diakonia

PEOPLE CHANGING THE WORLD

KAALO

Aid and Development Org.

INDIGENOUS KNOWLEDGE SUPPORTING THE RESILIENCE OF PASTORALISTS TO CLIMATE CHANGE AND NATURAL DISASTERS IN PUNTLAN

2017

INDIGENOUS KNOWLEDGE SUPPORTING THE RESILIENCE OF PASTORALISTS TO CLIMATE CHANGE AND NATURAL DISASTERS IN PUNTLAND

Funded by
Diakonia Sweden

diakonia
PEOPLE CHANGING THE WORLD

Implemented by
KAALO

KAALO
Aid and Development Org.

2017

Table of Contents

SUMMARY

This rapid assessment study highlights features and the many responses to drought stresses employed by pastoralists in the Puntland State of Somalia. Multiple data sources, including focus group discussions, key informant interviews and informal interviews with 54 pastoralists, village residents and local authorities were used to capture various aspects of drought adaptation and coping practices. Results revealed that extreme drought events were increasingly frequent, and have impacted negatively on pastoral livelihoods. In order to mitigate or cope with climatic abnormalities, pastoralists are deploying a variety of strategic approaches. In addition to the traditional household level coping mechanisms, the longterm adaptation strategies used include diversifying economic strategies to include rain-farming, wage labour and fishing; livestock mobility to track forage and water resources; diversification of herd composition to benefit from the varied drought and disease tolerance, as well as fecundity of diverse livestock species; and sending children to school for formal education as a durable investment expected to pay back through income from employment.

The livestock species kept include camels, sheep, goats, and donkeys, all of which have different forage and water requirements and variable levels of resilience to drought. The camels and goats provide milk, which is consumed by the households. The sheep and goats are sold when cash is required to meet other domestic requirements such as to purchase food or to pay school fees. For a long time, a majority of the pastoralist raised their livestock mainly to meet subsistence and sociocultural obligations. However, this practice has been changing in response to ecological and socioeconomic change dynamics as households increasingly embrace the market economy and offer more animals for sale than before.

Policies and development interventions that reduce risks, diminish livelihood constraints, and expand opportunities for increased household resilience to natural disasters including drought are critical complements to pastoral indigenous knowledge and traditional strategies that existed in millennia.

1.0 INTRODUCTION

Drought is often one of the most devastating but least understood weather phenomena, largely because of its slow onset and its accumulating impacts over time. Although definitions vary depending on the context, drought is generally an extended period of months or years in which precipitation is less than the annual average and results in severe water scarcity (Downing and Bakker 2000). According to the World Meteorological Organization, droughts are classified as either meteorological (lack of precipitation over a region for a period of time), hydrological (a period with inadequate surface and subsurface water resources), agricultural (a period with declining soil moisture and consequent crop failure due to lack of surface water resources), or socioeconomic (failure of water resources systems to meet demands, which impacts human activities both directly and indirectly). On the other hand, one could define optimal rainfall as sufficient rainfall in amount and distribution over time and space to meet the needs of specific livelihoods.

The Horn of Africa region including Puntland State of Somalia, drought occurrence has become increasingly severe during the last decade, with rainfall totals of at least 50–75 % below normal encountered in most areas, amounts that are not sufficient to support crop and pasture growth for livelihood security (Nicholson 2014). The community elders indicate that Puntland has experienced an increase in drought frequency from once in every 5 years in the 1960/70s to once in every 3 years in the 1980s; the frequency of drought increased to once in every 2–3 years in the 1990s, and has become increasingly unpredictable since 2000. This community narrative agrees with the report of the Intergovernmental Panel on Climate Change (IPCC 2012)that forecasted high probability of a marked increase in drought risk over much of Eastern Africa by the 2050s, which ultimately will threaten climate sensitive economic sectors.

There is no doubt that drought poses serious challenges for populations whose livelihoods depend principally on natural resources. The Puntland is extremely aridzone, which have faced increasing drought frequency and intensity since the 1990s, is one of the most vulnerable and drought-prone regions in Somalia. Despite this exposure and sensitivity to frequent droughts, pastoral economy is backbone of the Puntland's economy, generating 40% of the GDP and 80% of foreign currency earning (remittances excluded) and provides the main source of livelihoods with an estimated 65% of the population engaged in livestock production. However, this important livelihood is threatened by unpredictable climatic events. Given the changing global climate, coupled with expected increase in evapotranspiration due to increased temperatures, the part of Somalia is expected to experience frequent weather extremes, reduced carrying capacity of rangelands, increased water stress, weakened-animal productivity, increased food insecurity and malnutrition. Adaptation and coping prac-

tices are therefore necessary to reduce vulnerability to drought stresses as well as to prepare for possible future extreme climate events. The Intergovernmental Panel on Climate Change report (IPCC 2012) define adaptation as an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Adaptation therefore involves adjustments in reducing the vulnerability of households to climatic variability and change. On the other hand, Blaikie et al. (1994) define coping as the manner in which people act within existing resources and ranges of expectation in a given context to achieve various ends. Therefore, adaptation involves longer-term shifts in livelihood strategies, while coping involves temporary adjustment in response to change or to mitigate shocks and stresses on livelihoods. However, adaptation or coping mechanisms of people to different hazards vary from household to household based on existing support systems that increase the resilience of affected individuals.

The adaptation strategies of pastoral communities to changing environmental conditions have showed that the livelihoods of most pastoralists have evolved to some extent under variable climatic conditions in arid and semiarid environments. The African Union (2010) reports that pastoralism has "evolved over generations as a response to marked rainfall and temperature variability," and that flexible and mobile pastoralism has great potential for reducing poverty, generating economic growth, managing the environment, and promoting sustainable development. Other research has shown that pastoralists have an intimate relationship with their environment and a rich knowledge that enables them to both protect and exploit the changing rangeland conditions on which they depend (Notenbaert et al. 2012). Understanding how pastoral communities adapt to and cope with extreme climatic conditions, particularly drought, becomes even more important as pastoralism in Puntland already faces environmental, political, and socioeconomic marginalization.

Recent developments such as fencing off large tracts of grazing land for farming and fodder production has already constrained herd mobility, which is a key drought coping strategy and therefore the main tenet of the pastoral production system in the area. Given the projections for increasing drought incidents and impacts in the pastoral areas and other social pressures, it is important to document and revive various traditional adaptation and coping responses at local levels in order to reduce risks associated with climate change disasters.

This study sets out to examine drought characteristics, identify adaptation processes more broadly as longterm mitigation measures, and analyse temporary coping responses to drought in Puntland Somalia. Knowledge about pastoralists' adaptation and coping responses to drought stresses can Guide possible intervention measures, as well as better inform policies and strategies designed to reverse the decline in pastoral production systems, and hence ensure continued sustainability of rural livelihoods in an increasing arid environments.

2.0 STUDY OBJECTIVE

The main purpose of this brief study was to identify indigenous knowledgesupporting the coping strategies and resilience of pastoralists to climate change and droughts.

3.0 SIGNIFICANCE OF THE STUDY

The recommendations from this study will help the government, CSOs and development partners in designing sustainable drought coping strategies.

4.0 RESEARCH METHODS

Much of the information gathered by the research was collected using Focus Group Discussions, Key Informant Interview and Informal Group Discussions to solicit information on traditional drought coping strategies from community leaders, government authorizes and women organizations. The researchers have met 28 men and 26 women in Bargaal, Carmo, Gardo and Bender Beyla Districts.

5.0 STUDY AREAS

In the selected districts, pastoralism is the predominant livelihood, and engages the attention of over 55 % of the population, which is mainly pursuing extensive nomadic livestock rearing in communal open access rangelands. However, some of the pastoralists in the Bargaal and Bender Beyla occasionally work as casual labourers in the fishing sector. Most of the land in the study area is communally owned, which is an important strategy in support of effective drought adaptation and coping mechanisms. For the pastoralists, the communal land tenure system is pivotal to livelihood security because it allows for livestock mobility to take advantage of pasture and water resources that are only seasonally available. The herders own a mixture of indigenous livestock species, which are selected on the basis of survival and productivity. The livestock species kept include camels, sheep, goats, and donkeys. Limited small-scale irrigated crop cultivation is spread along the oasis in valleys, and mainly is focused on growing cash crops including vegetables, watermelon, tomatoes and lemons.

6.0 RESULTS AND DISCUSSION

6.1 Characterization of Drought

In an arid land like PuntlandState, drought is a common phenomenon. However, the community elders and local authorities suggest that drought frequency has increased, particularly in the past three decades. Increases in temperature and rainfall variability, associated with global climate change, are likely to further increase the drought risk in Puntland. More than 80 % of the droughts that occurred in PuntlandState were of large spatial extent, and also had widespread impacts in other parts of Puntland. These extreme conditions pose a major challenge to livelihood activities. The community leaders in the study areas have unanimously indicated that the 2015-2017 is the worst drought experienced over the last 50 years in the zone.

6.2 Impacts of Drought as Perceived by the Pastoralists

Drought is expected to have significant impacts in most of the climate sensitive sectors in Puntland. In the hyper-arid areas, frequent droughts are associated with the deterioration of livestock condition, increased incidences of certain diseases and livestock deaths, altered herd structure, and a collapse of livestock markets. Respondents cited the 2015-2017 on-going drought years as the cause of the highest livestock mortality in Puntland, exceeding in destructiveness the 1974-1975 drought. They believe that starvation and diseases related mortality accounted for 70% of small ruminants' deaths. Since the majority of households in the study area do not have diversified livelihood options to fall back upon, they are normally vulnerable to extreme drought events.

Other drought impacts observed by the respondents are the drying up of water sources, declining pasture availability, food shortages, increasing food prices, livestock export ban by Saudis and loss of income. While the perceived impacts of drought can be numerous and far-reaching, none are more important than the drying up of water sources. Puntland is permanently under water stress, with seasonal streams and groundwater providing the State's main water supply. In general, the observations made by the respondents in this study confirm the findings by the international organizations and Civil Society Organisations that the increasing frequency and intensity of drought events are negatively impacting pastoral livelihoods and ecosystems.

6.3 Key Indigenous Knowledge

6.3.1 Traditional Early Warning System

To reduce the devastating effects that often result from unpredictable and variable weather patterns, pastoralists have developed a culturally rich early warning system based on long-term observation and centuries old accumulated experience which was highly regarded as a source of inspiration, Guidance and a tool for decision making. For example, rain forecasting has been a developed art among Somalis. This art was born from a synthesis of Persian and African astronomy. The Persian heritage for instance can still be found in the Nayruus ceremony,

which is celebrated with ignition of fire (literally Dab-shid) and hanging a life branch/leaf (preferably aloes) at the entrances of houses, and is still a major starting point for traditional weather forecasting.

The Somali forecaster is called Xidaar (literally: someone warning against something ominous, such as drought, tribal conflict or heralds something good such as rain) or otherwise Xiddigiye (astronomer). This class of people were very much respected as their predictions generally used to be precise.

Local astrologers predicted the probable course of events and on the basis of the information generated, pastoralists used to base their decision on issues related to their day to day life, whether climatic (rains, droughts) or social (migration, tribal warfare, marriage etc).

6.3.2Traditional Sheep Mating Calendar

Usually, Somali pastoralists keep rams and ewes apart throughout the year, to control mating in a way that the ewes do not give birth to new born lambs in the dry season, when the feeding resources will not be enough for the next generation. "Dambasame" is the night, when Somali nomads let loose the rams with the ewes for mating, because it was about 150 days – the time the sheep are pregnant – until the beginning of the GU' rains. Dambasame night occurs exactly 120 days following the Dabshid (Nayruus) which marks the 1st night of the Somali year. It is the night when in the middle of autumn (November) the moon is in conjunction with the Urur/Pleiades on the 15thday of the lunar month (full moon). The Pleiades constellation is very important for Somali nomads and is also known as "Urur" or "Laxo", while "Laxo" means also sheep. So the mating time is determined by using the Urur/Pleiades as a point of cue, and also as a precursor for tracking the time period left until the rains will begin in spring. In this way, mating time is determined in a way that the lambs, which will be born about 150 days later, are delivered in a season of abundance in the middle of the GU' rains (spring) around April15th. This is the time the Pleiades will start to set at about twilight described by the following proverb: ["markey laxo dhacaan ayey laxo dhalaan", "When the laxo star in the sky goes down, then the sheep bring birth"]. This also expresses the double meaning of "laxo" as a star and as a sheep.

While the night of "Dambasame" is still used to calculate the beginning of the GU' season, nowadays pastoralists are well aware of the changes of season and the unreliability of the onset of the GU' season, which is expected now to start about 30 days later than before (around May 15thearliest, sometimes even on June 15th). Therefore, from recent local experience, showing that GU" rains shifted roughly around 30 days into the summer time, mating of the rams and ewes are not any more organized at Dambasame night, but 30 days later, meaning around December 15th; this shows the adaptive capacities of this traditional forecasting and decision making system.

6.3.3 Mating Synchronization with Wildlife Behaviour

While the rough calculations on the basis of Dambasame night are still in danger to become the victims of the unreliable beginnings of the GU" season, there is another method for the determination of the proper mating time, which is said to be almost infallible: It is correlating the mating time of sheep with the mating time of the Cawl (GazelleSoemmeringii). The 'Cawl' gazelle is the only gazelle species which mates outside the normal mating season, when all animals or gazelles are busy mating, which has the effect, whenever there is a drought because of GU' rain failures many of the new born offspring of the other gazelle species suffer and die. However, the same is not true for the 'Cawl' gazelle.

There is a well-known folklore which says that Cawl gazes at the stars before it mates and is said to be able to read the stars better than humans "For you will never see a 'Cawl' gazelle with new born off spring in times of failed spring rains, like you do with the other gazelle species. Before four decades, some nomads used to go far in the middle of the night to keep a track on a nearby herd of 'Cawl' gazelles, so that they know when to let their rams mate with the ewes, and all this depended on whether the 'Cawl' gazelles had started to mate or not. Because, in the time period which 'Cawl' gazelles give birth to new born offspring is about the same time as sheep give birth to their new born lambs (five months from the time of conception).

There are countless phrases, songs, proverbs and poems in Somali, which ascribe these skills to the 'Cawl' gazelle and countless other wild animals.
The poem of Cali Dhuux ascribes these skills to the 'Cawl':

Somali Language

Markuu Cawlku Cawlaa orgayn, waa u cibaaroone,
Cisaday ku uuraysatiyo, caadaduu garane,
Cashaday calool gelahayaan, cannugga beertiisu,
Curcurradiyo lawyada intuu, ku cuskaduu saaro,
Cirridiyo cagaar miday ku dhalan, caadka kor u eegye,
Hadba cirirka loo nuuriyuu, ku cimro-qaataaye

Translated Version

When the male 'Cawl' wishes to mate with his females,
He first makes astronomical calculations,
He knows their menstrual periods and the techniques of mating,
The day he wishes to cause propagation and off springs,
He, placing first his front knees on to the female's back,
Judges whether the young will be born in sun or green from the signs in the heavens,
His decision whether to continue mating or to descend is in accordance with his celestial inductions

The above story links indigenous knowledge, myth, and current changes. An ungulate "reading" the stars is fascinating. However, if we try to match this indigenous knowledge with the later scientific findings, it is true that some ungulates have the ability to delay the birth date for a period of time if conditions are not suitable, thus ensuring the survival of the calf. Therefore, this means that 'Cawl' gazelle will always deliver its calves during a rainy season!

Unfortunately the Gazelle Soemmeringii is now rated as 'vulnerable' in the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species due to rangeland degradation and hunting. Therefore, its rarity and decline in number makes it inadequate as an indication for proper mating dates.

6.3.4 The Pastoralists' Indigenous Knowledge and Human Heath

Pastoralists have developed over years a system for identifying all wild plants found in their areas, so every plant has got a local name and some have functions to play especially in dealing with the health of people or their animals. The whole plant, roots, shoots, leaves, fruit or bark is used for treating different diseases and injuries. Though nowadays they see doctors and take their women as well to see doctors, indigenous knowledge is still there and the elders are keeping and safeguarding it against any type of erosion or of being forgotten.

6.3.5 The Pastoralists' Indigenous Knowledge and food security

In the Puntland, there are some plants species that exist in wild form and used traditionally for their food, fodder, fiber, oil or medicinal properties, but not yet have been adopted in large-scale agriculture. They may have the potential to contribute to food security, nutrition, health, income generation and environmental services. Many of these plants are used during periods of food scarcity and famine. Some of these species have potential for more wide spread use, and hence promotion for food security and agricultural diversification. Species such as Cordeauxia Edulis (Somali: Yicib), Ziziphus Mauritania (Somali: Gob), and others are used as human food some of which even when there is no food shortage.

6.3.6 Traditional Institutions

Pastoralism requires types of institutions which can flexibly react to adapt quickly to the dynamic changing conditions. The two major types are Xeer agreements and Degaan ownership:

A.Degaan Ownership

According to the perception of land as a “smooth” space, in traditional Puntland society, private ownership of pastureland did not exist, and water sources could only be owned privately to a limited scale. Until today, access to natural recourses is based on communal ownership and cooperation with other groups. Generally, the concept of Degaan describes the traditional claim for land ownership by a certain clan ethnic.

B.Xeer Agreements

Affairs are regulated by contracts between clan groups. These contracts define rules for the management of land and other issues, and set up sanctions for the case that agreements are broken by one of the parties. Xeer agreements between groups need to be continuously renegotiated and redefined according to the needs to move towards new water and grazing resources.

The responsibility over these institutions was held by the clan authorities: Clan elders regulate clan affairs on behalf of their people especially in regard to access to natural resources land conflicts. However, changes in land use patterns also eroded these institutions. Many elders reported that they lost their authority, and, while traditional institutions lose their significance, modern institutions are not yet ready. This is especially relevant in regard to land grabbing for the establishment of enclosure or for appropriation of communal land for charcoal burning, where traditional land use agreement lost almost completely control of natural resources.

6.4 Traditional Adaptation and Coping Strategies

As a result of climate change, pastoralists' way of life is undergoing great transformation and the trend is moving towards higher vulnerability, loss of solidarity mechanisms for coping with droughts, destitution and dropping off from pastoral life. Pastoral production system depends on the availability of natural resources which are sensitive to climate change. What complicates their situation is that pastoralists do not have a diversified pool of resources to draw from, which makes them more susceptible to outside pressures such as climate change.

The prevailing vulnerable situation of pastoralists as well as future uncertainties looming over the whole spectrum of pastoral production, many households have opted for some sort of diversification in order to fill existing economic gaps caused by climate change. While some of animal products such as ghee (clarified butter), hides and skins and Gums have had a longer history of trade, more recent additions are milk. With the decline of milk, ghee is now also rare to get.

6.4.1 Mobility

Nomadic pastoralists who utilize the Puntland Rangelands are traditionally livestock herders as opposed to crop cultivators, and depend upon livestock for subsistence either through direct consumption or trade, and who as a result of their harsh milieu, have evolved by learning numerous survival strategies to cope with environmental conditions of risk and uncertainty. Mobility is the primary means by which the Somali pastoralists compensate for the sparse and unpredictable resources which characterize the arid environment in which they live. It is a strategy of risk aversion, crisis survival, and a method of utilizing a rangeland poorly endowed with moisture. Also,the use of different species of livestock by nomadic pastoralists, which is common to arid environments, is based on pragmatic considerations. The practice has both ecological and economic implications. Discussions with key informants confirm that herd mobility enables opportunistic use of resources and helps minimize the effects of droughts and disease outbreaks. These movements are often affected by impacts such as violent clan conflicts, diseases outbreaks, and recurrent drought. Elders emphasized that seasonal decisions to migrate insure that households maintain the productivity of their herds and security of their families. This form of mobility is pursued primarily for livelihood purposes and indeed is very strategic. Movement of livestock to areas with secure water and pasture resources is an effective strategy against droughts.

Even though most pastoralists have become increasingly semi-sedentary, their herds are still quite mobile. A key issue to consider in the future in order retaining mobility as an adaptation strategy will be the ability of pastoralist to continue managing the rangelands at a communal scale, rather than fragmenting rangelands into private and individual tenure systems.

6.4.2 Milk Sales

Selling milk in the past was uncommon and a lowly business to an extent that any person or family involved in selling milk was dubbed as “caano-dhiiq” (literally milk-seller). Surplusmilk was always kept for and freely given to Guest and wayfarers. In a pastoral encampment,consisting of a number of families, it was the responsibility of women to contribute, collect milk and store into one gourd which is then kept under a tree with the intention of satiating the hunger and thirst of a weary traveller. Nowadays, selling milk is a well-organized business with and established network of collection. The commercialization of milk in the pastoral areas on one hand and their increasing demand in the urban areas causes to drain milk from far and wide, with its resulting negative impact on nutrition, particularly for children and the elderly. Nevertheless, milk sale is an important contributor to pastoral household income. More attention among pastoralists is now on higher milk yielding animals rather than emphasis on body weight.

6.4.3 Charcoal Production

Charcoal production became a fall back option for poor pastoralists who are unable to carry on with their traditional way of life. Charcoal making, as a non-livestock income generating activity, is widely practiced in the study area and from discussions with the community it remains the most important option for generating alternative income with regards to the number of people involved, coverage, market opportunity and low investment required to kick start this sort of business as well as the free access to tree resources to produce charcoal.

Discussing with local elders about the history of charcoal production activities in the area, they mentioned that licensed cooperatives were the only producer groups before the year 1990.However, the heavy involvement of pastoral households in charcoal production started soon afterwards. The main driving force is the widening and increasing consumption of Qat chewing among pastoral youth and the deteriorating livestock herd sizes makes them resort to charcoal production.

To gauge the extent this coping mechanism contributes to mitigating adverse impacts on pastoral livelihoods, one can argue that it is an effective strategy since it provides contingent income needed by poor households as a distress coping strategy. However, it is important to highlight its negative impact on environment and the permanent loss of livelihoods which could result from charcoal production. The regeneration of acacia species is very slow and it usually takes at least thirty years for a tree to mature and produce a minimum of 50kilogram of charcoal.

6.4.4 Diversification of Livelihoods

Diversification of livelihood is a major adaptation strategy practiced by most pastoralists. In this study, livelihood diversification refers to processes by which households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living.

6.4.5 Veterinary Services

Training in livestock health provision was reported by respondents as a strategy to reduce risks associated with recurrent drought and livestock diseases. The increased number of trained, community-based animal health workers now operating in Puntland areas is an important animal health delivery channel in this marginal area. Of the livestock keepers who had treated their animals, 45 % claimed to have gained skills, training, and knowledge from the community-based animal health workers. Traditionally the control of livestock diseases was through the use of local herbs and local techniques; these practices seem to have changed with the emergence of trained community-based animal health workers. Key informants revealed that many youth with animal health care skills are able to support their families with income earned from the sale of veterinary drugs and from attending to sick animals. But owing to the limited training and literacy of community-based animal health workers, these medical providers have been perceived by professional veterinarians and government officials as a threat to the provision of adequate animal health services.

6.4.6 Herd Composition

Diversification of herd composition and species are key strategies that have enabled pastoralism to thrive in a harsh environment for centuries. Almost all the respondents surveyed diversify herd composition and keep a mix of livestock species that include cattle, shoats (sheep and goats), camels and donkeys. Households involved in diversification of herd composition and species have a higher off-take and thereby improved access to food during drought. Key informant discussions indicate that Puntland presently prefer goats, sheep and camels, since these species are perceived to be more resistant to drought than cattle. The large proportion of respondents indicated that mixed herd composition can generate a wider variety of livestock products and make better use of the available forage in different seasons, even in times of drought. However, increasing drought frequencies are unlikely to permit sufficient fodder growth to allow for adequate accumulation of a sustainable herd size to support a household through animal products alone. The local authorities believe that increased drought frequency hastens herd depletion, narrows opportunity for rapid livelihood recovery, and intensifies pressure on depleted water and pasture resources.

6.4.7 Child Education

Sending children to school to acquire education and training is partly seen as an essential strategy to facilitate income diversification for pastoral households. Many respondents view education as a long-term adaptation strategy. Most elders believe education assists family members to find jobs in the modern sector and urban economy. For a long time, education for pastoralists was considered by the Somali Government as an exit strategy to be encouraged, and not as an end or adaptation in itself. This probably explains why pastoralist areas have had lower enrolment, retention, completion, and achievement rates than the rest of the country. Households surveyed indicate that when young boys and girls go to school, there is a probability of redistribution of household tasks, including livestock herding, to parents and those children who are not able to access school. The local authorities believe that an increase in the number of children going to school could result in a more limited family labour poolin pastoral areas. Our study suggests that the educational system as currently modelled in Puntland is undermining pastoral livelihood just as much as it is seen as a successful adaptation to drought.

6.4.8 Animal Sale

Livestock off-take at different stages of a drought's development is an important adaptation strategy used by pastoralists. In times of drought and food shortage, increased off-take is obligatory to meet the household's demand for food for two reasons: (1) cereal is the most important source of food in domestic economy; and (2) animal sales realize some economic return from drought-caused livestock losses that might generate no cash flow whatsoever. Our study indicates that pastoralists sell livestock on a regular basis to have a source of cash income to cover other adaptation costs as well as to cope with short-term stresses. Pastoralists have a strong preference for holding camels for milk and calf production. Instead most respondents sold small stock, particularly goats, much more often than any other livestock type. The motivation to sell goats is the need to buy food, obtain medical care, pay school fees, and obtain cash income for other household needs. The increasing demand and price for livestock products generated by urban areas also provides another incentive for this adaptation measure. Key informants maintained that few pastoralists make use of livestock markets to off-load livestock when climatic shocks temporarily reduce the rangeland pasture and water resources needed to sustain them. From a policy perspective, it appears that investments in livestock marketing systems might enhance drought adaptation by increasing pastoralist marketing responsiveness to climatic variation.

6.4.9 Mobile Banking

Banking based on mobile phones is increasingly becoming a common and well-developed service in the area. Results showed that households are slowly embracing mobile phones for receiving cash remittances through the SAHAL and SAAD systems from relatives in urban centers. So far mobile phones are not used by many respondents because of the poor network coverage in Puntland.

7.0 General Challenges

7.1 Deforestation

Deforestation, with its devastating effects, is one of the most debated issues in the country. Unfortunately the attention afforded to this issue either by the government, development agencies, private sector and direct resource users is minimal or non-existent. In the past three decades, the rate of deforestation, in response to the rising demand for charcoal, wood for construction and establishment of enclosures has been rising to an extent that millions of hectares of woodlands have been cleared. Biomass is the main and, indeed, the only traditional source of energy for Puntland populations. Charcoal is the principal energy producing fuel commonly used in urban areas for cooking, whereas firewood is commonly popular in rural settlements. With increasing populations and high urbanization rate, the demand for charcoal has been rising exponentially. Deforestation is contributing to diminishing rangelands integrity, water ineffectiveness and watershed degradation. It is causing severe soil erosion and compaction, and flash floods with destructive effects. Moreover, deforestation is a direct threat to rural livelihoods as domestic economy is heavily dependent on pastoral production.

7.2 Soil Erosion

As a result of overall decline in biomass production, reduced ground cover, litter and organic matter content and the resultant soil compaction, large tracts of land became exposed to increased runoff and erosion processes such as rill erosion and gully erosion. Shifting sands is also becoming more common in many areas, particularly in treeless plains (ban) causing transportation and deposition of soil material. The main causes of soil erosion are overgrazing, deforestation, inappropriate agricultural practices and unplanned urbanization.

7.3 Climate Change and Droughts

Remarkable increase of temperatures in higher altitude ecological zones and elsewhere compared to earlier periods is being experienced. Nowadays one could hardly hear words used to describe severe cold conditions such as “gabadano, dhaxan and bane”. Extreme weather conditions such as decrease in precipitation levels, soaring temperatures, increase in the frequency of droughts and flash floods are becoming more common. Moreover, there are changes in the biological succession of some of the plants in certain vegetation zones. Changes in weather patterns have also contributed to the disturbance of calendars for both livestock mating and crop production. The cumulative effects of climate change led to erosion of assets and deterioration of livelihoods among pastoral and agro-pastoral communities in Puntland. Climate change has also led to an increased drift of rural population to the urban centers.

7.4 Wildlife Poaching

By the turn of the last century, much of the wildlife in Puntland, particularly the big mammals such as lions, the Somali Wild Ass (Equus asinus somalicus), Oryx (Oryx gazelle), Alcelaphus buselaphus swaynei ('Siig') and others has been decimated in numbers, some of them to extinction levels. Traditionally, hunting wildlife for subsistence and economic gain was an uncommon practice and indeed was regarded as the task of the inferiors. Political unrest during the past three decades has created better access to automatic weapons. Therefore, other than poaching and illegal exportation of wildlife to the Arabian countries, habitat loss is another major cause for their decimation. Among the most common wildlife species remaining are the baboon (Papio hamadryas), warthog (Phacochoerus aethiopicus) which have been prohibited from hunting by the religious belief that consuming their meat is impure. Speke's gazelle and Gerenuks can still be encountered in few numbers, while Dik-dik(Madoqua spp.) are still numerous, thanks to their small body size which makes it a difficult target for poachers using guns. Remaining carnivores include hyena, bat-eared fox, wild cat (Felix lybica).

7.5 Poor Environmental Sanitation

The most eye-soaring thing is the plastic bags strewn everywhere and hanging from all trees. In the rural areas, these bags, when not disposed of properly, are eaten by livestock (due to shortage of browse and grass) and consequently contribute to the death of large number of animals.

Because of the inefficient garbage collection and disposal system in urban centers inhabitants dump garbage in the nearest stream, ditch or space available, and to their relief, if rains come, the runoff water carries the garbage all the way to the valleys, Indian Ocean and Gulf of Aden, with its dire consequences on the marine life such as sea turtles mistaking plastic bags and pellets as authentic food, or sea birds mistaking for a fish egg causing the clogging of their intestines and their eventual death

.

7.6 Unsustainable Fishing Practices

As Puntland's terrestrial ecosystems continue to be degraded and over-exploited on one hand, and human needs continue to increase on the other, more and more people are determined to earn a living by venturing into the sea.

Culturally and historically, Somalis have never been dependant on fish for their nutritional needs and their knowledge on the sea has been very limited. This might be the reason why Somali call a 'man-eating

fish' as 'Libaax-badeed' or 'Sea Lion' because lions used to abound in their lands. However although there are high prevalence of nutritional deficits among the local population, it is unfortunate that foreign fishing vessels maintain continuous presence in the sea and in many cases inside the twelve nautical mile territorial range of the coast intended to be utilized by artisanal fisher folks. Selective fishing practice where higher value species in the sea are collected and the rest are dumped into the sea is often reported by local fishing associations in Bargaal and Bender Beyla who have also been raising their concerns through the local media.

Puntland authorities have their own licensing mechanisms and assigning monitors to board some of those vessels, but because of the inadequacy of surveillance mechanisms in terms of knowledge, capacity and logistical arrangement, there are gaps in carrying out the strict monitoring required for the sustainable utilization fishery resources. As a result, as reported by artisanal fisher folks, there has been a continuous decline of fish catches.

7.7 Institutional Challenges and Low Public Awareness

Lack of weak political will and commitment to protect the environment is exemplified in the fact that the ministry which is mandated for environmental conservation and protection is one of the least funded government institutions. There is also absence of regional cooperation on issues related to environment. In Puntland, while there are number of natural resource management policies in writing, their implementation, like many other existing policies, is a sure challenge. Those policies include the newly developed Puntland Environmental Policy and legislation.

7.8Denial of Indigenous Knowledge

The negative attitudes towards indigenous knowledge among national elites and foreigners who openly disparage the relevance, usefulness and credibility of IK for social and economic development.

Globalization of capitalist production, consumption, and marketing systems have undermined completely the existence of indigenous knowledge production and consumption patterns and systems

8.0 RECOMMENDATIONS

i. Indigenous knowledge, should receive more in-depth research and attention as a productive asset and a pastoral heritage that should be carefully identified and documented.

ii. Indigenous knowledge should be recognized as communities' intellectual property in order to preserve and protect the rights of these communities.

iii. A link between Indigenous knowledge and modern sciences should be sought in order to achieve an optimal use of the findings of both branches of knowledge.

iv. The veterinary authorities should give more attention to the capacity building of traditional animal healers.

v. There is a need to crucially address reduction of dependence on charcoal which is the main contributory factor to the deforestation of the land. This can be addressed through popularization, diversification and adoption of viable alternative energies. Liquefied petroleum gas (LPG) is slowly being adopted. Also studies aimed at determining the magnitude, quality and economics of exploitation of local coal deposits is recommended. If successful, suitable coal (briquette) stoves for domestic use could be introduced. Moreover, exemption of tax on kerosene, LPG and energy saving materials and appliances is necessary.

vi. There is a need to activate the various natural resource management policies and legislations. However, a major challenge facing the concerned institutions to live up to their mandates is the scarcity of resources. Capacitating and empowering these institutions to deal with those challenges through trainings and material support could be an important step to address this challenge.

vii. There is also a need to initiate techniques towards the recycling and salvage of garbage. This will contribute to cleaner and healthier environment, more jobs and income for many people. On the other hand, an in-depth analysis of the current garbage management initiatives and why it is not serving the purpose need to be conducted and the necessary remedial actions be taken to address this problem.

viii. There is an urgent need to develop new comprehensive policies for pastoral development that should take into account the complexities of the pastoral ecosystem.

Therefore, any development plan should consider the basic factor contributing to the nomadic existence: that nomads inhabit a highly variable environment and that production is always faced with risk. Of course, the major climatic element, rainfall, cannot be modified, at least given the current level of technology, but precautions can be taken to ameliorate its effect when it fails.

ix. Research to resolve the problems associated with managing rangeland and utilizing these lands for producing livestock on a continuing basis is essential. It would seem logical to initiate a research program to gain an understanding of the local pastoral ecosystem supplemented by a collection of an ecological baseline data set. Consideration of nomadic movement patterns, types of livestock and the selling of livestock and their products would appear to generate sufficient questions to begin serious hypothesis testing.

x. Organize a research to focus and examine the advantages and negatives of new large scale water
development points, preferable immediately before and sometime after the completion of the wells.

xi. There is no doubt that the risk of resource degradation is likely to occur whenever the number of livestock exceeds the “carrying capacity" of the land. Therefore, it would be more sensible to develop
a pastoral system that reduces pressure on rangeland, and at the same time, increases long range economic security for the pastoralists. The only way of achieving these objectiveswould be to prevent overstocking.

CONCLUSIONS

The impact of drought among pastoral communities normally manifests itself in the form of livestock losses, which adversely affects the provision of subsistence, income, and other sociocultural goods and services to a pastoral household. In Puntland, pastoral households are already taking measures to protect their livelihoods against the increase in drought events. Most of the adaptive and coping strategies to drought are rather reactive and mainly intensify exploitation of existing resources, which may in turn undermine the very livelihoods that they are meant to complement. Existing opportunities for long-term adaptation strategies to drought appear constrained by a number of socioeconomic developments, political changes, and deteriorating ecological conditions. For example, violent clan conflicts, lack of credit facilities and financial services, limited access to markets, recently observed land tenure changes from communal to private ownership, and poor infrastructure are problematic to sustainable pastoral production system. Other constraints are inadequate access to professional veterinary services, degradation of grazing lands, and poor information access and extension services. The increasing frequency of droughts allows limited recovery periods for pastoral households, and, if the trend continues, the recovery periods may become even shorter thereby undermining the resilience of both pastoral ecosystems and livelihoods. Therefore, proactive measures aimed at sustainable protection of the main productive assets, such as pastures and livestock resources, are essential. Pastoral viability is best attained by guaranteeing free and safe livestock mobility, improving the provision of security, increasing access to education, livestock markets, and expanding transport and communication infrastructure. These efforts would be most effective if supported by programs offering affordable credit facilities, strengthening extension services, promoting diversification of livelihoods and income sources, and enhancing livestock diversity and promoting species that are drought tolerant. This brief study concludes that although the adaptation and coping strategies employed by households in Puntland are specific to their context, the information generated about resource use is an important tool with which to guide development and policy processes at both state and national levels.

REFERENCES

1. African Union. 2010. Policy framework for pastoralism in Africa. Addis Ababa: African Union.Google Scholar

2. Blaikie, P., T. Cannon, I. Davis, and B. Wisner. 1994. At risk: Natural hazards, people's vulnerability and disasters. London: Routledge.Google Scholar

3. Downing, T.E., and K. Bakker. 2000. Drought discourse and vulnerability. In Drought: A global assessment. Natural hazards and disasters series, Vol. II, ed. D.A. Wilhite, Chapter 45: 3–18. London: Routledge.

4. IPCC (Intergovernmental Panel on Climate Change). 2012. Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.Google Scholar

5. Nicholson, S.E. 2014. A detailed look at the recent drought situation in the Greater Horn of Africa. Journal of Arid Environments 103(1): 71–79.CrossRefGoogle Scholar

;;;;
;;;;

ANNEX 1: LIST OF THE STUDY PARTICIPANTS

S/N	Name	District	Gender
1	Ruun Ahmed Mohamud	Baargaal	Female
2	Maryam Ali Sed	Baargaal	Female
3	Xareedo Siciid Axmed	Baargaal	Female
4	Maryam Abdi Ahmed	Baargaal	Female
5	Sureer Raage Shire	Baargaal	Female
6	Buuxo Adan	Baargaal	Female
7	Ayan Shire Osman	Baargaal	Female
8	Mumino Ali	Baargaal	Female
9	Fowsiyo Saciid Yusuf	Baargaal	Female
10	Xadiyo Maxamed Yusuf	Baargaal	Female
11	Johro Maxamed Adam	Baargaal	Female
12	Sareedo Maxamed Shabelo	Baargaal	Female
13	Maryam Mire Ibrahim	Carmo	Female
14	Sacdiya Xasan Maxamed	Carmo	Female
15	Baxsan Maxamed Maxamud	Carmo	Female
16	Asha Abdille Waberi	Carmo	Female
17	Fartun Salad	Carmo	Female
18	Raxmo Xasan	Carmo	Female
19	Fadumo Maxamed Maxamud	Carmo	Female
20	Amina Maxamed Farax	Carmo	Female
21	Karuro Yusuf	Carmo	Female
22	Xamdi Xasan	Carmo	Female
23	Amal Abdirahman	Carmo	Female
24	Anisa Warsame	Carmo	Female

25	Khadra Maxamed Maxamud	Carmo	Female
26	Shukri Saciid	Carmo	Female
27	Mohamed AAli (Clan elder)	Gardo	Male
28	Mohamed Isse	Gardo	Male
29	Mohamed Muse	Gardo	Male
30	Said Mire	Gardo	Male
31	Xirsi Mohamud Diriye (C.Elder)	Bender Beyala	Male
32	Jaamac Mohamud Ali	Bender Beyala	Male
33	Khalif Mohamud Dacar (Clan elder)	Bender Beyala	Male
34	Mohamud Yasiin Omar (Clan elder)	Bender Beyala	Male
35	Kediye Geelle Nuur	Bender Beyala	Male
36	Buruj Mohamed Caguug	Bender Beyala	Male
37	Diraac Feeyig	Bender Beyala	Male
38	Abdi Elmi Said	Bender Beyala	Male
39	Bashir Mohamud isse	Bender Beyala	Male
40	Bile Nuur Farax (Guddoomiye)	Bender Beyala	Male
41	Abshir Shire Amaan (Xoghaye)	Bender Beyala	Male
42	Ahmed Abdirisak Ahmed (Macallin)	Bender Beyala	Male
43	Mohamed Said Hersi (Xildhibaan)	Bender Beyala	Male
44	Osman Jama' Nuux (Suldaan)	Bender Beyala	Male
45	Aweys Awad Nuux (Nabadoon)	Bender Beyala	Male

KAALO AID AND DEVELOPMENT ORGANISATION
ISLAN MOHAMMED STREET | GAROWE – PUNTLAND, SOMALIA
Telephone: +252 – 5 – 844247
Website: www.kaalo.org/ www.kaalo.so
E-mail: kaaloorg@yahoo.com | program@kaalo.org | operations@kaalo.org