MoHADM

Climate Vulnerability and Capacity assessment

FUNDED BY UNDP	IMPLEMENTED BY MoHADM-Puntland

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TABLE OF CONTENTS

Table of Contents

ACRONYMS

MOHADM	Ministry of Humanitarian Affairs and Disaster Management
CSOs	Civil society organisations
DRR	Disaster risk reduction
GAPs	Good agricultural practices
CVCA	Gender-based Climate Vulnerability and Capacity Assessment
GDP	Gross Domestic Product
GEF	Global Environment Facility
ENSO	El Nino Southern Oscillation
EU	European Union
ITCZ	Inter-Tropical Convergence Zone
NAPA	National Adaptation Plan of Action
NCA	Natural Capital Accounting
NDP	National Development Plan
NGO	Non-governmental organization
NRM	Natural resources management
PDRA	Participatory Disaster Risk Assessment
PPP	Purchasing Power Parity
PRA	Participatory Rural Appraisal
SDGs	Sustainable Development Goals
SIGI	Social Institutions and Gender Index
UNFCCC	United Nations Framework Convention on Climate Change
VSLA	Village Savings and Loans Association
UNDP	United Nation Development program

CHAPTER 1:

CLIMATE CHANGE and CVCA

1.1.Overview of Climate change in Somalia

Climate change is an unprecedented and increasing global threat to livelihoods and to the supply of life-supporting ecosystem goods and services, particularly in developing countries. It is a global issue, though impacts are felt more extensively in arid and semi-arid regions due to the high degree of climate variability and weak coping capacities. Climate change presents significant threats to the achievement of the SDGs.

Puntland is located in a region most vulnerable to climate change and climate variability, a situation aggravated by the interaction of multiple stresses, occurring at various levels, and coupled with a low adaptive capacity among the population. The existing major climate hazards in Puntland are droughts and extreme flooding events. Other climate-related phenomena such as dust storms, heat waves and cyclonic winds whose occurrences, though less frequent, still pose serious threats to local livelihoods. Future climate change is expected to see all of these hazards intensify.

Approximately 70% of Somalis are dependent on climate-sensitive agriculture and pastoralism. As floods and droughts become more severe and frequent in Somalia, there is a need to find approaches that can reduce the sensitivity of farmers and pastoralists to increasing rainfall variability. With natural resource degradation also rampant throughout Somalia, most notably for the production of charcoal, Somalia is becoming increasingly vulnerable to conflicts over scarce resources.

Climate change and resource scarcity are exacerbated by the absence of policies on land-use and disaster risk management at the national level. At local levels, communities lack the financial, technical and informational resources needed to build their resilience to climate change as well as the knowledge of how to prepare for extreme weather impacts

Somalia is the world's fifth poorest country with a per capita income of US$435[1] to US$600[2]. In 2016, 51% of the population lived on less than US$1.9 a day at 2011 Purchase Power Parity (PPP).[3] Exports constitute only 14% of the GDP, with livestock trading with the Gulf being a mainstay of the Somali economy, constituting 80% of foreign exchange earnings. UNDP estimated that in 2014 over 70% of Somalis were pastoralists or agro-pastoralists.

Pastoralism refers to a livelihood strategy based on moving livestock to seasonal pastures primarily to convert grasses, forbs tree leaves or crop residues into human food.[4] Whereas the search for feed in one of the reasons for mobility, pastoralists may move in order to avoid natural, social hazards or as in the case of Somalia, conflict. Another rationale is to avoid completions with others, or to seek conditions that are more favourable. In Somalia, pastoralism is fully embedded in the tradition, culture and economy.

Climate change is increasingly affecting Somalia, with the country facing growing uncertainty regarding seasonal and annual rainfall levels, rising surface temperatures, sea level rise and the loss of lives and livelihoods dependent on fragile over exploited ecosystems and natural resources. Climate change directly threatens the achievement of the Sustainable Development Goals (SDGs) especially those related to eliminating poverty and hunger. Food security – one of the most critical challenges facing Somalia – is compounded by the effects of climate change on agricultural production and the sustainable management of rangelands and other ecosystems. Climate change also has an impact on health, water availability, terrestrial biodiversity, coastal and marine resources, and the livestock sector.

[1] Somalia National Development Plan (SNDP), 2017
[2] World Bank estimates
[3] The report defines poverty as having a total daily per capita consumption expenditure lower than the international poverty line of US$1.90 at 2011 PPP, which equals 34,341 Somali Shillings per day per person in 2016.
[4] IOM, 2007
(footnote continued)

With the support of partners, the Federal Government of Somalia has developed a National Adaptation Program of Action on Climate Change (NAPA)[5]. The NAPA identifies three urgent areas of action ("agriculture, livestock and natural resources", "telecommunications and media", "financial services") and proposes adaptation measures. The NAPA also specifically lays emphasis on working with affected communities to understand the vulnerabilities of key sectors as well as collating communities' own perceptions on climate variability.

In addition to ferreting out sectoral vulnerabilities, Somalia's NAPA also calls for identification of vulnerable groups and a deeper understanding of their adaptive capacities and coping mechanisms. Among the eight principles of Somalia's NAPA is gender equality, which is described as "the active participation of women, youth and representatives of communities and marginalized groups." However, the Plan is yet to be cascaded to the regions as it has only been developed and designed by the Federal authorities in Mogadishu.

On its part, Somalia's National Development Plan identifies climate change as a phenomenon that is likely to increase the occurrence of disasters, and calls for "strengthening national capacity to forecast, avoid and cope with the aftermath of disasters is the key towards reducing the deleterious impact on poverty and society at large."[6] In particular, the agriculture sector is deemed as being at risk due to the vagaries of changing climates. For some reason, the infrastructure sector is however deemed to stand at the greatest risk due to climate change, which is why the vision of the infrastructure section talks about "creat[ing] infrastructure that enhances the employment, increases food security, **builds up resilience to climate change** and variability, respect Somali cultural heritages and is environmentally and economically sustainable."

[5] For more details on the NAPA, see Federal Government of Somalia (2013). *National Adaptation Program of Action on Climate Change (NAPA)*. UNFCC, UNDP and GEF.
[6] See Republic of Somalia (2016). National Development Plan (2017-2019). Retrieved on January 1, 2019, and accessed at http://extwprlegs1.fao.org/docs/pdf/som169866.pdf

The Somali government inaugurated the Somali Disaster Management Policy in January 2018, which aims to strengthen national capacities for better disaster preparedness, response, mitigation, prevention and recovery. The policy has been designed to improve responsiveness to early warning, and if implemented in full will address issues of coordination as well as timely and efficient pooling and use of resources to reduce the deleterious impact of disasters caused, by among other things, climate change.

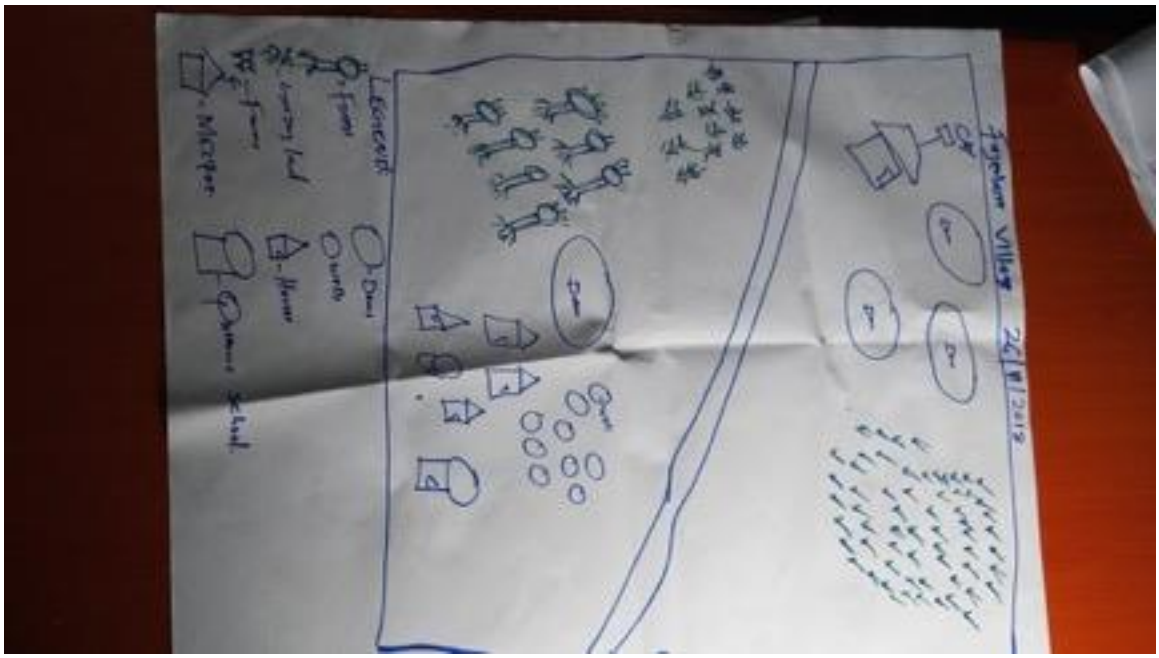

Figure 1: Community resource map

It is in the context of the foregoing that the MOHADM planned to undertake a climate vulnerability and capacity assessment in Nugaal and Karkaar regions in Puntland.

CVCA Process

The exercise of CVCA in Nugaal and Karkaar regions was undertaken by three teams including MoHADM technical staff who had been earlier trained as well.

The participants were trained on various concepts which included: Climate change, rationale behind CVCA methodology, CVCA tools, application and analysis. In order for the participants to internalize the concepts, a field practicum was done in Qardho and Garowe which were the main target areas of the assessment.

CVCA tools used in the study included livelihood context tool, Resource mapping, well-being and wealth ranking, Gendered Daily Activity calendar, seasonal calendar, institutional analysis/Venn diagram and finally vulnerability matrix. The participants were segregated based on age and gender i.e young women and your men, old women and old men and each category was interviewed separately. To reinforce community information, key informant interviews were conducted among key government and other stakeholder's representatives in Nugaal and Karkaar regions.

The primary data information from CVCA study were analysed and was further triangulated with documented secondary data from the literature review focusing on the thematic areas highlighted above ie institutional context, socio-economic context, climate change and vulnerability and adaptive capacity. Some of the secondary documents reviewed include: National Adaptation Program of Action on Climate Change (NAPA), developed in 2013 by the Federal Government of Somalia with support from the United Nations Development Program, the Global Environment Facility (GEF) and the United Nations Framework Convention on Climate Change (UNFCC).

The key informants' interviews were also conducted with village leaders, women leaders at community level and also with selected institutional representatives from relevant government departments at local and regional level and NGO

The findings of the CVCA study were shared with the stakeholders in Nugaal and Karkaar regions that served as a validation forum, gathering additional information and filling in the gaps, coming up with concrete, practical steps towards enabling and supporting communities implement priority interventions.

Limitation and Scope of CVCA

The scope of the study was guided by the five key results areas:

- Review and translate MOHADM CVCA tools and other Participatory Rural Appraisal (PRA) tools that will be used for the CVCA exercise from English to the local language and vice versa
- Support the training of the CVCA teams on the CVCA methodology and tools
- Provide field technical support to the data collection team on a daily basis throughout the study period
- Provide support in literature review – reviewing assessments, baseline surveys and other relevant studies
- Support sharing and validation of study findings at community and district levels
- Analysis of the CVCA data/findings (at all levels – community, district, regional, etc.) and compilation of the village profiles and CVCA report as the CVCA teams share information including aggregation of all the CVCA exercise in Nugaal and Karkaar regions

CHAPTER 2

OVERVIEW OF CLIMATE CHANGE IN SOMALIA

2.0 INTRODUCTION

Somalia is characterized by a generally arid and semi-arid climate with two seasonal rainfall seasons (*Gu* and *Deyr*). The Inter-Tropical Convergence Zone (ITCZ), monsoonal winds and ocean currents, jet streams including the so-called Somali Jetstream or Somalia Current, easterly waves, tropical cyclones, neighbouring Indian Ocean and Red Sea conditions influence the country's climate.[7]

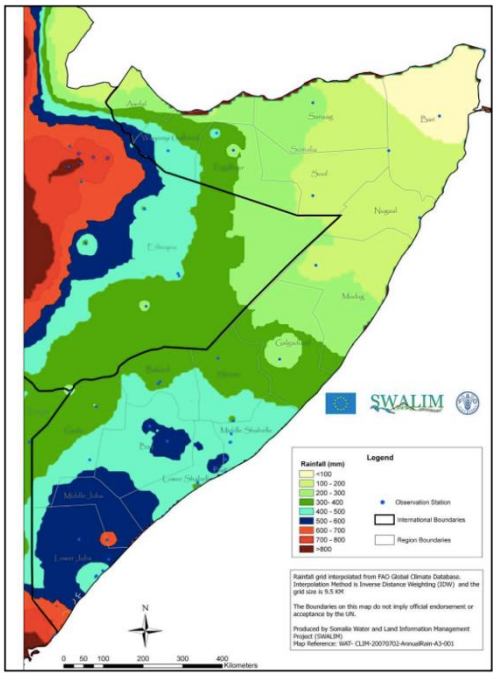

Figure 1: Mean annual rainfall in Somalia (source: SWALIM)

During the time of 1901-2015, the average annual temperature is highest in Somalia's heartland with marginally colder temperatures around the Gulf of Aden in the north (where Nugaal and Karkaar regions is nominallu located). Annual mean temperature is close to 30 degrees Celsius throughout all regions in Somalia, but slightly higher in Nugaal and Karkaar regions. Average monthly temperatures reach their maximum during the months of April through June of around 33°C. June to September are the hottest months in the north, while December to March mark the hottest months for the south. Somalia has a harsh climate with mostly marginal land suitable for nomadic pastoralism. It lies at the extremity of the sub-Saharan semi-arid zone commonly referred to as the Sahel, which traverses the continent from Senegal to Somalia. It has predominantly very arid and semi-arid climate zones, with large desert climate zones in the north and isolated humid semi-arid zones in the south.

[7] FOF SOMALIA, 2013

Located between two subtropical anticyclone belts, its main weather patterns are controlled by seasonal monsoon winds.

Mean rainfall distribution across the country (*fig 6*) indicates an arid and semi-arid north and wetter conditions moving south. As a pastoralist nation, most Somalis rely on rainfall for pasture and water for livestock and rain-fed, largely subsistence, agriculture.

2.1 RECENT CLIMATE TRENDS

Generally, in East Africa, the availability of station data is highly limited. Gridded observational data sets CHIRPS (daily, 1981-now) and CenTrends (monthly, 1900-2014) provide the best option for observational analyses according to Philip *et al.*, 2017.

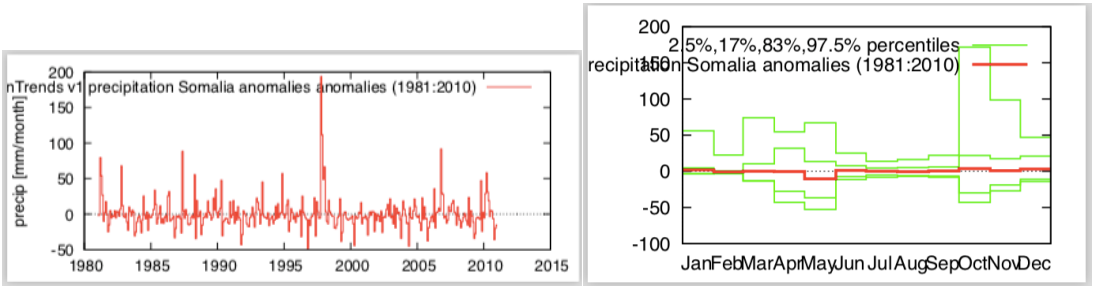

Figure 2: 30-year span of rainfall anomalies in Somalia (1981-2010), constructed on the CenTrends (1900-2014) dataset. (Left) The graph shows monthly anomalies in precipitation as mm/ month. Overall, rainfall anomalies show correlation with drought years, e.g. 1987 and 1998. (Right) Anomaly distribution in percentiles 1981-2010. Anomalies are largest during the OND (October, November, December), correlating to the (short) Deyr rainy season.

Since the 1960s, a warming trend has been observed in Sub-Saharan Africa. Despite trends for this region as a whole being inconsistent, East Africa has been experiencing precipitation increases in the northern part and decreases in rainfall in southern regions.[8] Moreover, climatic extreme events such as floods and droughts have been reoccurring on a once every ten years basis.[9] Especially since the beginning of the 2000s, Somalia has been impacted by a number of disastrous extreme weather events. The IPCC AR4 report already noticed in 2007 that a shift in seasonal patterns could

[8] Lott, F. C., Christidis, N., and Stott, P. A. 2013. *Can the 2011 East African drought be attributed to human-induced climate change?* AGU100

[9] Balint, T. Lamperti, F., Mandel, A., Napoletano, M., Roventini, A., Sapio A. 2016. *Complexity and the Economics of Climate Change: a Survey and a Look Forward.*

indicates an increased precipitation variability. The report points out that this will very well be causing the increased frequency and impact of drought and flash flood events.

In the East African region, rainfall is subject to great spatial and temporal variability with seasonal rainfall dominated by the north and south movement of the ITCZ. The El Niño Southern Oscillation (ENSO)[10] influences Somalia's climate variability in various ways, bringing more rainfall and flooding during El Niño and droughts in La Niña years. During the years 1972, 1977 and 1982, ENSO influences were among the strongest recorded and indicated a peak of the October to December rainfall. Drought events occurred during La Niña years 1971, 1974, 1975, 1984,1988 and 1994, 2004 2023 and are observable in large peaks and troughs during September to December seasons. [11]

2.2 CLIMATES, ENVIRONMENTAL CHANGE AND COMMUNITY KNOWLEDGE

Reducing rainfall, increasing temperature levels. Communities in Nugaal and Karkaar regions reported that rainfall has been decreasing and becoming unpredictable while the temperature levels have also been rising. There was a consensus among respondents that the temperature has increased during the past twenty years. Changes in temperature and rainfall have had negative impacts on livelihoods as these have contributed to shifts in the ideal planting calendar and conditions. On the other hand, communities reported that rise of temperature also causes high soil moisture loss, consequently affecting plant vigour and performance, resulting in stunted growth of crops and pasture.

Impact on livelihoods. Agropastoralist groups reported that it is becoming problematic to use the traditional cultivation calendar they were accustomed to in the past. In Nugaal and Karkaar regions, there is an increase in temperature, especially when accompanied by low amounts of rainfall, proved to have detrimental effect on food crop production. Discussions with communities revealed a general decrease in

[10] Note: El Niño and La Niña events tend to develop during the AMJ months and tend to disrupt the large-scale air movements in the tropics, triggering a cascade of global side effects. The events typically persist for 9 to 12 months, though occasionally persisting for up to 2 years. They typically recur every 2 to 7 years.
[11] FOF SOMALIA, 2013

yield due to mostly below-normal rainfall. Farmers have reported that crop yield, for example sorghum and maize, has been decreasing per hectare of land every year since 2007. Furthermore, it has become difficult to grow maize due to insufficient soil moisture, adversely affecting food security.

The major reasons for the reduction of cereal crop yields are: a) low precipitation and very short rainy seasons with very few rainfall episodes; b) variations with regards to onset of precipitation, causing anomalies in the cropping calendar; 3) soil fertility loss due to erosion by water and inappropriate agricultural practices; 4) invasive weeds (such as *Parthenium hysterophorus*) and pests such as worms ('*Dirxi*") affecting both maize and sorghum. Following the unpredictable nature of the rainfall, the cultivation of cereal crops in most parts of the rain fed agriculture has become highly opportunistic

Over 65% of the Nugaal and Karkaar regions population is rural and engaged in pastoral, agro-pastoral, fishing and subsistence agriculture as a livelihood. Increasing uncertainty around seasonal and annual rainfall, rising surface temperatures, and rising sea levels increasingly threaten these livelihoods, which depend on fragile or over-exploited ecosystems and natural resources. Amid chronic vulnerability, pervasive insecurity, and fragility due to conflict—along with a limited capacity to absorb climate shocks—approximately half of the Nugaal and Karkaar regions population can be characterized as suffering from water scarcity, food insecurity and malnutrition.

Access to weather and climate information. There is a high preponderance of ownership of mobile phones, which is one of the main crucibles by which weather and climate information is dissemination in the district. The global statistics platform Statista reports that mobile phone penetration in Somalia is approximately 49% as of the year 2013[12]: there is evidence to support the assertion that mobile phone ownership in the relatively more stable and prosperous region of the country is above the reported figure of 49%.

[12] See https://www.statista.com/statistics/510594/mobile-cellular-subscriptions-per-100-inhabitants-in-somalia/

FAO-SWALIM generates climate information for sharing, and part of this information finds its way to the communities. Radio ownership is also very high, and this contributes to the prevalence of availability of climate-related information.

CHAPTER 3

VULNERABILITY AND CAPACITY ANALYSIS

3.0 INTRODUCTION

The main climate-related hazards established in the assessment are droughts and flooding, livestock disease outbreaks, human disease outbreaks and locust/pests and diseases affecting cropping systems. Communities reported that whereas drought cycles used to be spanning 10 years, now droughts occur every 6 years. Communities reported that the droughts between 2011 and 2017 desiccated more than 90% of standing vegetation and reduced drastically availability of water for humans and livestock. This caused deaths among humans and livestock and increased the pace of wildlife mortality. The droughts also contributed to expansion of the honey mesquite (*Prosopis juliflora*), especially in Nugaal and Karkaar regions, in addition to negatively affecting soil quality for farming. In general, droughts have caused despondency, forcing more people to quit farming or herding.

Table 1: Resource endowment in Nugaal and Karkaar regions

Village	Natural	Physical	Social	Human	Financial
Badey	- Fisheries (lobster, octopus, fish) - Spring water - Mountains	- Electricity - Health centre - School - Shops - Cafes - Fishing boats - Vehicles	- Social ties - Kinship	- 300 households	- VSLA - Sahal money transfer
Daawad	- Grazing lands			- 750 households	
Buurtinle	- Grazing lands			- 40,000 households	

Bandarbayle	- Fisheries (lobster, octopus, fish) - Spring water - Mountains	- Electricity - Health centre - School - Shops	Social ties - Kinship	56,000 households
Garowe	Mountanious, two dry rivers,			
Qardho				

3.1 WEALTH AND WEALTH CLASSIFICATIONS

Wealth ranking typologies and classifications were different when it comes to (a) rural and urban, and (b) agro-pastoralists communities. In the rural areas, only two wealth typologies were self-identified by communities: "middle class" or poor ("*dhexdexaad*") and indigent or very poor ("*sabool*"). The assessment established that the "middle class" typology accounted for about 30% of the total population. On the other hand, communities reported that the indigent comprised about 70% of the population.

While the results show absence of what would normally be classified as "rich" families in rural settings, in a peri-urban Nugaal and Karkaar regions (an urban area) the community reported their existence. An examination shows that the "rich" families have possessions totaling to ~ $4,300. On the other hand, the rural poor ("middle class") consist of 30% of the population, possessions totalling to ~ $3,600. The indigent group were assessed as having ~ $250 in wealth and possessions.

Four climatic seasons were noted, two of them wet and the other two dry. The general consensus was that out of the four seasons, reliable rain was only realized in the *gu'* season (which is also the season in which the most rain was received typically). Livelihood activities were markedly different in the seasons. Shortages of food (especially milk) and other commodities were noted as occurring during the *diraac* (or *jilaal*) and *xagaa* seasons.

This assessment established that climate change and resource scarcity are exacerbated by the absence of policies on land-use and disaster risk management at the community level. In both districts evaluated, communities have a modicum of the financial, technical and informational resources needed to build their resilience to climate change as well as the knowledge of how to prepare for extreme weather impacts. However, this resource base is weak and there are disparities. Women were identified in both districts as the group most vulnerable to changing climates, after children and teenagers.

3.2 Gender Based Climate Vulnerability and Capacity Analysis (CVCA)

MOHADM decided to gauge communities' understanding regarding gender-based climate vulnerability and capacity analysis (CVCA). Targeting pastoral and agro-pastoral and fisheries households living in Puntland particularly Nugaal and Karkaar regions, the CVCA seeks to:

- Analyse vulnerability to climate change and adaptive capacity at the community level in the project target villages in Nugaal and Karkaar regions (in Puntland), and
- Combine community knowledge and scientific data to yield greater understanding about local impacts of climate change on the community

By combining local knowledge with scientific data, the CVCA process builds people's understanding about climate risks and adaptation strategies with a lens that includes participation by all gender. It provides a framework for dialogue within communities, as well as between communities and other stakeholders (e.g. local and national government agencies). The results provide a solid foundation for the identification of practical strategies to facilitate community-based adaptation to climate change. **Women and livelihoods in Nugaal and Karkaar regions.** Women were noted as working on average 6 hours (in Nugaal and Karkaar regions) daily, with men working 6 hours less. Within the women-headed households, women are traditionally responsible for raising livestock, growing food, gathering fuel and water, cooking, and

raising children. The division of labour, along with unequal access to both material and non-material resources, and diminished participation for women in decision-making in political and private spheres increases their vulnerability against the impacts of climate change. However, disparities were also noted between communities living in Somalia: women have more flexibility and decision-making opportunities in settled communities (such as dryland agriculture-practicing communities and also in fishing community e.g. in Badey) than in the pastoralist ones.

To support community-led climate adaptation activities, focus should be given towards water capture using small-scale infrastructure and flood impacts reduced with water diversion techniques and reforestation. With much of the population under 30 years of age, youth should be sensitized on climate change knowledge so that they can support communities' own efforts on-the-ground. Furthermore, MOHADM should empower women to market and to scale-up distribution of adaptation technologies, providing women an improved asset base.

- Community's own future projections of climate change show increased average temperatures, and unpredictable precipitation.
- Residents in Nugaal and Karkaar regions reported a similar set of hazards, identifying droughts as the main concern: however, in Nugaal and Karkaar regions, livestock diseases were more of a concern compared to other regions (which have lower livestock numbers).
- Gender roles are important in livelihoods and division of labour, and lead to differential vulnerability for different genders.[13]
- Strategies for dealing with hazards, including the shocks and stresses due to climate change, are diversified.
- Coping strategies such as increased cutting and sale of firewood are not sustainable, while longer term strategies such as the development of

[13] For an in-depth discussion of gender and climate change matters, please see Section 6 of this report

small-scale water infrastructure and the increased use of irrigation continue to build adaptive capacity.

- There are limits to the degree to which people can continue to diversify strategies without
    - Achievement of stable governance
    - Increased capacity in infrastructure and markets, and
    - Administrative capacity of local governments in Nugaal and Karkaar regions.
- Decision-making power continues to be the province of men in collective decisions, though women have more autonomy among the fisher-folks in north-eastern Somalia.
- Teenage girls have the least autonomy of all groups for decisions concerning their futures.
- Communities have a modicum of access to information concerning weather, climate, and some adaptive strategies, though women reported far less exposure to this information.
- Communities in Nugaal and Karkaar regions reported having multiple relationships with INGOs: there are no market-level interlocuters in any of the villages sampled.
- Men have more access than women to institutional services.

3.3 PROFILES OF VULNERABILITY

In Nugaal and Karkaar regions, the profile of vulnerable people were similar. More vulnerable people from Nugaal and Karkaar regions were noted to have the following characteristics:

- Fewer livestock possessions (both for husbandry and for selling)
- Lack of access to productive assets (land, livestock)
- Insufficient land to cultivate

- Limited access to remunerative markets or job opportunities
- Lack of sufficient labour for crops or livestock
- Single headed households (especially female), widows, and disabled persons
- Lack of capacity to buy food when prices are high

The main capacities that serve to reduce vulnerability are:

- Social capital (from clan linkages)
- Producer networks (such as agricultural harvest support groups)
- Trade relationships
- Diversified revenue sources (combining pastoralism, settled agriculture and fishing, with commerce in the background)
- Membership of religious groupings and associated resources
- Strong local organizations, particularly the VSLAs
- Supportive INGOs are located in the major towns like (Garowe and Qardho)
- Local administration that has mustered some resources to implement local policies in the main sectors affected by climate change, with support from INGOs

Programs to reduce these vulnerabilities and strengthen these capacities would support adaptation to climate change.

3.4 WEALTH RANKING

- Karkaar and Nugaal regions traditionally rank wealth on the basis of ownership of livestock
- However, the country has had nearly three decades of civil strife, which has had significant deleterious impact on wealth of people, particularly the pastoralists, agro-pastoralists and fisheries

- Typology and classifications are different when it comes to (a) rural and urban, and (b) pastoralists and agro-pastoralists: Table 3 explains the ranking of wealth by people in Nugaal and Karkaar regions, on the basis of their culture and experiences

- Three typologies were initially identified by the communities in Nugaal and Karkaar regions – "middle-class", poor and very poor

- However, on closer introspection, it was agreed by the community that there were only two typologies

- In the rural areas, only two typologies were self-identified by communities: poor ("*dhexdexaad*") and very poor ("*sabool*")

- Among **agro-pastoralists**:

    - "Middle class" was identified as a household with the following resource endowment: 0 camels, 0 cows, 70 goats, 30 sheep, 0 chicken, and 0 donkeys; this resource endowment totals to an income of approximately $4,250 a year

    - "Poor" was identified as a household with the following resource endowment: 0 camels, 0 cows, 5 goats, 0 sheep, 0 chicken, and 0 donkeys; this resource endowment totals to an income of approximately $700 a year

- Among **fisherfolks**:

    - "Middle class" --- owns one shop, one fishing boat, and has a farm to fall back on, and earns $3,600 per year as income from their businesses, has work throughout the year, form 30% of the population, proportion is reducing

- "Poor" --- includes old, retired people or able persons who are seasonal fisherfolks, works on average 10 days a month, earns $600 per year as income, form 30% of the population, proportion is increasing

- Among the urban inhabitants:

  - "Well-off" (or *qani* in Somali) is defined as someone with either a business outlet, land, vehicle; they form 5% of the population in Nugaal and Karkaar regions, and their proportion is increasing

  - "Middle class" (*dhexdhexaad*) is defined as someone with about 15 goats and operating a small business outlet; they form 30% of the population, and their proportion is decreasing

  - "Poor" or "indigent" (*faqiir* or *sabool*) is defined as someone with no income, and reliant on a donor or the goodwill of someone else; they form 65% of the population, and their proportion is increasing.

Table 2: Wealth ranking in Nugaal and Karkaar regions

Typology	Camels	Cattle	Goats	Sheep	Chicken	Donkeys	Net worth (US$)
Well-off	0	0	70	30	0	0	4,250
Middle class	0	0	15	0	0	0	700
Very poor	0	0	5	0	2	0	250

Indicative prices used for economic evaluation:
Camels ($700), cattle ($220), goats ($50), sheep ($25), donkeys ($100), and chicken ($5) per head

- The results show absence of what would normally be classified as "middle class" families in rural settings
- In Nugaal and Karkaar regions, rural poor consist of 30% of the population, possessions totaling to ~ $3,380
- Higher proportions of "very poor" families reported (worth ~ $210), consisting of 70% of the population in rural areas in Nugaal and Karkaar regions, whose challenges include:
    - Severe poverty
    - Malnutrition
    - Inability to access basic needs, including food

3.5 CLIMATES, SEASONS AND LIVELIHOODS IN NUGAAL AND KARKAAR REGIONS

- The communities in Nugaal and Karkaar regions identified four climatic seasons, two of which are "wet" (or rainy) seasons and the other two are dry (one 'hot and dry', the other 'cold and dry')
- Livelihoods revolve around the experiences of precipitation around the two rainy seasons

Table 3: Deyr and Diraac seasons in Nugaal and Karkaar regions

Season	Description of the season	Key livelihood activities
"*Deyr*" (autumn)	From Sept. to Nov., moisture high, rainy season, very hot days then cooler in Nov., cold nights	Weddings, start of fishing season, migration with livestock to pasturelands, casual labour, shop-keeping, tea parlours, kiosks, farming starts mid October

"*Diraac*" (summer)	From Dec. to Feb., hot days, high temperatures, no rain, livestock diseases preponderating	Milk scarcity, prices of commodities rise, reduced weight of livestock, farm harvest from previous season of rain, more men registering for casual labour, women looking for income opportunities (e.g., washing clothes), water vendors selling water using donkey carts, fishing season continues

Table 4: Gu' and Xagaa seasons in Nugaal and Karkaar regions

Season	Description of the season	Key livelihood activities
"*Gu*" (spring)	From March to May, a rainy season with longer number of rainfall events, slightly cooler than preceding season, lightning and thunderstorms, most rain received in the year in this season	Higher risks of lightning, calving higher, more milk available, less livestock diseases, businesses booming during this season, especially buying and selling of livestock, farming activities peak, higher weed infestation in farms, end of fishing season
"*Xagaa*" (winter)	From June to Aug., very windy, cooler temperatures, lack of rain	Milk shortage begins, farmers begin harvesting of produce, casual labour activities pick up e.g. water-vending kiosks and carts, tea shops; prices of commodities increase in this season, higher cases of livestock diseases

Seasons and livelihood activities - farming

Table 5: Gender, seasons and farming-based livelihood activities in Nugaal and Karkaar regions

Key livelihood activities	Responsible?	Decision-maker?	When?	Who benefits?
Land preparation	Men	Men	March, Sept.	Family
Planting	Women	Women	Mid-March, Sept.	Family

Weeding (1, 2)	Men and women	Men	April, May, Oct., Nov.	Family
Harvesting	Women	Men	Jan	Men, family
Selling produce	Men	Men	Aug., Feb.	Men, family
Threshing, winnowing grains	Women	Women	Feb., August	Family

Seasons and livelihood activities – herding and fishing

Table 6: Gender, seasons and livestock-based livelihood activities in Nugaal and Karkaar regions

Key livelihood activities	Responsible?	Decision-maker?	When?	Who benefits?
Grazing herds	Women, men	Men	Both *gu'* and *deyr*	Family
Buying, reselling	Men	Men	All seasons	Men
Selling produce	Women	Men	*Diraac*, *xagaa*	Men
Treating herds	Men	Men	*Diraac*, *xagaa*	Men
Slaughtering	Men	Men	All seasons	Men

Table 7: Gender, seasons and fishing-based livelihood activities in Nugaal and Karkaar regions

Key livelihood activities	Responsible?	Decision-maker?	When?	Who benefits?
Repair of fishing nets	Women	Men	*Low season*	Men

Fishing in deep sea	Men	Men	*Sept. to May*	Men and women
Cooking fish for sale	Women	Women	*High season*	Women
Fish refrigeration	Women	Women	*High season*	Women
Smoking fish	Women	Women	*High season*	Women
Selling fish	Women	Women	*High season*	Women

3.6 EXISTING COMMUNITY RESOURCES

Table 2: Typology of resources as perceived by communities in Nugaal and Karkaar regions

Typology	Existing in Nugaal and Karkaar regions as perceived by communities
Natural resources	Farmlands, grazing lands, fisheries stocks, trees
Physical resources	Roads (main + feeder), settlements, livestock, people
Social resources	Quranic schools, mosque, playgrounds, mobile health centre (MOHADM)
Human resources	Children, traditional birth attendants, manpower
Financial resources	Livestock, vegetable gardens, small businesses, VSLA groups

3.6 EXISTING COMMUNITY RESOURCES

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CHAPTER 4

GENDER AND CLIMATE CHANGE

4.0 INTRODUCTION

- The Social Institutions and Gender Index (SIGI) measures gender-based discrimination in social norms, practices and laws across 160 countries, including Somalia.
- The SIGI covers five dimensions of discriminatory social institutions, spanning major socio-economic areas that affect women's lives:
    - discriminatory family code, restricted physical integrity, son bias, restricted resources and assets, and restricted civil liberties.
- The SIGI's variables quantify discriminatory social institutions such as unequal inheritance rights, early marriage, violence against women, and unequal land and property rights: all of these serve to weaken women's capacity to face up to climatic vagaries and changes.
- In the Social Institutions and Gender Index 2014 Edition, Somalia has very high levels of discrimination against women in social institutions (with

parameters including high female genital mutilation, exclusion from leadership, etc.)

- In 2013, 39% of the female working-age population was part of the labour force, while 78% of the male working-age population was part of the labour force.[14]
- It has lower discrimination in son bias and higher discrimination in restricted physical integrity.

4.1 WOMEN, GENDER AND CLIMATE CHANGE IN NUGAAL AND KARKAAR REGIONS

- Women and men in Nugaal and Karkaar regions are experiencing climate change differently, as gender inequalities persist around Somalia in general and the district in particular, affecting the ability of individuals and communities to adapt.
- Women in Nugaal and Karkaar regions bear an unequal brunt of the hardships occasioned by poverty, conflict and clan-based culture which promotes strict male hierarchy and authority.
    - There was no women representation in the Nugaal and Karkaar regions council at the time of carrying out this assessment.
- This is further exacerbated by religious and cultural limitations on the role and status of women in the Nugaal and Karkaar regions society.
- The highest proportion of illiteracy in Nugaal and Karkaar regions is to be found among women.
- As a result, deeply rooted gender inequality prevails; women are either excluded from formal decision making and asset ownership or operate through a patriarchal filter.

[14] See SIGI report available at https://www.wikigender.org/countries/sub-saharan-africa/gender-equality-in-somalia/

- Majority of the people who are classed as "poor" in community's own wealth ranking are women.
- Women also tend to work more hours than men (in the case of Nugaal and Karkaar regions, by 6 hours).
- Women do not generally own any property in Nugaal and Karkaar regions, although they predominate in food production.
- Women do not have easy and adequate access to funds to cover weather-related losses or adaptation technologies.
- Women face gender-based barriers to access to land, financial services, social capital and technology, which render them vulnerable to food insecurity.
- In Nugaal and Karkaar regions, the proportion of women affected by climate-related livelihood changes is estimated to range up to 70 percent.
- Women are, therefore, disproportionately vulnerable to the effects of climate change, which could, in turn, exacerbate existing gender disparities.
- Women have, however, proven to be leading the way towards more equitable and sustainable solutions to climate change in Nugaal and Karkaar regions: for instance, in Badey village, where women-led enterprises are leading the way in eco-fishing enterprises (including restrictions on fishing prohibited species and juvenile fishes).
- Across many economic sectors in Nugaal and Karkaar regions, women's innovations and expertise (such as opening up tea shops and roadside restaurants) have transformed lives and livelihoods, and increased climate resilience and overall well-being.

4.2 DAILY TIME USE

- An investigation of daily time use reveals that women and men have different responsibilities in the family and work different hours

- Women work for about 8 hours daily in Nugaal and Karkaar regions
- On the other hand, men only work for about 12 hours daily
- There is, therefore, a pronounced differential of about 6 hours in terms of daily working hours, in favour of men
- Women have more flexibility and decision-making opportunities in settled communities (especially among the fishing communities in the villages and districts on the shores of Indian Ocean) such as Eyl, Bandarbaylle, Qundheed, Falfalax, Jiifle, Kulub.

CHAPTER 5
INSTITUTIONS, GOVERNACE AND CLIMATE CHANGE

5.0 INTRODUCTION

- Somalia has not had a strong central government since the collapse of the former military regime in 1991.
- This has led to two decades of lawlessness, destruction and displacement causing the decay of all public institutions, continued violence, failed peace talks, chronic famine and food insecurity, and, in the recent past, piracy and religious extremism, all of which have contributed to weakening communities' resilience to climate change.

5.1 GOVERNMENT OF PUNTLAND'S FRAMEWORK FOR COMBATING CLIMATE CHANGE

- A Puntland-wide conference on environment, natural resources and climate change was held on April 2014.
- The key priorities recommended by conference participants were:
    - a) Introduction of environmental education;

- b) Implementation of community-based initiatives on natural resources management;
- c) Validation of environment and disasters management policies through public debates;
- d) Introduction of alternative sources of energy to combat degradation due to charcoal use.

- Following the Conference, the government inaugurated the Puntland Environment Policy, also known as PEP, which includes aspects of combating climate change.
- The PEP approved by the Parliament and assented to by the State's President in December 2014.
- The Puntland administration has established 2022 the Ministry of Humanitarian Affairs and Disaster Management (MoHADM), which is legally under the Puntland Disaster Management Framework.[15]
- According to the Framework, MoHADM will establish links with external institutions for best practices and sharing of experiences in disaster and risk reduction issues.

5.3 COMMUNITY'S OWN PLANNING ARRANGEMENTS

- In Nugaal and Karkaar regions in Puntland, however, new entities of governance have emerged which enjoy legitimacy from the citizenry, including a wide range of indigenous institutions such as council of elders (*Guurti*), peace seekers (*Nabad doon*), women associations and other local CSOs, which have replaced the formal administrative structures.

[15] See Government of Puntland (2011). Puntland Disaster Management Framework. Available at http://www.jccp.gr.jp/_src/sc2340/2_PuntlandDRR.Final.pdf

- They play a variety of roles in defining community priorities, maintaining peace and making resource allocation decisions.

- They largely use traditional Somali system of governance which consists of sets of contractual agreements (*xeer*) and customary laws, that define the rights and the responsibilities of the individual within the family, clan and among neighbors.

- Currently, nearly all tensions are resolved though *Nabad doons* and through councils of clan elders (*shirar odiyaal*).

5.4 INSTITUTIONAL ANALYSIS

- A number of institutions were identified in Nugaal and Karkaar regions by the communities: these institutions were identified on the basis of their interface with droughts and climate change-related dynamics

- These institutions identified include[16]:

    - Village development committees (5% women representation in leadership)

    - Religious groups (all male)

    - VSLA groups (80% women)

    - Early warning committees (40%)

    - Natural resources management (30% women)

    - Water resources management (20% women)

    - Community animal health workers, CAHWs

[16] In parentheses, please see (where available) proportion of women's representation in leadership positions

- FFS groups
- Nursery caretakers
- MOHADM
- Norwegian Church Aid
- World Vision
- World Food Program
- KAALO
- United Nations Development Program (UNDP)
- Food and Agricultural Organisation of the United Nations (FAO)

Table 10: Institutions in Nugaal and Karkaar regions and interface with climate change and preparedness

Institution	Interface with climate variability
Village development council	General responsibility for planning and community development, first port of call in attending to emergencies, droughts, coordination, etc.
Religious council	Faith-based, prayers for intercessions, mobilization in terms of crises, organizes food aid
Village savings and loan association (VSLA)	Women-run, livelihoods-based, savings and loans scheme, can play a greater role in enhancing community's resilience and adaptive capacity
Early warning committee (EWC)	Established through UNDP and INGOs, has weak capacity to relay forecasts to community, needs further training and capacity building
Natural resources management committee (NRM)	Established through NGOs, ideally should be responsible for regeneration, but capacity to implement NRM activities is weak

5.5 INSTITUTIONAL BARRIERS

Barriers identified as hindering rendering of better-quality services:

- Poor understanding of their roles
- Inadequate representation of women
- Capacity inadequacies as most people are illiterate
- Understanding of climate change and vulnerability issues is wanting
- Poor networking among the institutions themselves
- Support from NGOs is irregular
- Sustainability – a lot of changes made by new NGO entrants

CONCLUSION

Weather and seasonal changes are already threatening the trend of the livelihoods.

The climate driven changes and other hazards mostly affect communities' livelihoods negatively. Mainly, these changes also degrade their resources specifically of those regarded as key assets to livelihoods, and this emerges the decrease of communal capacity to adapt those changes.

In this mere regard; livestock are the most highly valued assets whereas the livelihoods of communities of whom possess livestock are varying in the effect of climate risks – as some of those households only retain livestock while others have livestock (and farms and referred as agro-pastoralsists – as ago-pastoralists face the least vulnerabilities. Climate and other hazards affect water and pasture availability intensely. Therefore, they affect livestock production and livestock-based livelihoods negatively. It was also noted that agro-pastoralist households engaged in motorized rain fed farming are vulnerable to climate hazards such as droughts, floods and frost. These hazards pose grave risks to such households' livelihoods and well-being, compared to households engaged in livelihoods that are not heavily dependent on weather e.g. businesses.

Communal primary and secondary livelihood strategies for key assets.

Communities basic economic resources relatively depend on those two major sources, being – livestock, crops and cash obtained from sales of livestock (by sells members of the herds) and/or livestock products (most commonly milk) whereas majority of communities in Nugaal and Karkaar regions largely practice this strategy. Communities are willing the availability of sustainable water sources to fed their livestock during aridity whereof the total-or-most of their livestock dies for either lack of pasture, depletion of water and/or diseases. Besides, Villages packed by pastoral households has also under pinned their urgent need to veterinary centers for the wellbeing of their livestock – these primary livelihood strategies are found within

Adaptation Pathways – where the categorization of two strategies (short-term and long-term) were adopted.

There's significant gender inequality in the access of existing livelihood assets.

Women have roles are often associated with household's basic works since that start of the morning at 6:00am whereas they works begin with cooking for household and feeding young children around 7:00am - 9:00am, they often look-after the livelihood assets including livestock of which young children or women go-after until 5:00pm. Similarly, at the same timing, they go to water points to fetch potable for their household – this more relies to women in villages far from the urban towns as of Labixaar and Gerihel of Karkaar region - as the those villages in nearer households have access to nearer water sources to their households. During 9:00am-12:00 young girls (primarily those in villages far from urban areas) go after the goats or sheep as the access to education is limited in these particular villages. At the noon 12:00 cook for household including men and children, and thereafter; In afternoon, women roles often correlates the preparation of household's accommodation for the night. In enormous equivalence; women give away the most crucial household roles regardless that some of these roles were those for men.

Magnificently, women are hugely burdened to social-related interventions or primarily to work, but within the CVCA study, the women are now given by new roles in DRM committee and every village (20 villages) there were existing DRM committee of which each women has good representation. These commitees were established by MoHADM with the support of UNDP

Women in target communities have governance representation in existing DRM coomittees.

There're exiting social safety nets as of DRM committees of which women and men both represent communities to pre-plan for disaster and engage adaptation options with relevant institutions. Each of assessed village have those social safety bodies that exist DRM units through the support of UNDP

Government's relevant institutions provide limited climate-services and responses to critical climate risks.

Communities in target villages, have the access to early warning systems to perform anticipatory actions prior the crisis, DRR policies are existing, and relevant local governments are aware the effects and the vulnerabilities of climate-change driven risks, but the resources and capacities to combat those risks by investing the sustainable livelihood assets is primarily limited or lucking

Identified strategies for adaptation pathways compared to key risks areas; can immediately contribute the achievement of climate adoptive societies.

The current strategies, however, is based on three major areas that communities addressed as essential targets to achieve resilient livelihoods, those are: a) strategics for land and physical environment systems whereas the focus of sectors to be developed within the major include: Water sources, water security, land-degradation, and forestation. b) strategies for livelihood assets, the key identified assets that are severely prone include: Livestock, farmlands, and small business. c) strategies for development of cross sectoral dimensions: the identified areas include gender dimensions (gender equality and knowledge to adaptation of inclusive livelihoods).

RECOMENDATIONS

- Resilience programmings (specifically those related high-costed infrastructure as water-sources, irrigation facilities, veterinary centers, improved milk-storage facilities, and seed banks) to be planned and implemented in a participatory and inclusive manner, to tackle the increasingly severe impacts caused by climate change risks as of droughts, aridity, land-degradation, floods i.e.

- Community knowledge to producing diversified livelihood sources to be develop; so as they are able to adopt with climate risks – this would

enable communities to generate further income and relay more than one or two livelihood source.

- Existing community and governmental institutions that evolve with settings of DRM/DRR, their structures and systems should be strengthened to ensure sustainable management of resources, and the proper implementation of interventions to achieve resilient development. In each targeted village, in Puntland, there's an established and trained DRM committees but government's role to support those committees is utterly missing.

- Climate services is highly limited in both Puntland as communities in those disaster region, Karkaar and Nugal receive in early warning information but early action is lucking – regional centered early warning systems – should be develop to ensure communities early preparation prior the crisis.