigated. The crops grown include maize, bananas, tomatoes, cowpeas, green grams, mangoes, capsicum and watermelons. Most of the farms in the area are communally owned, with plots allocated to individuals within the farming group. The farms are primarily worked by hand, as the communities generally do not have access to mechanized equipment or beasts of burden. Because Somali culture prohibits women from engaging in hard labour, women's role tends to be limited to planting and protecting the farms from wild animals.

Crop production is the primary income source for 22% of agro-pastoral households participating in the survey, however there is significant variation in reliance on crop production across the four communities, from only 2% of households in Nanighi to 64% in Kone. Livestock production still represents the main source of income for 39% of surveyed households across the four communities. Unskilled casual labour and trade are also important livelihood strategies, representing the primary income source for 18% and 10% of households, respectively. Poverty rates are somewhat higher in the agro-pastoral communities, with almost 15% of surveyed households identifying as very poor and 53% as poor. However, this is likely due to the fact that the poverty rankings were established based on ownership of livestock, which is generally speaking lower in the agro-pastoral communities than in the pastoral ones. The average number of cows in these communities is less than three per household, compared to seven per household in the pastoral communities. Livestock herding patterns in this zone vary significantly with livestock type, season and the quality of rains from year to year. Distances travelled by herders are generally less than those travelled by herders in the pastoral communities, however the distances may increase significantly when the rains fail.



Workers at a farm in Garissa County - tending a banana crop,
©CARE 2013 Joseph Ndiritu/CARE-ALP

The Tana River is a critical resource, which enables a range of different activities and is highly valued by community members. It is an important source of water for the communities, providing water for human consumption, livestock and irrigation. However, it also represents a source of risk. The river floods every few years, generally caused by high precipitation levels in the highlands. The region also experiences occasional flash flooding when heavy rains occur. As noted above, climate change projections suggest that these events are likely to occur more frequently. Along side droughts, floods were identified as a significant hazard by all focus groups in the agro-pastoral communities. Floods have serious impacts on crop agriculture, causing crop damage and losses, damage to farm implements and irrigation infrastructure and soil degradation. They also result in harm to other assets, including houses, livestock and trees.

While the decision to shift to crop agriculture represents an innovation in response to the changing climate, the efficacy and sustainability of this decision over

Major flood events cause displacement of families living in the flood zone as well as disruption of transport, which impedes access to markets and services. Floods are also perceived to cause increased incidence of human and livestock diseases. Communities are managing flood risks in a number of different ways, including riverbank reinforcement and development of flood protection infrastructure, such as dykes and gabions. Placement of houses and crops takes into account the flood zones, and houses are reinforced to protect against damage. In the event of a flood, animals and other assets such as pumps and generators are moved to higher ground to avoid loss or damage. Currently, they rely on traditional early warning systems for information about flood risks.

In many cases, it is recurrent drought that has driven these families to settle and to engage in agriculture. Crop production was cited by many community members as a coping strategy for drought. However, in trying to escape the droughts, they have exposed themselves to a new range of risks due to the sensitivity of crop agriculture to both droughts and flooding. The use of irrigation could reduce the impact of droughts on crops, however it is currently practiced by only 14% of surveyed households. The shift of some households to a sedentary lifestyle also has negative implications for the nomadic pastoralists, as in the past the areas along the river were used as the dry season grazing zone for the region. Now, because the zone is settled and cultivated, there is less pasture available in the dry season.

While the decision to shift to crop agriculture represents an innovation in response to the changing climate, the efficacy and sustainability of this decision over time remains to be seen. Crop production provides an alternative source of food and income for the agro-pastoral households, but as most are traditionally herders, their knowledge of appropriate farming practices is limited. Settling by the river provides an ongoing source of water, thereby mitigating the risk of droughts,

however it has increased the exposure to floods, creating a new risk to livelihoods. As well, the settlements have placed constraints on the pastoral communities' access to critical resources, notably dry season pasture. A more sedentarized lifestyle may make it easier to access education, health and financial services, yet the availability and quality of services is still a challenge, particularly for poorer and female community members. While there is some evidence that this is changing, generally speaking, women have less access to public spaces

Kone

The agro-pastoral community of Kone is located on the Tana River, approximately 120 km from Garissa. The community includes 592 households, comprising a total population of just over 4000 people. Over 90% of the households identify themselves as agro-pastoralists. Poverty rates are high, with 70% of surveyed households identifying as poor or very poor, however as noted above the ranking system doesn't take assets other than livestock into account. Crop production is the primary source of income for over 60% of households, while a further 27% still rely on livestock rearing. Because households in Kone are increasingly reliant on crop production, they are concerned with a broader range of impacts of droughts than community members in Shant'abaq, who focused almost exclusively on livestock-related impacts. In addition to livestock deaths and consequences for livestock-related incomes, focus group participants highlighted low farm productivity and human-wildlife conflict, which occurs when wild animals migrate towards the river during dry periods, where they feed on crops and cause damage to farms. The indirect effects cited include high food costs, malnourishment of children and conflict between different communities.

Community institutions include the youth group, women's group, peace committee and the Elders Council.

Living along the river, the residents of Kone are also concerned with floods. According to focus group participants, floods cause damage and destruction to crops and farm implements, reduce livestock productivity and cause death of animals. They also degrade the soil, with longer-term implications for crop productivity. Floods are perceived to cause negative health impacts in both humans and livestock, requiring families to seek treatment at the dispensary or from a veterinarian or animal health worker. They also damage the roads, making it difficult to travel to access services or resources that aren't available within the community. Currently the community is making efforts to protect the riverbank to reduce flood risks, however they are still affected.

and services due to restrictions on their mobility. Somali culture requires women to be accompanied by a male relative or their husband if they are venturing beyond the vicinity of their homestead. This limits their ability to freely and actively participate in income generating activities and in community decision-making and development activities. This has significant implications for their adaptive capacity.

In the event of a flood, they move assets to higher ground and build temporary bridges to enable movement from the community. The Tana River represents the most important natural resource for all focus groups, along with land for both pasture and farming. It provides a water source for all of the surveyed households in the community for domestic purposes. It also provides water for livestock and for irrigation, as noted by women's focus groups, who highlighted the importance of irrigation infrastructure for farming. The school is an important resource within the community, and the road provides access to other resources and services, including the market in Garissa. Skills such as livestock husbandry, farming and weaving are highly valued by community members, as they provide a source of income.

Significant community institutions include the youth group, the women's group, the peace committee and the Elders Council. The shift to crop agriculture represents an innovation for a community that has traditionally engaged in nomadic pastoralism. Driven by recurrent drought and loss of livestock, the people of Kone have seized an opportunity to diversify their livelihoods by growing crops for food and income. However, their ability to realize the potential of this action is limited by inadequate knowledge about farming practices, as well as the start-up costs for irrigation infrastructure and farm implements. Despite these challenges, 78% of surveyed households in Kone are engaged in field crop production and almost 50% are using irrigation on their farms. Almost 30% are also growing economic fruit trees such as mango or banana. Community members are receiving some support in their agricultural endeavours. Half of surveyed households indicated that they had received agricultural training or technical support in the previous year. The most common type of support was training on fertilizer use, followed by improved seeds, pest management training and improved cultivation practices. The main sources of this support are the Ministry of Agriculture and NGOs, however some households had also received assistance from the Arid Lands Resource Management Project and the Food and Agriculture Organization of the United Nations (FAO).

Almost 90% of survey respondents indicated that they have noticed changes in climate that are affecting their agricultural activities. The most common impacts cited were decreased yields, difficulty in knowing when to plant and increased destruction of crops by wildlife. Community members are receiving some information on weather and climate to enable agricultural planning, including information on when to plant specific crops and what crops to plant, as well as early warning systems for extreme weather. Very few indicated that they have access to seasonal forecasts for the rainy seasons. The main sources of weather and climate information are radio, TV and NGOs.



Agricultural activity within Kone Community, ©2013
Jessica Omukuti/CARE-ALP

Approximately one-third of survey participants stated that they had used climate information for planning, and almost half indicated that their decision to produce crops was driven by climate change. In order for the people of Kone to successfully manage the transition to agro-pastoralism in a changing climate, they require increased support, in the form of capacity building for agriculture that is both productive and resilient to climate change, as well as access to information for planning that takes into account climate information, both seasonal and long-term.

In response, ALP facilitated a community adaptation action planning process with the people of Kone. The process included the development of a vision for the future and identification of actions the community could take to realize their vision. The process has triggered action at the individual, household and community level. For example, a savings and loans group has been established within the community and requested training from ALP. It has also generated demand for specific types of support needed from the government and other partners. The action planning process has been followed by training and technical assistance for community groups to support engagement in complementary livelihood strategies identified in the action plan. This has included technical training on crop and livestock production as well as business development skills.

Climate change is a driver of changes in gender roles and relations.

Reflections and Recommendations

Some common themes emerge from the overall analysis, as well as the specific cases of Shant'abaq and Kone. These insights lead to recommendations that are applicable to CBA initiatives in Garissa County and beyond.

Vulnerability to climate change is influenced by multiple, inter-connected factors.

Increasing exposure to climate shocks and stresses is only one dimension of increasing vulnerability to climate change in Garissa County. Adaptive capacity is a dynamic concept, each of the elements affected by a range of social, environmental, economic and political variables, many of them beyond the control of the community. In the case of Garissa County, the asset base for adaptation is influenced by population growth, unplanned development leading to land fragmentation and the existence of the Dadaab Refugee Camp, among other issues. Recurrent shocks and poorly designed response mechanisms have undermined communities' ability to innovate and engage in flexible decision-making. Traditional systems of adaptive management of resources and livelihoods have been overcome by external actors' view of development and policies that do not value the pastoral way of life. All of these factors have inhibited adaptive capacity and increased vulnerability of pastoral communities in a changing climate. Analysis of vulnerability must go beyond exposure and sensitivity to climate impacts, to explore the different dimensions of adaptive capacity and identify barriers that communities face in applying their existing capacity to respond to climate impacts. This leads to identification of adaptation options that reinforce and build upon existing adaptive capacity.

Informed, adaptive and forward-looking decision-making is central to adaptive capacity.

Poor people in Garissa County are in an ongoing process of making decisions to sustain their livelihoods in the face of the multiple challenges described above. Climate change is among the most serious of these challenges, exacerbating existing problems, exposing people to new and evolving risks and creating further complexity in decision-making. Decisions about how much to invest in different livelihood strategies, when to buy and sell livestock, which crops to plant and when, how much to spend and to save and when to migrate have a significant impact on vulnerability to climate change.

In order for people to engage in adaptive decision-making, they require information, knowledge and skills that enable them to actively address climate risks to their livelihoods. This includes information on weather and climate projections, market locations and prices and availability of different resources. Knowledge of the costs and benefits of different strategies under different climate scenarios is critical. The skills needed include practical skills in climate-resilient agriculture, livestock rearing and natural resource management, but also skills to analyze information and use it to make decisions about their livelihoods. To act on their decisions, people must be operating in an environment that enables them to do so. This means secure and equitable access to resources, appropriate services and safety nets in place and governance that empowers vulnerable people and creates opportunities

for them to thrive, even in the face of a changing climate. Adaptation efforts must aim to facilitate access to information and the development of the skills and knowledge needed for adaptation, while also working with institutions and policies to ensure an enabling environment for local adaptation efforts.

Adaptive capacity is shaped by gender.

Within communities and households, women and men have differing levels of adaptive capacity. As described above, Somali society has institutionalized women's social exclusion and unfavourable inclusion. This creates limitations on women's voice, movement and participation in public and household decision-making, which in turn creates limitations on their adaptive capacity. In a practical sense, this manifests in constraints to their access to information, opportunities to earn income and their power to make decisions to protect themselves and the household livelihoods from the negative impacts of climate change. This limits the ability of families and communities to realize the potential contribution of women's specific knowledge and skills to adaptation efforts. Analysis of vulnerability and adaptive capacity must uncover these differences and build understanding of the specific roles, responsibilities and challenges faced by women and men in securing their livelihoods and adapting to climate change. This understanding enables planning for adaptation that is equitable, allowing women and men to build their individual, household and community resilience, while also addressing the underlying cultural, social and political structures and norms that marginalize women.

Climate change is a driver of changes in gender roles and relations. As the impacts of climate change become more apparent and households are increasingly required to shift from their traditional livelihood strategies and practices, there is potential for changes in gender roles and relations. There is some evidence that this is already occurring in Garissa County, with women more actively engaging in markets, men contributing more to household tasks such as collection of water and fuel wood and an increasing role for women in crop production. Community social structures are also changing, notably in the agro-pastoral communities, where people are living in closer proximity and have more access to education and services. These changes have potential to contribute to women's empowerment as they are able to earn

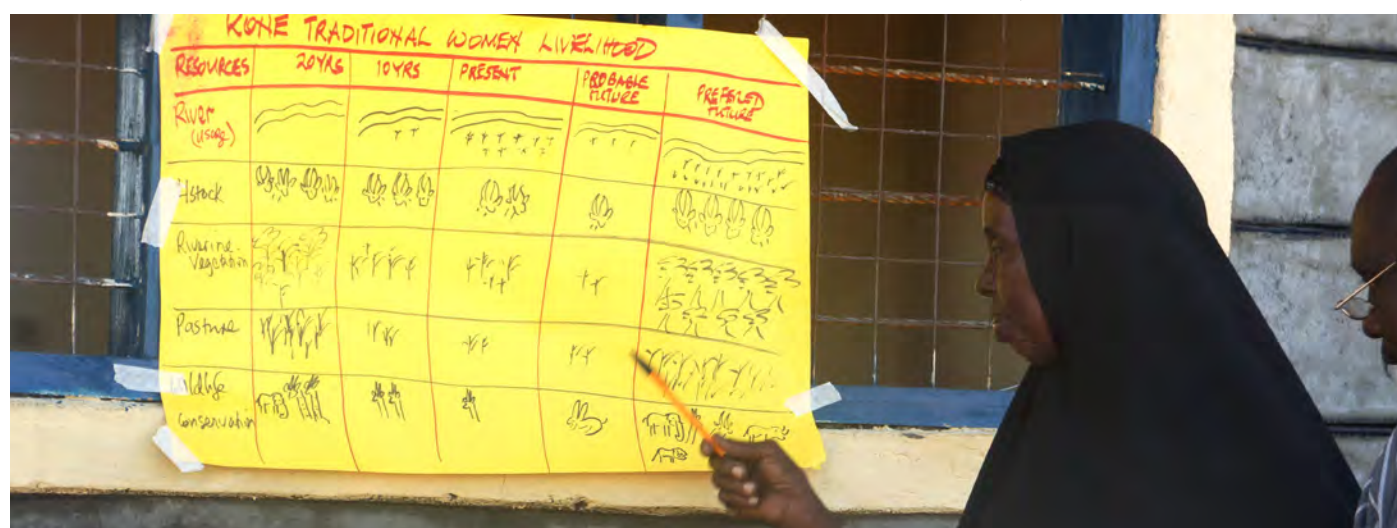
income themselves and may be perceived by their spouses to be contributing more to the household economy. This may lead to increased openness on the part of men to women's involvement in household and community decision-making. However, there is a risk of negative implications as well, in terms of increased workload for women as they take on more economic responsibilities and the potential for male resentment leading to violence against women and potentially to divorce. Adaptation efforts must take these ongoing changes in gender relations into account and facilitate dialogue and negotiation within communities to enable positive change for women and avoid potential backlash.

Diversification of livelihoods is an important strategy for building the resilience of the most vulnerable women and men to climate change.

Having multiple options for securing food and income provides people with alternatives when one strategy fails. As evidenced by the situation in Kone, the decision to diversify is often driven by recurrent shocks and stresses to existing livelihood strategies. However, in the absence of the necessary information and support, the effectiveness of diversification as a strategy for building livelihood resilience may be limited. Engaging in new activities requires new skills and knowledge that may not exist in the community, requiring capacity development and technical assistance from external actors. New livelihood strategies may also involve new risks, and these must be understood in order to ensure the right mix of strategies in the household livelihood portfolio. Finally, alternative livelihood strategies may create different or additional pressures on ecosystem services, which may disadvantage different groups in terms of access to resources such as land and water. This may lead to conflict and will ultimately limit the sustainability of the activities. CBA actors must support communities to make decisions around diversification in an informed and forward-looking manner, taking into account existing and future stress on resources, equity in access to resources and opportunities and changing climate risks over time.

Resilience may look different from wealth.

As noted above, in Garissa Country, wealth is determined based on the number of livestock owned. Households that are perceived to be rich (and therefore assumed to be more



Visioning process during the Kone community adaptation action planning process, ©2012 Joseph Ndiritu/CARE-ALP

resilient) are those that own the largest numbers of livestock, however the analysis found that these households are also highly sensitive to climate-related shocks and stresses as they tend to be completely reliant on their livestock for income and food. Agro-pastoral households, with a mix of livestock rearing, crop production and other income generating activities, seem to be more resilient as they have more options available to them. However, because they own less livestock, they are seen to be poorer. There is anecdotal evidence that crop production is considered to be an activity for 'poor people', and that even the agro-pastoral households themselves see crop agriculture as a temporary measure to earn money to build up their livestock herds again. While livestock will continue to represent the backbone of livelihoods in the region, the drive to increase livestock assets may inhibit investment in other activities or in cash savings that could help to provide a buffer in times of crisis. In order to facilitate risk management and adaptive decision-making, there may be a need to overcome traditional perceptions of wealth and to build understanding of the value and locally-specific characteristics of resilience. Visioning exercises such as those facilitated through the community adaptation action planning process in Kone can be extremely useful in creating aspirations for resilience.

Access to climate information is critical for adaptive management of livelihoods.

In order for the communities in Garissa County to effectively adapt to climate change, their wealth of indigenous knowledge must be complemented with scientific and technical information that enables adaptive decision-making. The analysis in 2011 demonstrated a need to create demand for this information and to help community members to understand the value of using scientific information for planning. This applies to decisions with longer-term implications, such as the decision to start farming or to buy camels instead of cows. It also applies to seasonal decisions, such as what to plant and when. Finally, it applies to short-term decisions, such as when to sell off livestock or when to move the family assets to higher ground. In each of these types of decisions, climate information can play an important role. The needed information ranges from

longer-term climate change projections, to seasonal forecasts, to early warnings for droughts and floods. Facilitating access to climate information on an ongoing basis is fundamental to building adaptive capacity. In the pastoral areas, the mobile nature of the community members creates a challenge in reaching people with information, however this can be overcome by planning communication systems taking pastoral mobility into account. Communication systems must ensure equitable access to information for women, considering constraints on their mobility and access to communication resources such as radios and mobile phones, as well as gender differences in literacy levels. The ALP PSP process provides an excellent example of how access to climate information can be facilitated in an action-oriented manner.

In order to facilitate risk management and adaptive decision-making, there may be a need to overcome traditional perceptions of wealth and to build understanding of the value and locally-specific characteristics of resilience.

Appropriate governance is essential for sustainable management of resources and risk management at community level.

As described above, pastoral communities traditionally had systems and practices that enabled them to manage climate variability and recurrent shocks in the form of droughts. The traditional rangeland management system helped to ensure access to water and pasture during the dry season and even during drought periods, while also minimizing the risk of land



A flooded farm at Nanighi, ©ALP 2013 Stanley Mutuma CARE/ALP

degradation due to overgrazing. The Ayutta system facilitated savings and credit for households within the community, without external support. When shocks occurred, the community social safety net system would be mobilized, with better-off or less-affected households loaning or donating livestock and other assets to households that were struggling. Sadly, with changing social dynamics and recurrent crises, as well as new approaches to policy, governance and development in the region, these systems have been eroded and there is increasing focus on individual household needs as well as more reliance on external support. Adaptation efforts in pastoral areas should aim to revive and strengthen these traditional systems, linking them to modern governance systems and formal institutions and enabling them to operate in a way that is equitable and effective.

Marginalization of women and other socially or economically disadvantaged groups reduces possibilities for household and community resilience that is equitable and sustainable over the longer term.

with stakeholders and institutions at higher levels to create an enabling environment for local actions.

The analysis has revealed the inherent adaptive capacity that exists in the pastoral and agro-pastoral communities in the region. In each community, there is evidence of the types of traditional knowledge and adaptive decision-making that are essential for CBA. However, there is also evidence of degradation of traditional knowledge and risk management systems with recurrent shocks and inappropriate development.

In the face of increasing risk and uncertainty brought about by climate change, there is a critical need to support and strengthen existing adaptive capacity, while bringing in scientific information, new knowledge and innovative ideas and approaches to respond to the evolving context.

Within communities, variations in vulnerability and adaptive capacity exist, based on livelihood options available, access to resources and information and a range of other factors related to power and opportunities. Gender inequality means that women are often at a disadvantage due to restrictions on their mobility and choice. Marginalization of women and other socially or economically disadvantaged groups reduces possibilities for household and community resilience that is equitable and sustainable over the longer term. CBA initiatives must therefore address gender inequality and social marginalization as important underlying causes of vulnerability to climate change.

Conclusions

Analysis of vulnerability and adaptive capacity has proven to be a critical step in the CBA process facilitated by ALP in Garissa County. By engaging communities and other local stakeholders in a process of dialogue and reflection on climate change, livelihoods and gender, ALP has uncovered the critical issues that influence the vulnerability and adaptive capacity of women and men in pastoral and agro-pastoral communities. Many of these issues originate outside the communities themselves, highlighting the need for CBA initiatives to engage

The recommendations above provide CBA practitioners with options for reflecting and responding to these challenges in practice. ALP is already acting on these recommendations, working with the communities and other stakeholders in Garissa County to plan for and implement CBA actions in an informed way. Early evidence suggests that the process has already contributed to reduced vulnerability of women and men in the targeted communities to climate change. ALP will continue to share emerging lessons and good practice on CBA to contribute to the broader knowledge base on adaptation, within Kenya and globally.



Climate information discussion sessions, ©Ahmed Hassan/CARE ALP

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About this CVCA report

That climate change is threatening rural communities across Africa, through increasingly unpredictable extreme events like floods and more frequent severe droughts, is well known. But how exactly is this affecting their lives and what are the implications? This report explores the vulnerabilities of pastoralist and agro-pastoralist communities to climate change impacts in Garissa County, part of northern Kenya's arid and semi-arid lands. It goes further to discover their inherent and growing capacity to adapt to the changes and uncertainties they are facing. The report draws from a series of vulnerability and capacity and gender analysis studies conducted in 2011 and 2012 by the Adaptation Learning Programme implemented by CARE International, as well as from ongoing work supporting Community Based Adaptation.

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