National Economic Council of Somalia

Climate change, adaptation and building human resilience in Somalia

FINAL REPORT

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Executive Summary

Somalia, like most of Eastern Africa, is experiencing severe climate-induced disasters. This strongly impacts the country as it is reliant on climate-sensitive sectors such as livestock and crop production. The vulnerability of different sectors such as and ecosystems is constantly demanding increased, innovative, and transformational interventions.

Hence, for Somalia to experience sustainable and robust socio-economic development against the vagaries of climate change, there is a need for building adaptive systems and resilient communities. There are some efforts that have been made by the Federal Government of Somalia (FGS) to lessen vulnerability to climate change and to improve the sustaining coping capacities of communities in dealing with climatic impacts. However, it is evident that Somalia lacks the means to handle extreme climate hazards, and the mechanisms to enhance human resilience.

From the perspectives of the Federal Government of Somalia, changing this vision into reality and achieving its target of getting the country on a sustainable development, in a few decades, faces enormous challenges.

In light of this, the study deals with understanding the overall challenges associated with climate adaptation in contexts similar to Somalia, critical examinations of possible gaps in climate adaptation and current systems of climate adaptation in Somalia. The study also extends to assessing the interactions between climate adaptation actions resilience building, and the gaps in policy actions thereof. Current and recent efforts at climate financing and enhancing the synergies between global and local climate financing are also examined. The study has explored the current state of local, national and international institutions in terms of their engagement on climate adaptation and resilience building in Sub-Sharan Africa in general and Somalia in particular. Largely based on the above observations, the study has also attempted to propose practical, short term and long term directions to fill the policy gaps.

The study methodology is comprised of analysis based on primary and secondary sources. The first part of the analysis focuses on review of relevant literature issues and deriving testable hypotheses. The second half of the analysis focuses on collecting relevant qualitative information from key informants. The secondary key informant interviews consist of relevant information from relevant government bodies, international development partners, academic institutions, and implementing non-ministerial bodies. Primary and secondary analyses were employed, with the latter employing descriptive approaches.

The assessment in this study regarding climate adaptation focuses on the sectoral, natural resource-based and organizational provisions for adaption building. For this, the adaptation technologies that are available for Somalia's largely arid environment have been analysed. The potential variation local/indigenous adaptation and available adaptation technologies in sub-Saharan African countries with similar biophysical, ecological and economic make ups have been investigated with a view to customize them to the Somali context. The supply side assessment in terms of technology provision also included the potential room for entrepreneurships in adaptation.

Actual adaptation actions in Somalia loosely align with climate risks, and there is encouraging awareness of the threat of climate change across sectors and the need to take up urgent actions. However, there is lack of comprehensive strategy both at a federal line ministerial and development

partners' level. There is also lack of synchronization of adaptation efforts stemming from ad-hoc, and project based efforts that are not backed by formal strategy mainstreamed into standard organizational activities.

The study highlights the task of characterizing resilience of households, communities, sectors against climate change in a manner that allows for distinct categorization for building pathways to effective resilience. There also needs to make efforts at getting a gender-focused resilience building. The resilience building analysis indicated that there is recognition that repeated shocks, associated with resilience erosion are serious in the case of Somalia. But, resilience building efforts are taken as synonymous in some instances, and as a result of that, there are only limited concrete efforts at resilience building at a policy level. Therefore, the following actions are envisaged as ways of building resilience: autonomous resilience building actions, political will, and huge financial investments; institutional, infrastructural, sectoral/national climate adaptation/resilience building strategies; and plans, research and dissemination, and capacity building.

The importance of local institutions in climate adaptation and resilience building, and the institutional arrangements, legislations and regulatory framework relating to climate change in Somalia are also assessed, followed by international climate agreements in climate adaptation and mitigation of relevance to Somalia. The primary data analysis focuses on respondents assessment of the shape institutional arrangements should take for effective adaptation and the policy actions that are in place for that purpose. The structure and challenges in partnership across institutions also extends to stakeholder engagement and partnership at a community level. Several challenges are identified in institutional arrangements with the major ones being the lack of guiding principles/policies in many areas, the lack of effective implementation of policies, laws, regulations and acts, and the lack of coordination across stakeholder institutions.

Global climate change is occurring and will continue to change in the coming century at rates projected to be unprecedented in current human history. In light of the vulnerability of areas in the developing world that have limited adaptive capacity, international funds were proposed under the Convention and its Kyoto Protocol. Since 2001, the Least Developed Countries Fund (LDCF) has funded a high number of adaptation projects,].

The assessment from both international and national organizations is that Somalia is a recipient of very limited climate finance even by African countries standards. Finance is non-existent but organizations like UNEP are in dire need of such resources for the work they do to improve the livelihood of Agro pastoral communities. One of the bottlenecks to accessing finance has been the lack of clearly developed internal criteria that matches with the criteria that funding agencies set for the different institutions to access the climate finance.

The policy recommendations of the study focus on seven key issues that include: expanding adaptive and resilience capacity in all sectors of the economy; incorporating climate adaptation strategy into national plan; increasing prominence of climate adaptation and resilience agenda in national and global policies; aligning resilience concerns with global development; maximizing synergies in climate financing; mainstreaming gender into climate policy; and crafting climate policy based on heterogeneity across agents.

Below we provide a summary of the study findings in four streams: adaptation, resilience building, institutional actions, and climate financing of direct relevance to Somalia. The study identifies sectors as critical to adaptation at a national level, due to their vulnerability to climate impacts. While differing

in degree, their need for adaptation appears all urgent. Critical lessons are drawn from adaptation in the agropastoralist/livestock sector, coastal areas-related climate change vagaries, adaptation in the forest sector from the perspective of illegal charcoal production. And identifies effective adaptation options the study also identifies the challenges adaptation in the different sectors ranging from institutional, political to policy based the study also identifies employment and job creation opportunities as well as social safety net options aligned to adaptation.

There are semi-autonomous resilience building actions that are suitable for Somalia that the study has identified. These include insurance: drawing down on assets: reducing consumption: forage and herd modification and crop-livestock integration: altering herd dynamics: mobile pastoralism and settlement: However, for these resilience building actions to be sustained, expaned and scaled up, a national institutional endeavors is required. In light of this, resilience building plan for Somalia, at a national level, would need to include a strategy that simultaneously tackles environmental and development challenges. For the purpose of exemplifying ssetting up a climate adaptation and resilience building strategy for Somalia, the study draws from, the Ethiopian case of Climate Resilient Green economy strategy.

Somalia has signed or ratified a number of international agreements and conventions aimed at preventing environmental degradation and promoting sustainable use of natural resources. These agreements fall under different categories including, protection of the atmosphere, combatting desertification, conservation of biodiversity, combating marine pollution, and hazardous waste management, among others. Increasing Prominence of Climate Adaptation and Resilience. Despite this however, the study indicated that Somalia needs to keep up with the ever dynamic progress in international negotiations and treaties. Further it also needs to improve the working of its local institutions at different levels. Superficially, the study points to aligning resilience concerns with global development, integrating climate adaptation and resilience building in the national plan, incorporating context, heterogeneity and scale in adaptation and resilience building, and mainstreaming gender into climate Policy.

Both analysis from primary and secondary sources point to the overwhelming lack of financial resources necessary to undertake meaningful adaptation and resilience building activities. To increase the effectiveness of raising and utilizing funds for these purposes, the study results enabled, identifying sources of funding Somalia is entitled to, identifying areas where funding applications for Somalia could be improved upon (Based on a financial accessing experience of Ethiopia,) and , maximizing Synergies in Climate Financing, both in donor-driven and locally financed activities.

Chapter I: Introduction and General Setting

1. Motivation of the Study

This Report is prepared for the study of *"the Climate Change, Adaptation and Building Human Resilience in Somalia."* With an economy closely linked to natural resources and climate sensitive sectors such as crop production, livestock, water and forestry, Somalia is facing a major threat because of the projected changes in climate, which is affecting the national and the household economy. There is already evidence of the direct manifestations of climate change in the country, such as increasing temperatures and rainfall variability, including unpredictable extreme events (droughts and floods). Limited resilience of the people to adverse weather conditions has severely reduced primary outputs and contributed to chronic poverty (FRS, 2020). The capacity of the authorities to undertake adequate recovery measures has also been affected negatively by the prevailing insecurity in major portions of the country; and by lack of effective national governance, weak public institutions, and limited financing access.

A robust policy response to climate change in Somalia is vital for adapting the country's susceptibility and building human resilience. The Government of Somalia recognizes that climate change must be mainstreamed into policies and sectoral activities to achieve sustainable growth (FRS, 2020). For this, knowledge generation associated with increasing adaptation capacity, promoting environmental protection and building climate impact resilience is imperative.

Accordingly, the study carries the major objective of assessing opportunities and constraints with respect to climate adaptation and resilience building in Somalia as part of a NEC's larger goal of formulating sound economic policies. Thus, the study sets out to map the existing institutional, socioeconomic, and natural resource landscape for adaptation and resilience building.

The analysis was utilized both primary and secondary information. Primary data collection was conducted through key informant interviews. Whereas, gathering secondary information involved data compiled by government and development partners at different levels as well as the wider development/policy and scientific literature pertaining to the relevant subjects.

2. The Climate in Somalia and its Changing Patterns

Somalia is generally an arid to semi-arid country with annual rainfall of about 250 mm. The northern maritime plains are extremely hot and arid with average annual rainfall less than 250 mm; with approximately 400 mm of rainfall in the south, and 700 mm in the south-west. The climate of Somalia is determined by the north and south movement of the inter-Tropical Convergence Zone (ITCZ), resulting in a longer rainy season, the Gulf season running from March to June and a shorter one "Dayr", commencing in September and ending in early November (FRS, 2013; FAO, 2015). The amount of rainfall received across Somalia varies dramatically from year to year, from drought periods that persist for several years to erratic periods of intense downpours and flooding. The temporal patterns of high rainfall variability over Somalia are also characterized by extreme events such as floods and droughts (ICPAC, 2013).

Regarding global warming, the fourth Intergovernmental Panel on Climate Change (IPCC) assessment report (IPCC, 2007) shows changes in extreme temperatures across the Greater Horn of Africa (GHA) region have been observed over the last 50 years. Inter-annual analysis of national data for Somalia

shows that mean air temperatures remain high throughout the year with the hottest months in the south, in March and April, being only a few degrees warmer than the coolest months, July and August (FRS, 2013).

Such high temporal and spatial rainfall variability, coupled with prolonged spells of repeated drought is bound to negatively affect crop and livestock production-two of the country's mainstays (FAO, 2015). Somalia's vulnerability to climate change is projected to increase due to its dependency on natural resource base. This, coupled with the man-made degradation of natural resources due to charcoal production and overgrazing, has increased Somalia's vulnerability to drought and desertification, leading to a marked reduction in food security. While precipitation deficit is the major factor causing drought, human activities such as unsustainable land use practices exacerbate the scale and impact of drought. (UNCCD, 2020).

The recurrent climatic shocks also exacerbate other persistent drivers of humanitarian crisis, armed conflict, protracted and continued displacement and a spike in evictions of internally displaced persons are again pushing Somalia towards a major humanitarian emergency. That the recurrent nature of climatic shocks and that resilience is strongly correlated with recurrent shocks is a stark reminder that Somalia is becoming increasingly vulnerable to the effects of climate change. The Federal Government of Somalia is committed to address the need by implementing long-term programs and durable solutions as part of its Resilience and Recovery Framework (UNOCHA, 2019).

3. Objectives and Scope

The principal objective of the study has been to conduct comprehensive research on the impact of climate change in Somalia and identify the pragmatic routes towards adaptation and human resilience building. The specific objectives of the study are to:

- determine and verify available adaptation and resilience building options that have been successfully implemented and what bottlenecks impaired effective implementation of other adaptation/resilience building tools;

- outline how the authorities and stakeholders are involved in the planning and governance processes for adaptation/resilience building actions

- identify critical activities for which there is a potential to utilize international climate related support (such as climate financing) as potential sets of resources, and concurrently identity potential areas of intervention.

- propose key area of focus to come up with climate smart and resilient building policy options

The scope of the climate adaptation/resilience study encompasses reviewing of relevant policies, legislation and other relevant documents, approaches and protocols in line with the national and regional adaptation policies laid out by the government. The focus areas of the study have been government institutions that are direct stakeholders in climate change adaptation/resilience issues at expert, individual, and institutional levels. At the institutional level, the areas of focus have been government organizations such as relevant line ministries and implementing and knowledge generating institutions. Development partners whose work is directly relevant to the topic of the study were also consulted.

4. Methodological approach

The study has employed both qualitative and quantitative research design that includes desk reviews and survey of key informants. Data has been collected through interview with a semi-structured questionnaire and checklists. The process of documents compilation has involved both systematic and ad-hoc with the former involving a systematic review of the scientific literature and the latter including documents sent through the NEC team in Somalia.

The data gathering instruments carefully emphasized climate change impacts and adaptation measures especially during the occurrences of climatic extremes (drought and flood), as repeatedly indicated during the previous policy formulation processes. Parallel to the desk research, expert Key Informant Interviews (KII) were held with about 16 experts working on sectors and institutions of direct relevance to climate adaptation and resilience. The expert-based KII were employed to generate data on climate change, adaptation, and resilience issues. The KII with experts at stakeholder institutes generated qualitative information to compliment the secondary information from the desk review and relevant documents.

In each sectoral mix of the climate/adaptation/resilience direct stakeholders consisting of 16 members were interviewed, as presented in Table 1.

Table 1: Number of KIIs across institutions by sector

Institution type	Expert KIIs				Total
	Agriculture/water/livestock/ and Food Security	Health	Marine and Coastal Resources	Environment	
Federal Government Institutions	4	2	1		7
International development partners				5	5
Academic/Research Institutions				2	2
NGOs				2	2
Total respondents	4	2	1	9	16

Source: Author's compilations from the Key Informant Interview Survey

As per Table 1, the stakeholders that were subjects of the key informant-based data collection include the Division of Climate Change at the Prime Minister's Office, Ministry of Agriculture and Irrigation, Ministry of Humanitarian Affairs and Disaster Management and, Ministry of Fishers and Marine Resources. In addition, local and international NGOS working on the subject of climate change, were also interviewed. Among the development partners, representatives from UNEP and UNDP were also included. The Somalia Institute for Environment and Peace and the University of Somalia were also part of the discussion, representing academic/research institutions.

The discussions with respondents focused on knowledge, attitude and practices related to climate change and adaptation issues, including development and management of climate adaptation projects

and programs, preferences for alternative adaptation mechanisms, history of adopting and being signatories in international climate adaptation negotiations, and utilization of various financial provisions for climate adaptation. The discussions also focused on situation of the different sectors before and after the rise in awareness (concerted action) on climate change and adaptation awareness, as well as their perceptions towards the development of climate adaptation strategy and practices. In addition, adaptation and resilience building from the perspective of development partners was discussed, as were the adaptation interventions.

5. Structure of the Report

The report is organized in the following manner:

This introductory chapter I is the entry to the report, and consist of background on an overview of the subject matter and relevant policy and key stakeholder institutions and includes the objectives of the study, a presentation of key climatic issues in Somalia, and the overall methodological approach followed in the study, and the structure of the report. Chapters II and III assess the impacts of the climate change observed at national, local and household levels; the existing policies, institutional, technical, technological, cultural, and capacities on existence in the country. The two consecutive chapters also examine hindrances or constraints to promote adaptation measures and resilience building efforts.

In Chapter IV analysis of the institutional arrangements and policy provisions at national and international levels are conducted. This includes examining international treaties and bilateral agreements that includes Sub- Saharan Africa (SSA), and Somalia in particular, that focus on climate change adaptation and resilience. This is followed by the climate financing aspects in Chapter V. The analysis here takes into account planning for , accessing, and delivering climate finance; monitoring for the implementation of specific programs/projects: as well as the practical difficulties to capitalizing on the stated provisions. Along with this; local institutional, organizational, financial, and general capacity gaps are be assessed. The final chapter of the study covers topical and key policy recommendations and regulatory changes for a long-term viability of climate change adaptation and resilience building actions. This is hoped to contribute to the design of a comprehensive strategy for climate change adaptation and resilience building. Specifically, the recommendations point to identifying pathways to embark on climate resilient development path.

Chapter II: Climate Adaptation in Somalia

1. Climate Variability and Vulnerability in Somalia and Similar Settings

1.1. Climate adaptation needs and challenges

In developing countries, there is an increasing need to resolve climate related risks that are currently happening and emerging risks (World Economic Forum., 2014). Tackling these challenges requires adaptation[1] action, many of which represent directional change in socio-ecological systems. However, despite planning for climate change adaptation strategies being regarded as a vital element of climate policy in many countries, the practical execution of adaptation actions is in its initial stages [Forster, P.M.; Paavola, J., 2017]. For sub-Sharan African countries in particular despite the increasing efforts, there is a need for concerted knowledge-based, structural and all rounded framework for tackling climate adaptation challenges (GEF, 2015). Somalia also falls in line, with inadequate adapation policies or weak enforcement etc.

1.2. Sector-based climate adaptation needs and challenges

The livestock sector: Sub-Saharan arid and semi-arid countries like Somalia have livestock as the most important source of income for rural populations (Kaufmann et al. 2019)[2]. In recent decades, however, traditional pastoral strategies in sub-Saharan Africa have been severely affected by global environmental changes (Linstädter et al. 2016). These changes have had tremendous effects on pastoral livelihoods (Martin et al. 2014) and on pastoralists' resilience strategies (Kaufmann et al. 2019). Specific to the Horn of Africa, the pastoral and agro-pastoral production systems in Ethiopia-which has cultural, ecological and geographic similarities with Somalia- is getting more vulnerable to climate change and less able to support the basic needs of people living in the area, due to substantive changes to the socio-economic, and ecological environment over the past two to three decades. It should be noted that the climatic conditions and hardships that characterize pastoralism are shared across countries and continents, the people inhabiting these areas differ in their socio-cultural traditions, herd compositions, coping strategies and in the degree of their integration into the market economy (World Bank, 2003). What is more, pastoralism in Somalia-tends to bear the triple challenges of conflicts, being affected by frequent droughts that impact on natural resources (water and grazing land) and lack of innovation (Belay, et al, 2005).

The agriculture sector: Somalia's agriculture sector, a top contributor to GDP and the country's export earnings remains the backbone of the Somali economy (World Bank and FAO 2018). However, the growth of robust agriculture sector is hindered by climate change, where Somalia is ranked as one of the top countries in the world for global vulnerability to climate change (Tracy 2017). Droughts undermine crop production by reducing the cultivated land area leading to harvest failures. Flooding

[1] Adaptation is defined as the process through which societies increase their ability to cope with an uncertain future that involves taking appropriate action and making the adjustments and changes to reduce the negative impacts of climate change [Muller, J.C., 2014] .

[2] The livestock sector in Somalia has had strong pastoral propensity in the past and is now augmented by cereal activities. This has similarities with the agro-ecologically similar western Sahel where livelihood composition at a household or village level has made similar shifts to improve food security (D'Aquino 1998; D'Aquino 2000).

is also another form of climate change event that suppresses crop yield, destroys properties, displaces households, and in some instances, claims the life of vulnerable people (FAO and World Bank, 2018).

The water sector: IPCC's predictions (2007) indicate that many parts of the world will suffer a decrease in water resources due to climate change; in Africa particularly between 75 and 250 million people were expected to be exposed to water stress by 2020 (Chambwera & Jesper, 2010). Much like the rest of Africa, Somalia's water resources have not been spared by climate change. The degradation of water resources in general and in Africa in particular is mainly sea-level rise, receding water table, reduced water quality, drying of water bodies, and contortions of precipitation and water vapour patterns (Tompkins et al., 2009). Climate change is taking a heavy toll across eastern Africa, and increasingly erratic weather - from recurring droughts to floods - is becoming commonplace in countries such as Somalia, Kenya, Uganda and Ethiopia. Further, nearly three-quarters of Somali families lack safe drinking water as drought looms across the country and depletes wells, raising the risk of hunger as crops fail and livestock dies (Bhalla and Omer, 2021). Moreover, Somalia is predicted to be one of the nine African countries that will face water scarcity by 2025 (Boko et al., 2007), and therefore land degradation will worsen the water scarcity effects by increasing the population's vulnerability to drought (Holleman, 2003).

The forest sector: Dryforests are well adapted to the arid and semi-arid landscapes and their contribution to combating alarming desertification and biodiversity conservation remains significant. Their contribution also extends to the livestock sector with almost all of the livestock feed coming from dryforests and grasslands, hence improving their management will contribute to meeting increasing feed demand for livestock sector. As agricultural expansion and demand for wood and charcoal is increasing deforestation of dryforests and given the predicted effects of climate change, crop and livestock production are likely to be constrained and dependence on dryforests and forest products is likely to increase. As challenges facing drylands are social and ecological, future interventions should target improving both livelihood and ecological outcomes and dryforests offer such an opportunities.

Biodiversity: Loss and degradation of biodiversity in Africa in general and Somalia in particular is attributed to several factors in addition to climate change. However, climatic changes are increasingly altering the function of ecosystems and constituents of biodiversity such as affecting species distribution and abundance, leading to biodiversity loss. (Mokany, and Ferrier, S., 2011; Tompkins, et al., 2009). Although Somalia is famous for its species diversity and endemism, the level of degradation is clearly evident. One cause of such degradation is climate change, along with exacerbating factors such as invasive species, and conflict and post conflict situation. Gaps and needs that limit the ability of Somali people and government to strengthen biodiversity conservation and sustainable use include weak institutional capacity and the absence of synergy among biodiversity managing actors, prevalence of sectoral over more coherent approaches, lack of baseline assessments of biodiversity, lack of considerable finances needed to reverse the massive biodiversity degradation, and the issue of insecurity. Considering this as a leading challenge, a systematic approach needs to be developed to move ahead with the conservation activities despite the security issue (Ullah, Saleem and Gadain, Hussein 2016). Additional factors associated with biodiversity loss are illegal hunting and illegal wildlife trade.

Enterprise firms: While the primary causalities of climatic risks are believed to be nature-based sectors, there is an increased acceptance of the fact that the manufacturing and services sectors need to be able to a read and respond to climate signals to be commercially successful. Indeed, firms are beginning to recognize effective climate risk management as a source of competitive strength

(Surminski 2013). However, in many instances, adaptation still lacks the salience to attract senior management attention (Berkhout 2012). Small and Medium Enterprises (SMEs) that form a critical part of developing country economies, are also considered highly vulnerable to climate change, to be among the most affected by extreme weather events and to typically have low adaptive capacity (Crick, Gannon, et al., 2018). Indeed, this high exposure to climate risk is often coupled with lack of development, including poor infrastructure, poor access to markets, and high levels of poverty (De Souza et al., 2015; Tucker et al., 2015; Jobbins et al., 2016; Gannon et al., 2018), which makes adaptation in these sectors even more challenging.

2. Adaptation Needs and Tools in Somalia

Several studies have documented that the economic impacts of climate change can be significantly reduced through adaptation practices (Kurukulasuriya and Mendelsohn, 2006; Mano and Nhemachena, 2006). The sub-sections below discuss the adaptation strategies taken up by households and communities, streamlined by sector. Based on the Somali setting, we take into consideration the following adaptation decisions in our analysis.

2.1. Agriculture-focused adaptation

Adaptation actions in the agricultural sector understandably include land, water and input-related. One of the most prominent of these is *land and soil based adaptation:* This strategy has been credited as a pivotal instrument of climate change adaptation, particularly in Africa (Di Falco and Veronsi 2014; Teklewold et al. 2015; Deressa et al. 2009; Difalco and Bulte 2011; Kato et al. 2009).

Season shifting and crop altering adaptation: This includes changing harvesting or planting times, shifting planting of crops in a different/more suitable location and introducing new crop varieties that have not been grown before, adopting early maturing varieties to escape drought, sequential timing of cropping, and adopting drought tolerant varieties. Diversification into new kind of crops is known to reduce the risk of crop loss associated with climatic variability (Di Falco et al. 2010; Di Falco and Chavas2009). Equally important are particular seed varieties that are naturally/developed with drought tolerance features in mind that play effective role in buffering against drought (e.g., Bezu et al. 2014).

2.2. Water-focused adaptation

Such adaptation includes conserving and protecting water resources during the dry season, rehabilitation of natural water points; using earth dams; and using rainwater harvesting techniques (dams, furrows). The reduction in water availability as a result of climate change (both in terms of quantity and reliability) increases the need for an efficient water management system for agriculture particularly in Africa (Vörösmarty et al. 2010). Hassan and Nhemachena (2012) identify irrigation as a critical tool for helping African farmers adapt to climate change. Moreover, farmers are food to choose to irrigate to supplement rain water and to compensate for loss of water associated with increased evapo-transpiration due to increased temperature (Deressa et al., 2009). Investments in irrigation conditional on access to water were ranked at the top among priority adaptations in Kenyan studies (Bryan et al., 2011).

2.3. Livestock-based adaptation

Changing livestock composition moving from particularly dairy and beef cattle to sheep and goats can be considered an effective adaptation strategy (Seo and Mendelsohn, 2008). Other adaptation options in the region include moving livestock to other geographical areas, purchase of the same type of new animals, livestock sale and destocking, getting grazing rights from traditional authorities, and using supplementary feeding.

For the purposes identifying of more tangible adaptation options for Somalia, we draw from Eriksen and Marin (2011)'s study of Pastoralist adaptation in the Afar region of Ethiopia. Table 2 presents adaptation lessons for Somalia based on key considerations of the study, possible gaps in adaptation and the corresponding lessons to be drawn for the Somalian case.

Table 2: Adaptation lessons from Pastoral regions in Ethiopia

Key considerations	Gaps	Lessons (for Somalia)
The role of environmental degradation in adaptation and resilience building	Pastoral communities are often associated with degrading rangelands.	There is a need to recognize that pastoral communities are primary custodians of the local environment; possess considerable knowledge and experience in dealing with climatic variability; development strategies and adaptation policies need to be drafted in consideration of protective environmental management laws.
National Adaptation Planning	Central to the economic growth, poverty reduction and food security efforts of pastoralist communities is the need to incorporate their legacy of variable and unpredictable rainfall, causing frequent droughts and heavy floods.	Negotiations under the United Nations Convention to Climate Change (UNFCCC) are currently creating a global framework for national long term adaptation planning. There is a need to Incorporate into Somalia's National Adaptation Plan such developments.
Development interventions interactions with adaptation	Unintended consequences of development interventions have been undermining ability to face droughts and climatic changes. Viewing development through the lens of climate change vulnerability and adaptation may contribute to identifying which transformation in current development pathways that is required	Development policies need to make adaptation actions their integral parts for sustainability of both efforts. In particular, pastoral pathways in terms of the dynamic vulnerability context and adaptations described here provide valuable lessons regarding the actions and development approaches through which the concept of sustainable adaptation can potentially be realized in practice
local and national adaptation needs and policies	National policy actions such as the enclosure and de facto privatization of key communal drought resources may result in responses to climate change and other long-term changes that actually reinforce vulnerability	There is a need to create clear links and connections between local pastoralist values and aspirations and national policy ambitions to modernize pastoralism.

Heterogeneity within the pastoralist community	there are differentiated interests and strategies within the pastoral communities, between population groups and between pastoralists and the government	There is a need to factor in such localized heterogeneities such as development and adaptation policy responses could become more effective.
the way that global–local linkages have been conceptualized so far	While pastoralists contribute little to global environmental or social problems, they are at the receiving end of many global strategies to respond to climate change, and potentially unfavorably so.	The vulnerability context and people's responses vary between places and change over time. Therefore, sustainable adaptation does not pertain to identifying a particular 'sustainable' practice or action, but to develop a set of actions that contribute to socially and environmentally sustainable development pathways.
The role of customary laws	Formal laws and administrative systems only sporadically offer support to customary laws or it is unclear whether it is done in ways that do not hijack or delegitimize customary institutions or cause favoritism and inequities.	There is a need to investigate whether these traditional institutions and informal relations are restored if climatic conditions improve and the current crisis is ameliorated. Traditional knowledge and customary law can be reinforced with formal research to raise indigenous trees, shrubs and grass well adapted to the local dry climate.

Source: Author's compilation from the document Eriksen and Marin (2011). Author's analysis added onto the lessons drawn (for Somalia).

2.4. Adaptation in coastal communities

Coastal communities in Somalia either engaged with the fishery or agro pastoralist livelihoods, are not only exposed, but are also highly sensitive to climate change driven threats. Just like the rest of the climate-vulnerable sectors, lack of access to basic facilities, inadequate income diversification, and low education levels are negatively affecting the communities' ability to adapt to climate change. In this section, we identify key features of coastal areas-related climate change vagaries, and the corresponding physical and soft-natured adaptation actions. Table 3 discusses these adaptation actions.

Table 3: Adaptation options for coastal communities

Options for responding to different vagaries	Adaptation action of physical nature	Adaptation action of institutional/soft nature
coastal fringe flooding	Construction of physical barriers Seawalls, breakwaters, gabion, groins and sluices	Environmental management Protection of mangrove, wetlands, dunes forests Prohibition or control of the removal of beach sediments
Impacts of flooding on infrastructure.	Secure infrastructure Secure energy transmission lines, Elevate roads and airports, Redesign road system, Increase waste and water treatment capacity Increase waste and water treatment capacity,	Reduce water flows, Drainage facilities and water pumps, Reduce paved areas to improve permeability of the soil or adopt water permeable pavements, Diversify energy supply
The impacts of climate change on natural systems.	Create artificial environments for the maintenance of species populations, Expand the protected area estate and revegetation	Provide incentive for conservation in farming areas, including benefits from carbon sequestration opportunities, Translocate species at risk to secure locations, Improve composition of tree species in reforested areas, Improve biodiversity management, Prohibit or control the removal of beach sediment
protecting the availability of fresh and drinking water	Devices to prevent seawater from back flowing into storm drains, Dams in farms and in other different locations	Desalinization technologies, Household and business tanks to supplement the reticulated water supply system

Source: Author's compilations based on the document Sinay and Carter (2020).

2.5. Adaptation in the forest sector

2.5.1. Challenges to forest based adaptation and illegal charcoal production

In Somalia, charcoal production accounts for a fifth of the total production and is the main source of energy in urban areas such as Mogadishu and Hargeisa but the foreign market accounts for the remaining 80%. In fact, charcoal has developed into one of the major export products, and is sometimes referred to as "black gold" with an estimated that 4.4 million trees are logged annually to produce the 250,000 tonnes of charcoal that is exported every year from Somalia to the Middle East. The alarming increase in illegal charcoal production over the years and the proceeds' funding of militia groups had led to resolution 2036 the UN Security Council banning charcoal export from Somalia, regardless of the origin of the charcoal.

In terms of scale of degradation, the charcoal trade is the main driver of the fast depletion of forests and woodlands in Somalia (UNEP, 2005) and reduction of ecosystem services provided by trees (ICRAF, 2014), For example, a recent study by FAO investigated tree loss of an area located in the arid Sool-Sanag Plateau, in northern Somalia, characterized by sparse vegetation (Oduori et al., 2011). To compound matters further, forest and range resources that provide the raw material production of charcoal in Somalia are extracted predominantly from slow growing dry deciduous bush land and thicket species of Acacia and Commiphora.

Degraded rangelands due to tree felling to meet the increasing charcoal demand are a common sight across Somalia. The north-east and north-west regions are impacted most due to steep topography and occurrence of frequent flash floods leading to the formation of deep gullies. Land degradation is most advanced around the main roads leading to the ports, water holes and wells, where the diminished carrying capacity of the rangeland no longer supports the feeding requirements of the animal populations. As such, the capacity of denuded rangelands to sustain the pastoral economy is already under irreversible loss threatening the medium to long-term sustainability of pastoral systems.

2.5.2. Adaptation in dryland forests

In addition to curbing illegal charcoal production and the associated forest degradation, one of the most potent opportunities for adaptation in dryland forests is integrating dryforests and gum and resin products to enhance social-ecological resilience. The second option is promoting high value forest crops requires very little, if any, capital outlays and builds upon already existing local knowledge and practice. More research will be required to understand the gendered dimensions of promoting high value forest crops and resource tenure concerning access to and ownership of trees.

However, adaptation in dryland forests face many institutional, political and policy based stumbling blocks. Taking from the example of a neighbouring Ethiopia, Teketay (2004) argues that dryforests in Ethiopia suffer due to policy marginalization, and hence are not integrated in national and sub-national landscape development planning. Despite some success stories related to area enclosure prevalent at the northern and northwestern parts, there is an ongoing massive conversion of dryforests, mainly at the pastoral and agro-pastoral regions (Rahmato, 2011). Unlike moist forests, dryforests in Ethiopia attract little research and hence there is wide knowledge gap, mainly at policy making level, hindering their acknowledgment as a development opportunity (Teketay, 2004-5). Equally important, traditional institutions are in a state of rapid transformation, their ability to re-enforce community responsibly to manage dryforests is weakened (Angassa and Oba, 2008). Other bottlenecks include: Inadequate technological, knowledge and human supply; inadequacy of access to finance and information; inaccessibility of the resource base in some areas, mainly due to lack of infrastructure such as transportation; rapid dryforest degradation; lack of quality and quantity control; low level of

awareness; thin representation of the private sector; lack of value adding; and illegal boarder trades (Teketay, 2004-5; Lemenih and Kassa, 2011; Worku et al., 2011b). Combinations of such gaps undermine the potential benefits of dryforests and gum and resin sub-sector.

2.6. Livelihood diversification, safety nets and adaption

In a country like Somalia where there is massive unemployment across all sectors, and where climate change is likely to exacerbate the unemployment situation with its effect on constricting activities, adaptation would need to address job creation opportunities. Below, we highlight some of these potential interventions.

Promoting Climate 'Neutral' Livelihoods: Given the extreme reliance of agro-pastoral livelihood systems Somalia, there is a need to promote more climate 'neutral' livelihood activities that are less dependent on nature, particularly rainfall in an arid/semi-arid desert region. There is a need establish support as a shift away from climate-dependent livelihoods toward micro-enterprise activities that rely less on the primary elements of nature. This might include small-scale artisanal activities, other artifacts or handicrafts that could marketed to the larger urban centers, skilled trades such as sewing, and other micro-enterprise activities where strong demand for a market product can be identified.

The Sahel Adaptive Social Protection Programme (ASPP): Somalia could strive towards crafting social protection program that is similar to the ASSP. This programme was launched in March 2014 (extended until 2025) to support the design and implementation of adaptive social protection programmes and systems in six Sahel countries (Burkina Faso, Chad, Mali, Mauritania, Niger, and Senegal). The 'adaptive' approach integrates basic social protection with disaster risk management and adaptation to climate change. The trust fund has major contributions from DFID, AFD, and a forthcoming contribution from BMZ (World Bank, 2019c). The envisioned adaptive social protection systems in the Sahel would consist of a combination of policies and programmes to help poor and vulnerable households build resilience, reduce the impact of climatic change and other shocks, and foster access to income earning opportunities. This work programme is being implemented through regional and stand-alone country level activities. The trust fund supports technical assistance, capacity building, and pilots, with the majority of resources disbursed as direct grants to governments. It is expected that those grants.

Poverty and Safety Nets in the Sahel: Poverty and Safety Nets in the Sahel Despite two decades of sustained economic growth in the region, extreme poverty is increasingly concentrated in Sub-Saharan Africa. In a context where the working-age population is expected to more than double over the 2015-2050 period, enhancing employment quality and incomes is one of the most pressing challenges faced by Sub-Saharan countries. Besides, the region records the highest vulnerable employment rate in the world and most of its workers are engaged in low-productivity activities. Social Safety Nets have the potential to increase productivity and reduce poverty in the medium and long term by targeting poor and vulnerable people whose living conditions are often contingent upon the incomes they derive from low-productivity activities. One of the key objectives of the ASPP is to increase poor and vulnerable people's productivity in order to strengthen households' resilience and reduce poverty. This report sets out the results of a qualitative assessment conducted in Burkina Faso, Chad, Mali, Niger, and Senegal on the constraints to enhancing farm and non-farm productivity in the Safety Nets intervention areas. Its main objective is to help define a package of accompanying measures and support their effective implementation to ultimately improve cash transfer beneficiaries' productivity.

The Ethiopian Productive Safety Net Program (PSNP): Social protection has been identified as one policy tool to protect people's livelihoods from the impacts of adverse shocks and a key pillar in the climate change and disaster risk management strategies. Following the increased consensus on the limitations of emergency food assistance in bringing sustainable solution to chronic food insecurity problems, the government launched the National Food Security Program (EFSP) in 2003 with the aim of addressing the root causes of food insecurity. Later in 2005, the Ethiopian PSNP was started as one major component of the EFSP. The PSNP is a targeted program that provides multi-annual transfers, such as food, cash or a combination of both, to drought prone and chronically food insecure households in selected Woredas (districts) across the country. The PSNP runs with an annual budget of nearly 500 million US dollar reaching more than 7 million people.

The main objective of the PSNP is to smooth household consumption through predictable transfers to the poor and chronically food insecure households. For households with able-bodied members this transfer is given conditional on participating on labor-intensive public works.[3] The PSNP thus aims to prevent asset depletion at the household level while building community assets via public works activities. The PSNP has a complementary initiative called the Household Asset Building Program (HABP). The HABP is designed to enable PSNP beneficiaries to get access to credit and demand driven agricultural extension services that will help them engage in farm and non-farm activities, thereby diversifying their income sources and increasing their productive assets (Berahne et al., 2011).[4]

2.7. Employment generation and adaptation

Green enterprising and job creation: Just like the rest of the Sub-Saharan Africa, there is a need for Somalian cities to develop industrial policies that are spatially and climate-sensitive, build and leverage green global value chains, and decarbonize energy, domestic connectivity as well as cross-border connectivity as enablers to deliver the green growth transition. Creating opportunities for sustainable green enterprise at the local level is a reliable way to diversify local economies, and reduce political risk and instability. The success of green industrialization policies requires a particular focus from the perspective of local settings because initiatives have to be anchored on equally ambitious culture of developing new and efficient urban governance systems (IGC, 2021).

Effective natural resource management and employment generation for the youth and women: It will be important to recognize the fact that even the best forest, marine resources, or agropastoralist water resources management plan will be insufficient if its implementation is not supported by the people who are ultimately responsible for managing the resources. Hence, understanding the capacities of young people and women to engage in the processes that determine natural resource governance regimes and shape the incentives of the farmers who manage the resource. Hence, determining the current extent to which women and young people are engaged (both formally and informally) in the resource management processes to date, as well as the identification of interventions which are most likely to result in increased capacity to engage in such processes, might

[3] PSNP also has a second component called direct support where government gives an unconditional transfer (food or cash) for labor-constrained households who could not take part in public works activities.
[4] HABP is another key component of the EFSP, which is started in 2009 with the aim of improving agricultural productivity and diversify livelihoods (Gilligan et al, 2009). It is a revised version of a similar program called Other Food Security Program (OFSP).

be necessary to ensure the participation of otherwise marginalized groups and generate employment for the same group.

2.8. Cross sectoral adaptation: migration and off-farm employment

Responses to disasters may result in farmers either moving away from farm to nonfarm employment or intensifying agricultural activities to compensate for the lost income (Eskander and Barbier, 2016). People may decide to migrate in response to climate induced disasters either temporarily (Eskander et al., 2018), or permanently (Oppenheimer, and Hsiang, 2014).

3. Gender and Adaptation

For women, efforts to develop climate change adaptation have faced many barriers including gender inequality, corruption, and poverty (Yannick, G., 2013). Female-led enterprises also face barriers to accessing new climate resilient technologies, finance and other forms of business safety nets, such as climate insurance products. The adaptive capacity of women led enterprises is constrained by many of the same factors that constrain gender-balanced participation, such as limited access to land, education, capital and new technologies, and deficient infrastructure (Stein, Hommes and Pinar Ardic, 2013; Beck and Cull, 2014; Crick, Gannon, et al., 2018).

This is despite the fact that through their, often concurrent, responsibilities within households, female entrepreneurs were understood to have incomparably close awareness of key livelihood needs, assets, opportunities and stressors, affording them unique and important potential to design and operate enterprises that are more responsive to the livelihood and adaptation needs (Horrell and Krishnan, 2007).

4. Perspectives in Adaptation in Somalia: Analysis of Primary Data

This section of the study presents analysis of adaptation options, strategies, actions and bottlenecks in Somalia, based on data from the key informant interviews.

4.1. Perception of climate adaptation risks

The respondents comprised of main representations of the climate stakeholder institutions in Somalia. The institutions were aligned to the following groups: federal government, sectoral (line) ministries, research and academic institutions, international development partners, and advocacy groups. The respondents presented their assessment of the climate related shocks with respective to each sectors within the last five years. Accordingly, climate related risks such as droughts, floods and conflict due to competition of scarce resources affect all the sectors of the economy, and insecurity in Somalia is identified as the major risk. The high risk of reoccurrence of disaster such as droughts, floods, and cyclones is another one that is identified as important climate-related risk**.** Indeed, Somalia is identified as one of the worst climate-risk hit countries in the world with very high intensity and frequency of climate related disasters. Table 4 presents assessment of overall risks by sector (with 5 indicating high risk and 1 indicating low risk).

Table 4: Assessment of overall risks by sector

Institution	Climate	Health	Market/prices	Conflict
United Nations Development Program-Somalia	5	4	4	-
Office of the Prime Minister	5	5		5
UNDP (Project Manager)	5	5	5	3
United Nations Environment Program-Somalia	5	5	3	5
Divison for Environment and Climate Change - Office of the Prime Minister	4	5	4	5
The Somali Institute for Environmental Peace	5	4	5	5
Ministry of Humanitarian Affairs and Disaster Management	5	5	5	5
National University of Somalia	5	4	4	4
Federal Ministry of Agriculture and Irrigation	5	4	3	4
Berghof Foundation	5	5	3	5
UNOPS	3	4	2	4
Ministry of Agriculture and Irrigation of Somalia	5	5	4	4
Ministry of Fisheries and Marine Resources	5	5	4	4
Action for Environment	5	5	5	5

Source: Author's compilations from the Key Informant Interview Survey

4.2. Procedures for conducting climate risk assessment

Respondents at federal line ministries such as the Federal Ministry of Agriculture and Irrigation (MoAI) stated that climate risk assessment information can be obtained through the national early warning system via IGAD office of climate change. Some federal ministries such as Ministry of Agriculture and Irrigation of Somalia make assessment about the climate change once a year but others like the Ministry of Fisheries and Marine Resources deduce from casual observations that the conservation of indigenous species and the livelihoods of coastal communities are under threat due to climate change.

Assessing current vulnerability, adaptive responses to past and present climate risks, knowledge of the climate drivers influencing current climate risks provide a basis for constructing scenarios of future climate. Also, understanding the relationship between current climate risks and adaptive responses provides a basis for developing adaptive responses to possible future climate risks. Based on this, the respondents' understanding of climate risks has been such that risk is a term in everyday use but is difficult to define in practice owing to the complex relationships between its components. Risk is the combination of the likelihood (probability of occurrence) and the consequences of an adverse event (e.g., climate hazard). While there does not seem to be a formalized method of risk assessment in NGOS working in the climate sectors, anecdotal evidences and casual observations show that there is high frequency rates of climatic shocks and stress in the climate sector.

In line with this, the respondents noted that it is easy to deduce that in the last past 5 years, the country has frequently experienced floods and droughts, which affected the lives and livelihoods of millions of Somali people. Some respondents have also noted that given that there is a clear correlation between climate change and conflict, the latter occurring right after a natural disaster, climate change should be one of the most pressing matters that should be dealt with right away, but somehow it is not a top priority for many institutions.

4.3. Sectoral differences in exposure to risk

In sectors which fall under natural resource management (NRM), it is reported that NRM is highly sensitive to the climate related shocks, cyclical droughts and floods, all of which negatively impact the natural environment. This is further exacerbated when destitute persons turn to exploitation of natural resources such as charcoal burning as a livelihood option. The overwhelming opinion is that in Somalia, the risks to exposure are constant with the sensitivity to shocks at the highest rank and the capacity to cope at the lowest rank. The agriculture sector is worse hit sector in terms of scale and reoccurrence, this sector is hit by extreme weather both during floods and drought. The adverse impact on agriculture is also believed to have a snowball effect on the overall economy, which is highly susceptible and vulnerable to climate changes, hence directing impacting national food security. Table 3 presents sectoral perspectives from respondents on exposure to risk.

Table 5: Incidence of climatic shocks and sectoral ability to cope

Institution	**Incidence of climate shocks/ risks**	**capacity to cope**
United Nations Development Programme-Somalia	very high	very low
Office of the Prime Minister	one of the worst hit countries in the world	
UNDP (Project Manager)	very high	very low
United Nations Environment Programme-Somalia	-	-
Division for Environment and Climate Change -Office of the Prime Minister	very high	very low
The Somali Institute for Environmental Peace	very high	-
Ministry of Humanitarian Affairs and Disaster Management	very high frequency	
University of Somalia	-	-
Federal Ministry of Agriculture and Irrigation	moderate	moderate
Berghof Foundation	-	-
UNOPS	very high	very low
Ministry of Agriculture and Irrigation of Somalia	worse hit sector	very low (with reoccurrence further exacerbating food insecurity)
Ministry of Fisheries and Marine Resources	high	low
Action for Environment	Severe	very low

Source: Author's compilations from the Key Informant Interview Survey

4.4. Sectoral strategies employed as adaptation actions

The Ministry of Humanitarian Affairs and Disaster Management (MoHADM) holds the view that those sectors that have inbuilt coping strategies such as capacity building or have sectoral expertise knowledge driven solutions to be implemented in these sectors could be at least risk for the damages posed by climate change vagaries. It was also noted that community awareness needs to be encouraged at a Federal level. Those who work as climate change adaptation experts in national and international organizations also point to the need to installing community-level early warning systems. There is also a need to mainstream climate-related tasks into regular sectoral activities even in sectors that do not work directly on climate change issues such as peace building and conflict resolution. There

is a recognition of the fact that climate change is a critical issue and a move to add climate risk aspects to project activities is important to address this and raise awareness. Table 6 presents the actions taken by the institutions as a way of adapting to climate change.

Table 6: Adaptation actions by institution

Institution	Capacity building	community awareness	Legal and institutional framework established	mainstreaming climate actions into project activities
United Nations Development Program-Somalia				
Office of the Prime Minister	x	x		
UNDP (Project Manager)				planning and implementation (customized depending on the types of Crises, droughts or floods, Natural or Manmade)
United Nations Environment Program-Somalia		x	policy and regulations support	
Division for Environment and Climate Change - Office of the Prime Minister	x		Conduct institutional review	
The Somali Institute for Environmental Peace	x	x	Policies and adaptation framework	
Ministry of Humanitarian Affairs and Disaster Management			Policies and strategies	
National University of Somalia	x	X	strengthening governance and legal frameworks development advocacy	trends of climate adaptation to be incorporated into the activities
Federal Ministry of Agriculture and Irrigation				incorporate climate adaptation activities into the development programs at all levels
Berghof Foundation		x	planting trees and providing clean and safe working environment	
UNOPS				
Ministry of Agriculture and Irrigation of Somalia	x	x		
Ministry of Fisheries and Marine Resources				
Action for Environment	X			mitigation, adaptation and DSG development plans

Source: Author's compilations from the Key Informant Interview Survey

4.5. Gender inclusion/participation in adaptation planning/ implementation

The consensus among the respondents has been that gender issues have received limited attention, despite increased efforts to mainstream gender into development activities overall. Adaptation policies and strategies seem to have largely bypassed gender issues, even though gender is increasingly becoming incorporated into project activities, albeit in an ad-hoc manner. Table 7 presents areas where gender issues have been incorporated into adaptation actions.

Table 7: Gender inclusion into adaptation activities by institution

Institution	very limited/no inclusion of gender issues in planning, implementation	gender issues inclusion in planning/project design	General women empowerment activities/ community based participation	development of gender focused tools in climate adaptation activities
United Nations Development Program-Somalia		x		
Office of the Prime Minister			x	
UNDP (Project Manager)				x
United Nations Environment Program-Somalia		x		
Division for Environment and Climate Change -Office of the Prime Minister		x		
The Somali Institute for Environmental Peace				
Ministry of Humanitarian Affairs and Disaster Management				
National University of Somalia		x		
Federal Ministry of Agriculture and Irrigation	x		x	
Berghof Foundation				
UNOPS	x			
Ministry of Agriculture and Irrigation of Somalia				
Ministry of Fisheries and Marine Resources		x		
Action for Environment		x		

Source: Author's compilations from the Key Informant Interview Survey

5. Concluding remarks: adaptation in the Somalian context

The assessment in this study regarding climate adaptation focuses on the sectoral, natural resource-based and organizational provisions for adaption building. For this, the adaptation technologies that are available for Somalia's largely arid environment have been analysed. The potential variation local/indigenous adaptation and available adaptation technologies in sub-Saharan African countries with similar biophysical, ecological and economic make ups have been investigated with a view to customize them to the Somali context. The supply side assessment in terms of technology provision also included the potential room for entrepreneurships in adaptation.

The study identifies seven sectors as critical to adaptation at a national level, due to their vulnerability to climate impacts. While differing in degree, their need for adaptation appears all urgent. Critical lessons are drawn from adaptation in the agropastoralist/livestock sector through focusing on the role of environmental degradation in adaptation and resilience building, national adaptation planning, interactions between development interventions and adaptation actions, local and national adaptation needs and policies, heterogeneity within the pastoralist community, the way that global–local linkages have been conceptualized so far and the role of customary laws.

The section also identifies the key features of coastal areas-related climate change vagaries, and the corresponding physical and soft-natured adaptation actions. The adaptation options are examined in view of availability for responding to different vagaries by categorizing adaptation action of physical nature, and of institutional/soft nature. The chapter also examines adaptation in the forest sector from the perspective of illegal charcoal production. The findings indicate that the increase illegal charcoal production is alarming in scale; the proceeds from it are linked with conflict-funding; and its production is largely damaging to the fragile forest ecosystem with inputs for its production extracted predominantly from slow growing dry deciduous bush land and thicket species of Acacia and Commiphora. Effective adaptation options are also suggested in the chapter including: curbing illegal charcoal production and the associated forest degradation, integrating dryforests and gum and resin products to enhance social-ecological resilience, and promoting high value forest crops that requires very little capital outlays and builds upon already existing local knowledge and practice. The study also identifies the challenges adaptation in dryland forests face: institutional, political and policy based stumbling blocks.

In a country like Somalia where there is massive unemployment across all sectors, and where climate change is likely to exacerbate the unemployment situation with its effect on constricting activities, adaptation would need to address job creation opportunities. The study explores expanding climate-sensitive employment opportunities such as Green enterprising and job creation as well as effective natural resource management and employment generation for the youth and women. On top of putting in place the right adaptation actions the study also looks into enhancing overall livelihood and social safety net. To this end the study has examined promoting climate 'neutral' livelihoods, the Sahel Adaptive Social Protection Programme (ASPP), Poverty and Safety Nets in the Sahel and The Ethiopian Productive Safety Net Program (PSNP).

The chapter's focus on primary data analysis has focused on climate perception risks which indicated that indicated that droughts, floods and conflict due to competition of scarce resources affect all the sectors of the economy, and insecurity in Somalia is identified as the major risk. The high risk of reoccurrence of disaster such as droughts, floods, and cyclones is another one that is identified as important climate-related risk. Indeed, Somalia is identified as one of the worst climate-risk hit countries in the world with very high intensity and frequency of climate related disasters.

Further, sectoral differences in exposure to risk has been examined based on primary evidence. Accordingly, in sectors which fall under natural resource management (NRM), it is reported that NRM is highly sensitive to the climate related shocks, cyclical droughts and floods, all of which negatively impact the natural environment. This is further exacerbated when destitute persons turn to exploitation of natural resources such as charcoal burning as a livelihood option. The overwhelming opinion is that in Somalia, the risks to exposure are constant with the sensitivity to shocks at the highest rank and the capacity to cope at the lowest rank. The agriculture sector is worse hit sector in terms of scale and reoccurrence, this sector is hit by extreme weather both during floods and drought.

All in all, actual adaptation actions in Somalia loosely align with climate risks, and there is encouraging awareness of the threat of climate change across sectors and the need to take up urgent actions. However, there is lack of comprehensive strategy both at a federal line ministerial and development partners' level. There is also lack of synchronization of adaptation efforts stemming from ad-hoc, and project based efforts that are not backed by formal strategy mainstreamed into standard organizational activities.

Chapter III: Resilience Building in Somalia

1. Why is Resilience Needed on Top of Adaptation?

It is increasingly clear that the impacts of climate change will be experienced in part as an intensification of the frequency and severity of climate-related extreme events (Fields 2012), and that the impacts of these events will be felt most severely by the world's most vulnerable communities (Hallegatte et al. 2016; IPCC 2014). Moreover, such climate-induced natural disasters have both short- and long-term impacts on affected households (Maccini and Yang 2009), who may lose their livelihoods, life savings, and creditworthiness. By destroying productive assets acquired over many years, natural disasters can push people permanently back into poverty, making it hard to recover their pre-disaster consumption levels and rebuild assets (Barnett and Mahul 2007; Anttila-Hughes and Hsiang 2013).

With the realization that repeated climate shocks are linked to poverty and affect the most vulnerable groups in developing countries more severely (Amuedo-Dorantes and Pozo, 2011; Constas and Barrett, 2013), building resilience the ability to bounce back to a pre shock state- is increasingly garnering more attention. It is such observations that brought the resilience concept that has been applied in development thinking and practice for several years, into climate change policy arena. Indeed, its recent popularity can be traced to two major concerns that have drawn the attention of policymakers and the international community (Little and McPeak, 2012).

The first is climate change, with a particular concern for how to build resilient communities in the face of increasingly extreme weather events (DFID 2011). The other is recurrent humanitarian crises, especially those traced to the most recent drought and conflict induced 2011 disasters in the Horn of Africa. Both of these phenomena have strong relevance for African pastoralism because many climate change models show strong impacts in arid and semiarid rangelands (for example, Thornton et al. 2009) and recent humanitarian events have centered on pastoral areas (Gebru et al. 2013). Indeed, even humanitarian agencies with limited humanitarian budgets have recently begun to focus heavily on resilience, as the disastrous impacts of increasingly frequent natural disasters kept compounding, cyclical food assistance needs are expanding (Cisse and Barrett, 2019; DFID 2011).

2. What Does Resilience Constitute?

Resilience is a multi-faceted phenomenon defined as the capacity that ensures adverse stressors and shocks are kept from having durable impact on overall wellbeing of society. In the context of this study, the shocks are represented by climate change.

There are three widely recognized components of the capacity to withstand shocks (resilience): absorptive, adaptive and transformative capacity. Absorptive capacity is the joint ability to minimize exposure to shocks and stresses and to put together resources quickly to bounce back from shocks when exposed to them. Adaptive capacity involves taking actions proactively by making informed speculations about the realization of foreseen shocks. Transformative capacity looks outside of autonomous resilience building at a household and community level into institutional factors such as governance mechanisms, access to markets, services and infrastructure, community networks, and formal safety nets (Be´ne´ et al., 2016; Frankenberger et al., 2013).

Given their complexity, these concepts cannot be measured using one single indicator. Measuring them requires combining a variety of indicators into an overall measure, and instead of treating each capacity indicator separately, resilience capacity widely addresses the following six broad categories: social capital; aspirations and confidence to adapt; economic sources of resilience capacity; access to services; human capital, access to information, and women's empowerment; village-level governance; and safety nets and disaster risk reduction (Frankenberger et al., 2013).

3. Building Resilience: Constituent Tools

Resilience building at a household and community level while effective, often does not fully buffer the adverse impacts of shocks, and different strategies may be undertaken by the household and communities concurrently or sequentially, with each one having distinct effects (Yilma et al., 2014; GAO & Mills, 2018). Below, we discuss the key resilience building instruments. While some of the adaptive capacity indicators are covered in chapter II of the report, the rest of the resilience building tools that comprise one or more of the absorptive, adaptive and transformative capacity are discussed below.

Insurance: One of the most potent risk mitigation and coping strategies available for arid and semi-arid regions in Africa is access to credit and/or insurance. For those who have, it might help them avoiding asset-based poverty traps (Carter & Barrett 2006). Despite this, however, most poor, rural households do not have access to formal insurance (Barnett, Barrett, and Skees 2008). Informal, community-based mechanisms are also more suited to insuring against idiosyncratic shocks than covariate shocks (Dercon 2002).

Drawing down on assets: Insurance- and credit-constrained households in developing countries have developed a variety of second-best insurance strategies, including informal borrowing, selling off assets, and risk averse production decisions (Morduch 1994). There is evidence from other countries in Sub-Saharan African that asset sales in response to drought (a covariate shock) do appear to temper the impacts of shock for some households and in some situations (Hoddinott 2006).

Reducing consumption: The austerity measures in food consumption patterns have three salient features including reducing amount of food consumption, reducing the variety of foods, and consumption of less preferred and poorer quality foods (Abid et al., 2020). Empirical evidences also point to idiosyncratic income shocks being correlated with non-food consumption (Skoufias & Quisumbing, 2005) with even relatively mild covariate shocks having permanent impacts, particularly for poorer households (Hoddinott 2006).

Forage and herd modification and crop-livestock integration: One of the classic resilience building strategies in pastoralist communities is changes in behavior and evolution of pastoral practices associated with scarcity of forage resources. Specifically, with abundant herbaceous plants during the last decades disappearing, their replacement with species of lower forage value that are more resilient to ecological disturbances is becoming a popular pastoral practice. In addition, pastoralists also use resilience strategies such as mowing grasses, building up fodder bundles, conserving crop residues, using woody fodder and adapting the type of livestock and the size of the herds to the ability of pastoralists to feed them. Strategies that are older than these are the integration of agriculture with livestock and decollectivized transhumance (Ouédraogo et al., 2021).

Altering herd dynamics: As such, households rationally accumulate large herds, as income increases in herd size and large herds serve as self-insurance in the face of shock (McPeak 2005), and decimate

animal populations in the face of devastating shocks, mostly as measures of last resort (Chantarat et al. 2013).

Mobile pastoralism and settlement: Pastoralist activities can benefit from increased mobility to buffer the high spatio-temporal variability of forage resources on rangelands (Martin et al. 2014), particularly in times of climatic stress. Mobile pastoralism is still an important component of rural livelihoods, including those in sub-Saharan Africa (Herrero and Thornton 2013). It is also a well-documented example for locally adapted and sustainable livelihood strategies (Martin et al. 2016).

4. Gender, Adaptation and Resilience Building

The essence of focusing on gender as a stand-alone issue in adaptation and resilience building is related to and is also based on the lesson that failure to incorporate gender into wider development agendas tend to contribute to lower productivity, and higher levels of poverty as well as under-nutrition (World Bank, FAO and IFAD, 2009; FAO 2011). The 2012 World Development report dedicated to Gender Equality and Development warns that the failure to recognize the roles, differences and inequities between men and women poses a serious threat to the effectiveness of the agricultural development (World Bank 2012).

In general terms, socially 'institutionalized' gender roles are a major challenge to female entrepreneurship, including in identifying and executing strategies to build resilience to climate risk within their enterprises. Furthermore, female entrepreneurs, at times of climate stress, can be vulnerable simultaneously at the business and household level that tends to be inter-connected (Crick et al, 2018).

5. The need for an overarching resilience building strategy: An Ethiopian example

What could be gathered from the discussion in this chapter so far is that while resilience building anchors itself on measures to be taken at household/community level there is a greater need to craft more impactful polices and measures that are likely to be formulated and implemented at the national level. In light of this, resilience building plan for Somalia, at a national level, would need to include a strategy that simultaneously tackles environmental and development challenges. Hence, the strategy would have as its integral part a comprehensive climate change resilience to reduce vulnerability, and integrate it with national macroeconomic and poverty reduction strategies. Effective resilience building would also require strong national institution, harmonization of their activities, and support from concerned development partners. Government leadership is thus paramount, even with the inadequate resources available and limited awareness and knowledge of affected communities. With security issues and internally displaced persons being significant in Somalia, any resilience building strategy would also be incomplete without coherent social protection programs or schemes, which play an important role in achieving the objectives of climate resilience and reducing vulnerability of affected communities.

For the purpose of exemplifying ssetting up a climate adaptation and resilience building strategy for Somalia, below we discuss, the Ethiopian case of Climate Resilient Green economy strategy below.

Ethiopia's Climate Resilient Green Economy (CRGE) Strategy, developed by the Government of the Federal Democratic Republic of Ethiopia, outlines the vision, strategy, financing strategy, and institutional arrangements Ethiopia will need to pursue to attain the triple goals of economic growth, net-zero emission, and building resilience. The CRGE Initiative positions Ethiopia at the forefront of the

low carbon revolution promised by the climate agenda. Ethiopia has huge low carbon potential – it is rich in forests and has ample renewable resources of hydro, solar, wind and geothermal energy. To make the most of this potential, Ethiopia needs to ensure that its long-term planning is compatible with a low carbon future, and to make itself as attractive as possible to carbon investors.

The CRGE Initiative, including the Green Economy Strategy, was launched in December 2011 in Durban (South Africa) by the late Prime Minister of Ethiopia during the 17th Session of the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC).

To support the implementation of the priorities set out in the CRGE Strategy and Investment Plans the Government set up a national financial mechanism called the **Ethiopia CRGE Facility**. The CRGE Facility is the Government's primary financial vehicle to mobilize, access and combine domestic and international, public and private sources of finance to support the institutional building and implementation of Ethiopia's CRGE Strategy.

Assistance Strategy: Building climate resilience is an urgent challenge for Ethiopia, as its weather is likely to become more unpredictable in the coming years, with increased flooding and drought. This will impact on all aspects of economy, including the health, transport, agriculture, natural resources, energy and industry sectors. To respond to this challenge, the government has developed Ethiopia's Programme of Adaptation to Climate Change (EPACC).

While building its resilience, Ethiopia will also take steps to ensure that its economy is green and sustainable. Through initiatives like the Nationally Appropriate Mitigation Actions (NAMAs), some immediate priorities have been already identified.

The CRGE Initiative consists of the CRGE Strategy, an integrated planning process called 'iPlan' under which CRGE sector investment plans will be developed, CRGE institutions (CRGE Units in line ministries and in Regional States), a national Monitoring, Reporting and Verification (MRV) system and a CRGE Facility as a financial mechanism to support its implementation.

The Green Economy component has been completed for seven sectors that offer the highest greenhouse gas abatement potential: Power Supply; Buildings and Green Cities; Forestry (REDD+); Agricultural/Soil-based Emissions; Livestock; Transport; and Industry. Over 60 Green Economy initiatives have been identified for their potential to ensure that Ethiopia's 2030 greenhouse gas (GHG) emission levels do not exceed the current 150 megaton CO_2 equivalent. This avoids about 250 megaton CO_2 equivalent that would be emitted if a conventional development path were followed to meet economic growth goals.

Governance: The Ethiopia CRGE Facility is governed by the **CRGE Ministerial Steering Committee,** chaired by the Prime Minister's Office, which will determine the CRGE Facility priorities. ***The CRGE Management Committee*** chaired by MOFED and includes representatives of the Environmental Protection Authority (EPA) and line ministries will prioritize the investment plans and make fund allocation decisions. *The Facility Secretariat* is a unit seated in MOFED that will support the Management Committee in close coordination with EPA and the CRGE Technical Committee. It will provide administrative and substantive support to the CRGE Technical and Management Committees. ***The CRGE Technical Committee*** chaired by the EPA and includes MOFED and experts from line ministries and others will assess and approve investment plans submitted by line ministries and regional governments. The ***Facility Advisory Group,*** chaired by one of the development partners and includes representatives of multilateral organizations, international NGOs, civil society, private sector and academia, will review investment plans and provide suggestions to the Technical and Management Committees.

The Facility-funded programmes will be implemented by the **National Implementing Entities** (federal and regional entities) in partnership with CSOs, private sector and academia. The MOFED is responsible and accountable for the effective development, implementation and monitoring and evaluation of the Facility's portfolio implemented by the National Implementing Entities.

Participating UN Organizations and Multilateral Development Banks may be requested by the Government to provide capacity development and selected implementation services. The **UNDP Multi-Partner Trust Fund Office** (MPTF Office) serves as the provisional Trustee, providing fund administration services for funding that is channeled through the **CRGE Facility's International Account**.

CRGE Facility Structure and Decision Making

The CRGE Facility will have **Two Windows** - Strategic Window and Responsive Window**.**

Strategic Window will exclusively finance the implementation of activities (**investment plans**) and associated institution-building requirements generated through the Government's strategic 'iPlan' process. Investment plans would be submitted by line ministries and regional governments, jointly or in parallel to the standard government budget process. Funds will be allocated by the Management Committee against the investment plans, on an annual basis.

Sectoral investment proposals will feature both climate activities undertaken through mainstreaming into existing programmes and through additional programmes. Regional investment proposals are those submitted by regions (alongside ministries), aggregating Worde proposals generated through the Mechanism to Motivate, Support and Reward Results (mms). Over time, these plans should look to shift from grant to a reward or results-based mechanism for distributing funding. As with the sector investment plans, the regional plans should be generated through the iPlan process and be submitted on a yearly basis.

Public funds disbursed through the Strategic Window should be used to leverage additional investment. Investment proposals identified under each sector investment plan should specify their financing needs - broken down by source (public, private) and type (grant, guarantee, loan etc.). All mechanisms that are eligible for climate financing including Clean Development Mechanism (CDM) potential should also be identified accordingly in the investment plan.

Responsive Window that will fund demand-driven implementation and institution-building activities. It will be open to proposals developed outside the iPlan process on a demand-driven basis from a range of stakeholders. This window will be primarily accessed by Government institutions at federal, regional, local level and by communities. Academic institutions, civil society and private sector organizations will work in partnership with government institutions at federal, regional, local and community levels. They will all be encouraged to put proposals forward and proposals will need to demonstrate that they are aligned with CRGE goals as outlined in the CRGE Strategy and in particular with published investment plans.

6. Resilience Building: Primary Data Analysis

6.1. Responses to shocks constituting resilience erosion

Respondents asserted that the intensity and frequency of drought shocks are likely to increase in the future. Table 8 presents the possible actions envisaged to be taken (or are being taken) towards building human resilience.

Table 8: Actions taken/envisaged/recommended for building human resilience

	local knowledge and resources	community awareness	disaster risk reduction policy	Reconfiguring institutional setup	integrating sectoral policy efforts	resilience policy synonymous to adaptation
Institution						
United Nations Development Program-Somalia				x		
Office of the Prime Minister			x			
UNDP (Project Manager)	x	x				
United Nations Environment Program-Somalia						x
Divisions for Environment and Climate Change - Office of the Prime Minister						
The Somali Institute for Environmental Peace					x	
Ministry of Humanitarian Affairs and Disaster Management					x	
University of Somalia		x				
Federal Ministry of Agriculture and Irrigation					x	
Berghof Foundation						
UNOPS						
Ministry of Agriculture and Irrigation of Somalia						
Ministry of Fisheries and Marine Resources						
Action for Environment	x	x		x		

Source: Author's compilations from the Key Informant Interview Survey

6.2. Policy actions to repeated and/intense shocks

As discussed above, one of the distinguishing features of resilience building is that it is a series of actions that are crafted in response of repeated/ intense shocks. Respondents were probed on the likelihood of their sector being able to successfully build resilience against the climate induced threats of repeated nature. Respondents were asked the likelihood of their sector being able to successfully act to such livelihood threats. It is the view of some that political will and huge adaptation investments are required for the various sectors to withstand the adverse impacts of climate change. Other respondents stated that despite limited structuring and strategic approaches to resilience building at federal, or sectoral regional levels, communities and households take endogenous adaptation and a resilience building actions through grain storage longtime in times of surplus production as well as downward adjustment in their consumption in shortage years such that they can cope with drought.

At sectoral level, approaches such as adopting to smart farming and smart irrigation management are recommended. Some organizations recommend developing of the climate change adaptation and resilience building plan for all sectors**.** Others suggest making a requirement in planning tools such as early warning, planning and preparation of the likely resilience building action. Even in organizations that do not have climate change adaptation and resilience building as their core activities, there is concern that if the current trends of climate change are not addressed so well, it will affect the development and peace building process. Hence there is need to link up the impact of climate vagaries such as drought, conflict, and low economic performance. Making it an issue of survival would thus lead to an understanding that there is need to prevent this from happening, to prepare for it when it happens and craft a solid way to survive through building resilience. There is also a suggestion of considering the everyday climate shocks and impacts in practical terms and preparing responses and interventions so that lack of actions will not create unprecedented and irrevocable results. Recognizing that climate change is imposing a high risk to individuals, communities and the country at large, and making appropriate nation-wide warning is also considered essential. Table 9 presents resilience building policy actions recommended by respondents.

Table 9: Recommended policy actions for resilience building by institution

	autonomous resilience building actions	political will	huge financial investments institutionally infrastructural	sectoral/ national climate adaptation/ resilience building strategies and plans	research/ information generation and dissemination	capacity building
Institution		x	x			X
United Nations Development Program-Somalia						
Office of the Prime Minister	X					
UNDP (Project Manager)				x	X	
United Nations Environment Program-Somalia					X	X
Division for Environment and Climate Change -Office of the Prime Minister						
The Somali Institute for Environmental Peace					X	
Ministry of Humanitarian Affairs and Disaster Management					X	X
University of Somalia						X
Federal Ministry of Agriculture and Irrigation	X					X
Berghof Foundation				X	X	
UNOPS			X	X	X	X
Ministry of Agriculture and Irrigation of Somalia	X			X		X

Source: Author's compilations from the Key Informant Interview Survey

7. Concluding remarks: resilience building

The chapter highlights the task of characterizing resilience of households, communities, sectors against climate change in a manner that allows for distinct categorization for building pathways to effective resilience. It also makes efforts at justifying the need for gender-focused resilience building. Particular to the case of Somalia, is that while resilience building anchors itself on measures to be taken at household/community level there is a greater need to craft more impactful polices and measures that are likely to be formulated and implemented at the national level. In light of this, resilience building plan for Somalia, at a national level, would need to include a strategy that simultaneously tackles environmental and development challenges. For the purpose of exemplifying ssetting up a climate adaptation and resilience building strategy for Somalia, below we summarize, the Ethiopian case of Climate Resilient Green economy strategy below.

Ethiopia set out a strategy for building a Climate Resilient Green Economy (CRGE) in 2011. The overall vision of the CRGE strategy is to sustain fast economic growth while increasing resilience and keeping emissions low. The strategy has garnered strong international support from bilateral and multi-lateral partners, as well as acknowledgement in global climate negotiation forums. If successfully

implemented, the CRGE strategy will make Ethiopia the first country to successfully exit poverty in green way, setting an example for other least-developed countries. Ten years on into its launch, the CRGE vision has now reached a critical stage: it has been adopted in the country's second Growth and Transformation Plan (GTP II) and implementation across the sectors of the economy has commenced. The financial and governance structure of the CRGE is also something that can be easily borrowed into the national resilience strategy for Somalia.

The analysis based on primary data indicates that the incidence of repeated shocks is a significant concern. Respondents also asserted that the intensity and frequency of drought shocks are likely to increase in the future indicating the need for serious steps into resilience building on top of standard adaptation actions. Actionable areas for resilience building include the roles of local knowledge and resources, community awareness, disaster risk reduction policy and reconfiguring the institutional set up. At a more formal level, institutional measures that are critical in creating effective resilience building environment could include enhancing autonomous resilience building actions, political will, availing huge financial resources, putting in place resilience building strategies at different levels, and investing in research and capacity building infrastructure.

Chapter IV: Institutional Arrangements for Adaptation and Building Resilience

1. Local institutions in adaptation and resilience building

Research on climate change adaptation makes the point that local level communities and institutions found in rural or urban areas have numerous levels of vulnerability and resilience, making each condition unique (Chersich, and Wright, 2019). This is due to resources being generally unevenly distributed; the impacts of climate change producing varying socio-economic impacts; and the agility and resources of the impacted communities varying across different locations (Zhao, et al., 2018). Impacts of climatic changes are also likely to be exposed and responded to regional/local levels because of heterogeneous circumstances of individual, institutional and local settlements (Ludena, and Yoon, 2015). Furthermore, facilities and resources to adapt to climate change are generally limited, leading to adaptation efforts becoming incremental. This calls for investments to build and develop communal facilities (Du Bois, et al., 2012).

2. Institutional Arrangements, Legislation and Regulatory Framework

Ministry of humanitarian affairs and disaster management: The main institutional arrangement for combating climate change disaster appears to be the Ministry of Humanitarian Affairs and Disaster Management which aims to lead the country in reducing disaster risks while improving current humanitarian delivery model. The Ministry sets out to make a shift from a reactive approach to a proactive approach by building individual, human and systems resilience (UNOCHA, 2019).

Constitution of the republic of Somalia: There are sections in the Constitution of Somalia pertaining to the management of environmental affairs, and are considered key legal instruments such as Articles 25 and 45 ("Environment"), 43 ("Land"), and 44 ("Natural Resources") (World Bank, 2020).

National environment policy: Supported by the Global Environment Facility (GEF) and the United Nations Development Program (UNDP), the National Environmental Policy, carries the goal of improving the health and quality of life of the Somali people. The policy provides the overall guiding policies relating to the management of the environment and natural resources. It also allows a

rationalization of administrative regulations and policies to eliminate deficiencies or inconsistencies with other previous policies. The policy promotes the use of appropriate environmental assessment instruments such as the EIA and Strategic Environmental Assessment (World Bank, 2020; UNDP, 2014).

The national adaptation plan: The development of National Adaptation Programme of Action (NAPA) has incorporated into it considerations of exposure, sensitivity and adaptive capacity to climate risks, along with a list of potential adaptation measures and criteria for selection of priority actions. The document was co-prepared by the UNDP and Ministry of National Resources of the FGS. The strategy recognizes that floods and droughts represent the most severe climate risks and are given priorities in the NAPA. A sectoral approach was taken to understand the vulnerabilities to drought and flood within each sector (FRS, 2013).

National climate change policy: The policy describes the climate governance structure of Somalia and identifies the relevant institutions and establishes appropriate committees at national and sub-national levels. It carries the vision of attaining a prosperous and climate resilient economy through the adoption and successful implementation of appropriate and effective climate change adaptation and mitigation measures. To make the vision a reality, the policy actions would involve promoting a harmonized, articulate and effective response to the challenges and opportunities that accompany climate change; delivering a framework that will guide the establishment and operationalization of interventions and action plans; and safeguarding the safety and health of citizens, their prosperity and states development in the advent of climate change through enhancement of resilience and implementation of adaptive ability to climate variability (FRS, 2020).

Effective adaptation and mitigation are key objectives of the policy. In terms of adaptation, sectors that need particular attention are agriculture, livestock, water, marine resources, forestry and biodiversity, infrastructure and urban settlements. Resilience to climate change-related extreme weather events is considered as the basis for Somalia's approach to disaster management. (FRS, 2020).

National drought plan: The National Drought Plan (NDP) of Somalia carries the twin objectives of safeguarding livelihood assets of rural communities in Somalia and improving the resilience mechanisms and socio-economic wellbeing of the drought vulnerable people. The plan stands on the following three pillars: implementing drought monitoring and early warning systems; assessing of drought vulnerability and risk; and implementing measures to limit the impacts of drought and better response to it. Given the consensus that drought is a major climate-related challenge implementing agencies are also urged to mainstream and operationalize the plan at both federal and state levels (UNCCD, 2020).

3. International Agreements in Climate Adaptation and Mitigation

Somalia has signed or ratified a number of international agreements and conventions aimed at preventing environmental degradation and promoting sustainable use of natural resources. These agreements fall under different categories including, protection of the atmosphere, combatting desertification, conservation of biodiversity, combating marine pollution, and hazardous waste management, among others.

An important international agreement to combat desertification for which Somalis is signatory to is the United Nations Convention to Combat Desertification (UNCCD). It aims to mobilize international

effort to prevent land degradation, mitigate the effects of drought by requiring countries to prepare and implement National Action Programmes (NAPs) (UNDP, 2016).

On conservation of biological diversity, Somalia has been part of three important conventions: (i) the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), (ii) the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and (iii) the Convention on biological diversity (CBD) which is an instrument for conservation of biological diversity and equitable sharing of the benefits from utilization of genetic resources which ensure that global trade in specimens of wild animals and plants does not threaten the survival of the species; which lays the foundation for coordinated conservation measures for migratory animals and their habitats.

Somalia has ratified four international conventions on combatting marine pollution, i.e. UN Convention on the Law of the Sea; Convention for the Conservation of the Red Sea and the Gulf of Aden Environment; Protocol concerning Co-operation on Combating Marine Pollution in cases of Emergency in the Eastern African region; and Convention for the protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region. Somalia also ratified the Kyoto protocol and the Paris agreement which operationalizes the UN framework convention on climate change (UNFCCC) to limit and reduce the greenhouse gases emissions in accordance with the agreed individual targets.

With regards to hazardous waste management, Somalia has ratified two international agreements, among others. These are the Protocol concerning Regional cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency, and the Stockholm convention on persistent organic pollutants (Stockholm convention). The following table summarizes the important international treaties, agreements and conventions ratified or signed by Somalia.

Table 10: List of agreements/conventions on sustainable natural resource use ratified by Somalia

Category	**Convention/Agreement**	**year ratified/signed**
Combatting Desertification	United Nations Convention to Combat Desertification (UNCCD)	signed in 2002
Conserving Biological Diversity	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Ratified in 1985
	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Ratified in 1986
	Convention on biological diversity (CBD)	Ratified in 2009
Marine pollution	Convention for the Conservation of the Red Sea and the Gulf of Aden Environment;	Ratified in 1988
	UN Convention on the Law of the Sea (UNCLOS)	Ratified in 1989
	Protocol concerning Co-operation on Combating Marine Pollution in cases of Emergency in the Eastern African region.	Ratified in 1985
	Convention for the protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi Convention);	Ratified in 1988
Hazardous waste management	Protocol concerning Regional cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency	Ratified in 1988

	Stockholm convention on persistent organic pollutants (Stockholm convention)	Ratified in 2010
Protecting the Atmosphere	UN framework convention on climate change (UNFCCC): Kyoto Protocol	ratified in 2010
	UN framework convention on climate change (UNFCCC): Paris Agreement	Ratified in 2016

Source: Author's compilations from the literature

3.1. Somalia's nationally determined contribution and cross sectoral committee on climate change

As part of its commitment to the Paris agreement, Somalia has put in place a plan for nationally determined contribution (NDC) in climate change adaption and mitigation for the period 2021-2030. [The estimated cost to implement activities under the NDC during 2021-2030 is about USD 55.5 billion (FRS, 2021)]. Given a narrow fiscal space in Somalia, much of the funding for climate change adaptation and mitigation activities would be financed through support from development partners. Currently a variety of NGOs /CSOs are involved in climate change related activities in Somalia. While some implement specific initiatives at the community level others engage in climate change policy advocacy at the national level (FRS, 2020).

In an effort to facilitate the mainstreaming of adaptation and mitigation activities to climate change, the government has set up a Cross-Sectoral Committee on Climate Change (CSCC). It's a forum that brings together officials from different government agencies and chaired by the director general of the directorate of environment and climate change. CSCC's mandates include, coordinating and advising sector-specific and cross-sector implementation of activities. Among challenges hindering the mainstreaming process are institutional capacity shortages pertaining to climate change institutions, including, lack of appropriate laws, human capital deficiency and scarcity in climate change financing (FRS, 2021). Table 11 presents comparisons between INDC supporting actions at a sectoral level for Somalia and Sahel based interventions that are supported by international partners.

Table 11: INDC supporting actions at a sectoral level and comparisons with Sahel based interventions

Adaptation focus by sector	Sector-based interventions (Somalia)	Sector based interventions (other countries in the Sahel)
Agriculture, food security	Adoption of Sustainable Land Management to Build Resilient Rural Livelihoods and Enable National Food Security	Integrating Climate Resilience into Agricultural and Pastoral Production for Food Security in Vulnerable Rural Areas (Burkina Faso; Niger)
Water resources management	Adaptation Using Integrated Water Resources Management to Ensure Water Access and Supply to Vulnerable Populations and Sectors	Improving Climate Resilience of Water Sector Investments with Appropriate Climate Adaptive Activities for Pastoral and Forestry Resources (Mauritania); Niger River Basin programmes (Sahel); Enhancing Resilience of Agriculture to Climate Change to support food security in Niger through modern irrigation techniques (Niger);
Forest based adaptation	UN Joint Programme on Sustainable Charcoal Production and Alternative Livelihoods (PROSCAL) to Mitigate Against Deforestation; Project Proposal Charcoal Production from Prosopis and Replacement with Crop Production	Cashew Development Support Project in Comoé Basin for REDD+ (Burkina Faso);
Renewable energy	Rehabilitation of Fanoole Hydro-Electric Dam and Irrigation Infrastructure; Up scaling the Use of Solar Energy	Desert to Power Initiative – Yeleen Rural Electrification Project (Burkina Faso); Project for Scaling-up Renewable Energy in Mali (PAPERM); GCCA+: Climate change adaptation and renewable energy development in Chad
Marine and costal environment	Marine and Coastal Environmental Governance and Management of Somalia	
Integrated adaptation approaches	-	Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy (Burkina Faso); Participatory Natural Resource Management and Rural Development (Burkina Faso); Adapting Natural Resource Dependent Livelihoods to Climate

		Induced Risks (Burkina Faso): Development of the Master Plan and Priority Investment Programme for Integrated Development and Climate Resilience of Populations (Mali)
Climate financing	-	The Climate Commission for the Sahel Region (Sahel); Africa Disaster Risk Financing Initiative (ADRF) (Mauritania)
Desertification	-	Great Green Wall initiative (Sahel); Action Against Desertification (Sahel);
Adaptation and social justice	-	The Sahel Adaptive Social Protection Programme (Sahel); The Inclusive Value Chain Development Project (Mauritania);
Region-wide initiatives	-	Co-operation in International Waters in Africa (CIWA) programme; Regional Sahel Pastoralism Support Project for Africa (PRAPS); Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin; Climate Services for Increased Resilience in the Sahel;
Early warning and disaster prevention systems	Adaptation by Reducing Risks among Vulnerable Populations from Natural Disasters	Africa Hydromet Programme - Strengthening Climate Resilience in Sub-Saharan Africa(Mali Country Project)

4. Institutional actions at climate adaptation and resilience building: lessons for Somalia

As discussed in sections 2 and 3 of this chapter, local/regional and national institutions have strived towards facilitating the ability of households, firms, and natural resources to respond to climate-induced stresses. We have also highlighted instances where division of responsibilities amongst institutional actors to achieve wholesome results in Table 12. Table 12: Institutional actions taken at different levels in coping with drought in Nigerian pastoralist areas

	Community action	**Government assistance**	**Assistance from NGO**
	Sales of livestock to buy grains, harvesting of wild plants for food, working as casual labourers in nearby towns, help from relations, sales of household properties	Food aid - few bags of millet, sorghum, and maize were given to each household and few bottles of cooking oil	Food aid distribution
	Harvesting of wild plants for food, sales of livestock to buy grains, migration of young men to work in Nigeria, help from relations, and sales of household properties	Food aid - few bags of sorghum and maize were given to each household and few bottles of cooking oil and biscuits. One bag of wheat flour and few bags of rice were distributed to each household during the drought of 2005 along with powder milk and salt	MSF (Médecins Sans Frontière) distributed powder milk, bottles of cooking oil, and fortified biscuits. Malnourished children were fed at MSF feeding centre
	Harvesting of wild plants for food, hunting of wild animals, sales of livestock to buy grains, migration of young men to work in Nigeria, and borrowing from people in the community to buy grains	Food aid - few bags of sorghum, groundnut, and cowpea were given to each household and few bottles of cooking oil and biscuits. The state also gave loan to some households to buy food	Food aids from the World Food Programme and Catholic Relief Service

Source: Author's compilation based on the document Ayantunde, et al. (2015).

It goes without saying that institutional arrangements for climate adaptation need successful integration at local (community) and national levels. To demonstrate this, we take the example of pastoralist settings that has paralles between the two levels of institutional interventions. Table 13 presents the analysis starting with justification for the need for institutional action.

Table 13: Institutional arrangements at local and national levels

Type	**Essence of institutional action**	**Institutional stakeholder (at a local/community level)**	**Institutional stakeholder (at a national level)**
Identifying and streamlining different adaptation actions as per their result and cost	Adaptation actions can be high to low cost and appropriate at household/business to community levels.	Lead adaptations that reduce risk community-wide.	Design policy that serve their constituencies of adaptations that allow for co-existence.
Creating awareness	While people may acknowledge the reality of climate change, they are less aware of its implications at a local and household level and even less aware of actions they can take to contribute to reducing greenhouse gas emissions and how to adapt to reduce their vulnerability to impacts.	Improving community knowledge of climate change, its impacts, mitigation actions and adaptations that can be made in preparation for climatic and resulting change and extreme events.	Creating a coherent and coordinated climate information generation, communication and awareness creation
Ensuring community engagement	Not all adaptation options can be implemented by governments who will be increasingly required to consider community-wide defensive actions in response to imminent threats to life and property.	Ensure that residents and industries modify their own properties and their management practices to ensure they are climate change ready.	Progressive implementation of adaptation strategies will have less upheaval of communities and individuals.
Capacity building in implementation of adaptation and resilience building actions	Adaptation actions require coordination to happen at relatively low cost.		planning, political articulation and financial incentives, insurance and professional skills enhancement
Coordinating adaptation activities as a spectrum (complementary)	While the academic literature presents the different adaptation approaches stand alone,	Organizing component of interest in the affected system, with focus on properties and infrastructure, natural systems, food production,	

	they are stages within one spectrum of options.	availability of water and well-being of the local population.	
Investment strategy	This will require a large scale, capital-intensive investment strategy	Coordinating key stakeholders to carrying out actionable investment interventions in the region.	Well-coordinated multi-year investment strategy involving an array of donor institutions, supporting a well-defined consortium of government, private sector and civil society stakeholders.
Scaling up of interventions	Effective adaptation option need scaling up for far reaching impact.		Can best be achieved by creating synergies and well-defined roles, drawing on complementary capabilities among development actors with a common vision for the region.

Source: Author's compilation from the documents Cooper and Prize (2019), Eriksen and Marin (2011) and UN (2020).

5. Institutional Arrangements in Climate Adaptation and Resilience Building

5.1. Institutional Laws and Regulations for Climate Change

Respondents were asked about actual/envisaged policy actions they undertake to address the threats of climate change. The responses particularly focused on how their respective institutions go about proactive approach by building individual, human and systems resilience against repeated shocks. The respondents were also asked about the necessary/envisaged actions, laws, regulations, and guidelines that aid conducting adaptation and resilience actions. Table 14 presents the varied policy actions by the institutions (actual actions taken by institutions for climate change adaptation, are presented in Table 4).

Table 14: Acts, regulations and laws regarding climate adaptation and resilience building by institution

Institution	capacity building	knowledge building and research on autonomous adaptation	strengthening policy implementation/ clarification of laws/mandates	crafting relevant policies/laws	legislations/ laws/ regulations	clarification of laws/ mandates
United Nations Development Program -Somalia	x		x	charcoal policy, energy policy	climate change policy, environment policy, NDP, RRF,	
Office of the Prime Minister		x				
UNDP (Project Manager)				National Determined Contribution (NDC) for climate change	National Climate change policy; Environmental management bill ; Environmental management policy; NDC	
United Nations Environment Program -Somalia			x		Climate change/ Climate security policies, Environmental safeguards, National Biodiversity action plans	
Division for Environment and Climate Change - Office of the Prime Minister						
The Somali Institute for Environmental Peace				Climate risk and vulnerability assessment and early warning actions	climate change policy being developed and other actions such as NDC , NAPA, NAP and INDCs Strategies	
Ministry of Humanitarian Affairs and Disaster Management					National resilience policy	
National University of Somalia		x		Carbon dioxide emission policy, Protecting plants, plantations, providing clean and health environment		
Federal Ministry of Agriculture and Irrigation				Somali agricultural regulatory and inspection law SARIS	national adaptation program of action on climate change	
Berghof Foundation						
UNOPS			x	adaptation financing		
Ministry of Fisheries and Marine Resources				National Fisheries Policy and National Fisheries master plan	The new amended fisheries law	
Action for Environment				climate finance laws	national adaptation programme of action on climate change (NAPA)	

Source: Author's compilations from the Key Informant Interview Survey

5.2. Partnerships and collaboration in adaptation and resilience building

The respondents identified several partners and stakeholders towards climate change adaptation and resilience building. They also stated examples of activities done in collaboration with partners as well as the way activities of partners were monitored by them. Respondents identified challenges identified in the collaborations and ways forward in resolving them.

Regarding the process for the selection of the partners and procedures for working with them, some seem to be guided by what is comprised of as partnership activities in project requirements. Others would craft them from scratch based on their relevance to their vision and strategic objectives or based on their relevance to their own vision and strategic objectives. In general, the consensus seems that there is no coherent process to select within the government sector. For example federal institutions such as selecting partners who were mostly active inside communities. Research and academic institutions such as the National University of Somalia follow the route of consultative meetings to identify partners fit for different project activities and vice versa.

Respondents were in general agreement that swift and meaningful adaptation can be realized with increased community level implementation, support to provide sectors for generation of resilience based businesses. Others noted the inexistence of such partnership or unawareness of their existence. Community awareness of the need for partnerships was stressed while public private partnership was recommended in other instances. Table 15 presents the patterns of partnerships followed by related discussion.

Table 15: Institutional partnership in climate adaptation / resilience building

Institution	partners	Examples of partnerships included in design/ implementation of climate adaptation activities	Monitoring of partners' activities with regards to climate adaptation	Challenges of partnership and coordination
United Nations Development (UNDP) Program-Somalia	Environment line ministries and departments	government institutions at FGS and FMS levels and communities in project areas	field visits and independent third party monitors	lack of clear definitions national institutional mandates
Office of the Prime Minister	All Environmental information systems	Stakeholder's women's association groups, include youth groups.	scheduled Action plan	Most challenging security and Budget
UNDP Project Manager	GCF, GEF and Somali Government UNDP	Director of Environment and Climate Change (DOECC)	independent third party monitors	Capacity of the national designated Authority (NDA)
United Nations Environment (UNEP) Program-Somalia	UNEP- DOE-		Directly evaluating reporting of porter' activities	Lack of capacity from the seniors leading this sector
The Somali Institute for Environmental Peace (SIEP)	Government, International donors, Universities and local communities		communications and information exchanges both formally and informally	lack of national strategic guidance and monitoring by the partners
Ministry of Humanitarian Affairs and Disaster Management (MoHADM)	IGAD	IGAD	Integrating the activities of the ministry to that of the partners' and thereby coordinating their activities	
National University of Somalia	Students, parents, community surrounding the University, local government and international partners	students, parents and the local government	Through monitoring the achievement of goals	Not coordinated at all
Federal Ministry of Agriculture and Irrigation (MoAI)	National agricultural association, Shabelle river basin authority , Jubba river basin authority, Line ministries at federal member states			Nil United nation Food and Agriculture Organization, FAO, United nations Environmental Program UNEP, United nations development programs UNDP.

Source: Author's compilations from the Key Informant Interviews Survey

5.3. Demand-driven (community level) adaptation strategies

Like any other strategy/policy, climate adaptation requires effective trickling down at grass roots levels to bear the intended results. While the scope of the study limits assessment to national level interview of experts, indirect assessment of micro (community level) by experts has been presented. The general consensus among respondents has been that as each and every intervention has its

strengths and weakness; its uptake by the community needs examining interventions against their pros and cons from the community's perspectives. This might call upon doing consultations with a variety of stakeholders at a community level during climate adaptation planning and ensuring that implementation strategies that are spread across different themes and geographies in the country are suited to the needs and settings of the community. Table 16 presents examples of adaptation actions in partnership with institutions at a community level.

Table 16: Community level adaptation strategies by institution and sector

Sectoral focus	**Geographical focus (if any)/ activity**	**Institution**
Water/irrigation/environment	building of sand dams and mid-size water reservoirs	UNDP, Somalia
Forest/ environment	Private sector Dedo.organization	PM OFFICE, Somalia
	involvement of gender and community based organizations	UNDP project manager
Natural Resource Management	Rangeland Management; natural, Conflict resolution of the grassland	UNEP
Natural resource management	Community FGD Awareness and community preparedness	MoHADM
general	Awareness campaigns, stakeholder engagement in the process, coordination, monitoring and evaluation of the implementation	University of Somalia
Agriculture	Climate smart agriculture adaptation projects	Federal Ministry of Agriculture and Irrigation (MoAI)

Source: Author's compilations from the Key Informant Interview Survey

6. Concluding remarks: Institutional arrangements in adaptation and resilience building

In this chapter, the importance of local institutions in climate adaptation and resilience building, and the institutional arrangements, legislations and regulatory framework relating to climate change in Somalia are assessed, with the result that most of the necessary arrangements are in place, at least in their formative shape. The chapter also examined international climate agreements in climate adaptation and mitigation, again with the indication that those agreements relevance to Somalia mostly include the country in some form.

In an attempt to draw parallel in functionalities of institutions working on adaptation and resilience building, cases studies from similar settings are examined. The chapter also examined nationally determined contribution (NDC) in climate change adaption and mitigation for the period 2021-203, put in place as part of its commitment to the Paris agreement. To that effect, a number of sectoral and cross sectoral projects are taken up by the initiative. For the purpose of benchmarking, we compared the nature of the projects with those being carried out in the Sahel under the support of international organizations. Integration adaptation approaches, climate financing, desertification, adaptation and social justice, inter-country initiatives, and early warning and disaster prevention systems.

The analysis of the primary data presents respondents assessment of the shape institutional arrangements should take for effective adaptation and the policy actions that are in place for that purpose. The structure and challenges in partnership across institutions also extends to stakeholder engagement and partnership at a community level.

The respondents identified several partners and stakeholders towards climate change adaptation and resilience building. While the development partners count as their main collaborators Environment line ministries and departments, the line ministries and federal government bodies tend to work with international bodies like GCF, GEF. They also stated examples of activities done in collaboration with partners as well as the way activities of partners were monitored by them including field visits and independent third party monitors , scheduled action plan, Directly evaluating reporting of parter' activities , Respondents identified challenges identified in the collaborations and ways forward in resolving them. Lack of clear definitions national institutional mandates, Capacity of the national designated Authority (NDA) and lack of national strategic guidance and monitoring by the partners.

At a community level, the general consensus among respondents has been that as each and every intervention has its strengths and weakness; its uptake by the community needs examining interventions against their pros and cons from the community's perspectives. This might call upon doing consultations with a variety of stakeholders at a community level during climate adaptation planning and ensuring that implementation strategies that are spread across different themes and geographies in the country are suited to the needs and settings of the community. While the activities identified favor natural resource management, water and agriculture, this clearly indicates the need for concerted action from various stakeholders to generate and conduct community level activities in the forest, pastoralist/livestock, coastal communities and enterprise and city adaptation related activities.

Several challenges are identified in institutional arrangements with the major ones being the lack of guiding principles/policies in many areas, the lack of effective implementation of policies, laws, regulations and acts, and the lack of coordination across stakeholder institutions.

CHAPTER V: Climate Financing

1. Introduction

As discussed in the previous sections, tacking climate change challenges-through adaptation and resilience building- as much as it requires understanding of the nature of the challenges and crafting appropriate solutions, cannot be effected without acquiring the necessary resources to implement the activities. Specifically, equipping with effective of institutional, intellectual and material capabilities that would warrant a full-fledged launch of its activities and their implementation requires assessing the challenges associated with acquisition of the financial resources. Accordingly, this section focuses on understanding the processes of organizational establishment, capacity mobilization, stakeholder engagements, partnership building, program planning, and preparation of a conducive financial access environment.

As economies like Somalia are challenged by inadequate domestic financial resources availability, it would naturally be difficult to sustain the rapid pace at which climate activities would need to expand, calling for a new climate financing approach, without heavy reliance on limited public spending and unsustainable debt financing.

2. Climate Financing Challenges and Possible Sources

2.1. Understanding climate financing challenges

Africa's vulnerability to climate change creates a call at both national and local levels to finance adaptation activities, given that very little financing was undertaken to assist adaptation efforts Notwithstanding the current increase in approved finance globally, Africa is still receiving a relatively small proportion (Nakhooda, et al., 2011).. These general trends in Africa are likely to mirror the Horn of Africa region in general and Somalia in particular (See Section 4 of this chapter). Needless to say, the Government of Somalia is highly constrained financially to address climate related adaptation efforts.

2.2. Global Climate financing Sources of Relevance for Somalia

One way Somalia could access climate financing resources is from international funds that were proposed under the Convention and its Kyoto Protocol. Examples include the Special Climate Change (SCC) Fund, which assists technology transfer and adaptation, the Kyoto Protocol Adaptation Fund which funds local adaptation programmes, and Least Developed Countries Fund which funds efforts to develop national adaptation programmes of action. (Brazier, A., 2018). At the national level, there is a need to combine local level revenue generation with local based private sector financing that could support adaptation (Thirdway Africa., 2018).

The global climate finance, a critical input into effecting climate adaptation and mitigation activities has been considerably growing over the past 25 years. Initially, the concerns and the fund allotment have been sporadic focusing on strictly donor-driven and project-based activities. While Africa and other developing countries that have initially neglected, there is a steady increase in the need to allotting resources to countries that contributed nothing to the global warming impact but have carried the brunt of the damages from climate change. The financing has grown to a higher level with

the recognition that adaptation should become as much of a global responsibility as mitigation. This section identifies a few sources of climate finance of direct relevance to Somalia. Further, it also identifies the potential bottlenecks to accessing financial resources and lessons drawn for Somalia, by evaluating climate financing in Africa, the Sahel (which as agro-ecological, economical, and sociocultural similarity), and Ethiopia (a fellow Horn of Africa country with considerable agropastoralist community that shares linguistic, sociocultural and economic similarity to Somalia).

Green Climate Fund aims to mobilize funding enabling investment in low-emission and climate-resilient development globally. The fund was established in 2010 at the United Nations Framework Convention on Climate Change (UNFCCC), by the UN Framework Convention on Climate Change encompassing 194 countries, under the guidance from the Conference of the Parties to the Convention (COP) and is created by. It allocates its resources to low-emission and climate-resilient projects and programmes in developing countries. The Fund has identified five cross-cutting investment priorities which will deliver major mitigation and adaptation benefits: transforming energy generation and access, creating climate-compatible cities, encouraging low-emission and climate-resilient agriculture, scaling up finance for forests and climate change, and enhancing resilience in Small Island Developing States (SIDS). The GCF is also considered one of the financial mechanisms the Paris Agreement adopted in 2015, is the world's single-largest source of public finance dedicated to reducing greenhouse gas emissions and helping countries adapt to climate change.

Despite a commitment to enable developing country institutions to access funds without going through an international intermediary, the GCF has struggled to enable "direct access" to take off. Most of the climate finance provided by the GCF flows through international institutions such as the UN Development Programme (UNDP) or the World Bank. The GCF has accredited 62 developing country institutions as eligible for direct access so far, but 42 of them have yet to receive actual project funding. Giving more direct access to finance is crucial to putting developing countries in the driver's seat of their own development. It's also key to the GCF's success, as demonstrated by past examples of GCF-supported projects of direct access entities: Direct Access Brings Adaptation Finance to the Local Level; Direct Access Is Critical to Aligning Financial Flows with the Paris Agreement; National and Local Institutions Are in it for the Long Run ; and Direct Access Entities Can Be Nimble and Innovative.

Climate Investment Fund: The African Development Bank serves as an implementing agency of the Climate Investment Funds (CIF), a premier multilateral climate finance mechanism at the forefront of climate action in developing countries. Established in 2008 as one of the largest fast-tracked climate financing instruments globally, the $8.3 billion CIF gives developing countries worldwide an urgently needed jump-start toward achieving low-carbon and climate-resilient development. The CIF provides developing countries with grants, concessional loans, risk mitigation instruments, and equity that leverage significant financing from the private sector, multilateral development banks, and other sources.

Since 2010, the African Development Bank has played an important role as a CIF implementing entity, advancing a growing portfolio of projects in renewable energy, forestry, and resilience in Africa. The CIF's four key programs include : Clean Technology Fund (CTF) , Forest Investment Program (FIP), Pilot Program Climate Resilience (PPCR), Scaling Up Renewable Energy Program (SREP).

The Sahel Alliance (supported by UK and other donors) recently announced that EUR6 billion is being made available to G5 Sahel member countries for the implementation of over 500 projects between 2018 and 2022. They will be implemented rapidly, particularly in the most vulnerable areas, and aim to align with priorities of the G5 Sahel countries (Cooper and Prize, 2019).

Development Fund: A key aim of the Development Fund activities is to increase the adaptive capacity of marginalized rural poor farmers and pastoralists in the South. The fund intends to support activities that respond to local, national, and global challenges that affect the livelihood of these farmers and pastoralists.

2.3. Assessment of climate financing based on the Ethiopian experience

The climate financing assessment is done by CCC-E (2020) with the aim of tracking adaptation finance tracking by investigating if multilateral and bilateral donors' reporting of adaptation finance is reported reasonably accurately The project further investigates if the supported adaptation activities are targeting the poorest and most climate vulnerable parts of the population, and if the activities are gender sensitive. The report has made the assessment of 20 projects, including the 10 largest received by Ethiopia, between 2013-2017. For the purpose of this study, relevant aspects of the assessment are identified and summarized and attempt is made to draw lessons from the exercise for the purpose of shaping future climate financing actions in Somalia.

Table 17: Climate financing assessment for Ethiopia and Lessons for Somalia

Assessment criteria	***Relevant climate finance features***	***Lessons (for Somalia)***
Adaptation/mitigation features of climate finance	*Climate finance received by Ethiopia predominantly targets adaptation.*	*To represent the balance stipulated in the Paris Agreement, donor development aid targeting mitigation activities must be significantly increased without being detrimental to current levels of Adaptation*
Climate finance (real value)	*Significant amount of the climate finance received in Ethiopia has been Rio marked "principal". Considering the principal marking encompasses wider objectives of 'biodiversity conservation and combating desertification' climate financing figures tend to be inflated.*	*Identifying projects that are more narrowly focused on adaptation/meet mitigation criteria could enable effective tapping into climate finance resources.*
Sustainability of adaptation financing	*Ethiopia is at high risk of entering into debt distress, yet around 50% of all climate finance commitments received in Ethiopia from 2013-2017 were in the form of loans.*	*There is a need to design projects that are suitable for grant-based climate financing. Providers of climate finance should increase their provisions of grant-based support for climate change to prevent the negative impacts related to debt.*
Projects' capacity to address the vulnerability needs	*Adaptation projects routinely produce vulnerability analyses relevant to the projects activities and impacted stakeholders.*	*There is a need to incorporate into project the relevant context of climate vulnerabilities and develop activities addressing the identified risks, vulnerabilities and impacts.*
Adaptation relevance of multifaceted projects	*Projects reported as adaptation-relevant by a donor which are more focused on commercialization, market development and entrepreneurship have less contributions to climate change adaptation.*	*There is a need to design projects that have adaptation as central features for efficient use of climate finances.*
Poverty reduction and reaching out to vulnerable groups	*World Bank's Rural Productive Safety Net Project, WaSH, and Response and Resilience projects are good in addressing poverty orientation by targeting the poor and food*	*There is a need to focus on projects that have features that address poverty and vulnerability. There is a need to craft projects that have clarity on how to target the poor and*

	insecure households, the pastoralists and agropastoralist and poor regions.	*most vulnerable in project implementation.*
Gender mainstreaming	*Majority projects have gender co-targets; but significant of them did not address gender equality. All of the assessed projects have mainstreamed gender and contributed to womens empowerment, but at varied levels.*	*Project actions and objectives regarding gender equality need to be transformative.*
Criteria met by most projects against climate financing assessment	*participatory & inclusiveness, government sectors having defined roles and resource, targeting most vulnerable and building skills & capacity*	*Crafting projects that meet these four criteria could be useful entry points to qualify for climate financing.*
Useful climate finance repository	*The OECD's climate-related development aid database*	*Such repositories would enable accessing relevant information and data for identifying financing sources.*
Climate Finance flow	*1,222 climate-related projects; 3.87 billion USD between 2013-2017*	*With projects suitably crafted for adaptation and climate financing criteria, the sum to be acquired could be substantial*
Major sources of climate finance (international)	*World Bank (WB), African Development Bank (AfDB), United States (US) and United Kingdom (UK).*	*The same/similar group of development partners could be targeted as sources of climate finance*

Source: Author's Compilation from the documents Federal Government of Somalia November, 2015 and Cooper and Prize (2019).

3. Climate Financing Challenges, Sources and Structure: Analysis of Primary Data

The assessment from both international and national organizations is that Somalia is a recipient of very limited climate finance even by SSA standards. The view shared among line ministries like Ministry for Disaster Management and the National University of Somalia is that climate finance is the most essential input into climate adaptation but it is essentially missing or very low.

Currently no climate finance institutions exist in Somalia, resulting in no routes to raising funds in many government institutions. In academic institutions like the University of Somalia, there are small amount of funds allocated for operations and administration departments. Climate activities are generally poorly financed due to lack capability to mobilize and accountability challenges. Finance is non-existent but organizations like UNEP are in dire need of such resources for the work they do to improve the livelihood of agro pastoral communities amidst climate change.

3.1. Institutional assessment of sources of climate finance

Assistance for climate change adaptation can come either in the form of climate finance or in the form of technical assistance in the realm of technology acquisition, strategy development, capacity building, and the like. The development and international partners provide such support department responsible for climate change adaptation and resilience. In line with this, the biggest of such assistance comes from Green climate Fund (GCF), and Global Environment Facility (GEF) via organizations like UNDP and UNEP. The Ministry of Disaster Management receives most of its support

from IGAD. However, such support to organizations like SIEP or the National University of Somalia for climate change related activities is almost non-existent except occasional funds from UNDP.

The main procedure involved in accessing climate finance resources for international organizations like the UNDP is through developing project proposals. There are also instances at federal level where climate finance resources are raised through community contribution. Table 18 presents sources and procedures for climate financing, followed by discussions on sources, purposes for which climate finances are used.

Table 18: Sources and procedures of climate financing

Institution	Major source of finance	blended experience in climate finance	Purpose of climate financing
United Nations Development Program -Somalia	GEF, GCF and bilateral donors	No	vertical and horizontal fund for adaptation activities
Office of the Prime Minister	Community contributions	-	-
UNDP (Project Manager)	Not yet established	No	-
United Nations Environment Program-Somalia	Global Environmental Facility (GEF), Green Climate Fund (GCF), Adaptation Fund	Yes	-
Division for Environment and Climate Change -Office of the Prime Minister	-	-	-
The Somali Institute for Environmental Peace	-	No	Budget support and capacity building trainings
Ministry of Humanitarian Affairs and Disaster Management	-	No	-
University of Somalia	The World bank	No	-
Federal Ministry of Agriculture and Irrigation	-	No	-
Berghof Foundation	-	No	-
UNOPS	World bank, European Union and African development Bank	No	
Ministry of Fisheries and Marine Resources	-	-	-
Action for Environment	UNDP ,GEL and other UN agencies	No	consultations, training regarding to the climate adaption and resilience

Source: Author's compilation from the key interviews survey

3.2. Climate financing criteria and climate finance access

There are certain criteria that funding partners set for the different institutions to access the climate finance. Institutions also set their own criteria to access and utilize climate-related funds. One such criteria set by UNDP-Somalia has been the contribution to adaptation of the proposed activity (project) to be funded. In general, though, while organizations like UNDP are keen to support adaptation activities/strategies through funding, at least at a federal level, setting up a concrete criteria for qualifying for adaptation funding is incomplete from UNDP's side at least. As for UNEP, it has a set framework to follow, one of which is for the adaptation strategy/project to pass through

national designated entity which are government departments. Academic institutions, however, argue that there is no clear policies, and make applications on ad-hoc basis. Whereas, federal line ministries stated that proposed adaptation activities required accreditation from the relevant Ministry to qualify for adaptation funding.

For the limited pre-conditions that exist for qualifying for climate financing, the study also assessed if there has been any reforms from the organization's that were requesting for the funding. Many federal institutions have stated there has been no actions from their sides to put out a criteria to qualify for climate financing, likely because there has also been limited to no criteria set out by the funding entities for the same.

The respondents were also asked for their suggestions on best access and use of climate finance from recipients' perspectives. From a recipient perspective, first a lot of training and capacity building is required to teach how to access the climate finance in government institutions. Capacity building for the staff and proper planning for identifying priority of intervention areas is also believed to be useful, from the respondents' perspectives. Respondents also suggested probing ways of accessing finance directly from climate policy institutions instead of using other UN agencies. Some government ministries have indicated increasing community awareness about climate adaptation, resilience as well as availability of international finances that could lead to better financial access. Experts from the universities stated that working on establishing clear criteria for access and clear priorities on adaptation actions would improve the effectiveness of financial application and quality and quantity of access. Representatives from the Federal and ministerial bodies are of the view that there needs to be a centralized system of accessing climate financing where priorities are set at a federal level and clear goals, mandates and responsibilities are set at sectoral and regional levels. This would avoid duplication, misuse and underutilization of available climate funds the country could access.

4. Concluding remarks: Climate Financing

The chapter begins by setting out the challenges in climate financing in the context of Africa with lessons from Somalia. This is followed by assessment of potential climate financing sources, and routes to access that are relevant for the Somalian case. The effectiveness of access and features of climate finance are also evaluated by assessing the case of Ethiopia, a fellow Horn of African country with a large agro-pastoralist population, with lessons drawn for Somalia. The analysis based on key informant interview from Somalia is also assessed.

For the purpose of this study, relevant aspects of the assessment are identified and summarized and attempt is made to draw lessons from the exercise for the purpose of shaping future climate financing actions in Somalia. Accordingly, gaps are identified in the following areas: Adaptation/mitigation features of climate finance, Climate finance (real value), Sustainability of adaptation financing, Projects' capacity to address the vulnerability needs. Accordingly, this section focuses on understanding the processes of organizational establishment, capacity mobilization, stakeholder engagements, partnership building, program planning, and preparation of a conducive financial access environment.

The assessment from both international and national organizations is that Somalia is a recipient of very limited climate finance even by SSA standards. The view shared among line ministries like Ministry for Disaster Management and the National University of Somalia is that climate finance is the most essential input into climate adaptation but it is essentially missing or very low.

Chapter VI: Policy Recommendations and Way Forward

This chapter presents the policy recommendations that emanated from the assessments made and gaps identified in the previous chapters. The following key policy issues are identified and briefly discussed in the subsequent sections below.

1. Policy and institutional actions for effective sectoral and cross sectoral adaptation

For adaptation actions to work, the following findings need to be acted upon for pastoralist and agro pastoralist sectors:

- Crafting adaptation policies around the knowledge that pastoral communities are primary custodians of the local environment; possess considerable knowledge and experience in dealing with climatic variability;
- Incorporating into Somalia's National Adaptation Plan Negotiations under the United Nations Convention to Climate Change (UNFCCC) that are currently creating a global framework for national long term adaptation planning.
- Factoring in s localized heterogeneities such as development and adaptation policy responses could become more effective.--. Traditional knowledge and customary law can be reinforced with formal research to raise indigenous trees, shrubs and grass well adapted to the local dry climate.

Adaptation actions for coastal communities would include institutional actions such as:

- Actions to protect coastal fringe flooding, and flooding on infrastructure., reducing or mitigating of climate change on coastal ecosystems and protecting the availability of fresh and drinking water either through setting up appropriate physical infrastructures
- Environmental management Protection of mangrove, wetlands, dunes forests Prohibition or control of the removal of beach sediments
- -Reduce water flows, Drainage facilities and water pumps, Reduce paved areas to improve permeability of the soil or adopt water permeable pavements, Diversify energy supply
- Desalinization technologies, Household and business tanks to supplement the reticulated water supply system
- Devices to prevent seawater from back flowing into storm drains, Dams in farms and in other different locations

Adaptation in dryland forests could include the following three actions

- curbing illegal charcoal production and the associated forest degradation,
- Integrating dryforests and gum and resin products to enhance social-ecological resilience.
- Promoting high value forest crops requires very little, if any, capital outlays and builds upon already existing local knowledge and practice.
- Working towards reducing the many institutional, political and policy based stumbling blocks in the sector.

Recommendations for employment and social safety net related adaption in Somalia include:

- Green enterprising and job creation
- Effective natural resource management and employment generation for the youth and women.
- promoting climate 'neutral' livelihoods,

- the Sahel Adaptive Social Protection Programme (ASPP),
- Poverty and Safety Nets in the Sahel
- The Ethiopian Productive Safety Net Program (PSNP).

2. Policy and institutional actions for effective resilience building

There are semi-autonomous resilience building actions that are suitable for Somalia that the study has identified. These include insurance: drawing down on assets: reducing consumption: forage and herd modification and crop-livestock integration: altering herd dynamics: mobile pastoralism and settlement: However, for these resilience building actions to be sustained, expaned and scaled up, a national institutional endeavors is required. In light of this, resilience building plan for Somalia, at a national level, would need to include a strategy that simultaneously tackles environmental and development challenges. For the purpose of exemplifying ssetting up a climate adaptation and resilience building strategy for Somalia, below we discuss, the Ethiopian case of Climate Resilient Green economy strategy.

Ethiopia's Climate Resilient Green Economy (CRGE) Strategy, developed by the Government of the Federal Democratic Republic of Ethiopia, outlines the vision, strategy, financing strategy, and institutional arrangements Ethiopia will need to pursue to attain the triple goals of economic growth, net-zero emission, and building resilience. It consists of *an Assistance Strategy: and Governance: The Ethiopia CRGE Facility is governed by the CRGE Ministerial Steering Committee, chaired by the Prime Minister's Office,* which will determine the CRGE Facility priorities. The CRGE Management Committee , The CRGE Technical Committee , The Facility Advisory Group, National Implementing Entities The CRGE Facility will have Two Windows - Strategic Window and Responsive Window. Strategic Window will exclusively finance the implementation of activities (investment plans) and associated institution-building requirements generated through the Government's strategic 'iPlan' process. Responsive Window that will fund demand-driven implementation and institution-building activities.

3. Actions to be taken to strengthen local and national institutional setup for adaptation and resilience building

Somalia has signed or ratified a number of international agreements and conventions aimed at preventing environmental degradation and promoting sustainable use of natural resources. These agreements fall under different categories including, protection of the atmosphere, combatting desertification, conservation of biodiversity, combating marine pollution, and hazardous waste management, among others. Increasing Prominence of Climate Adaptation and Resilience.

Somalia's largely arid climate, livestock-centered economy, weak institutions, economic and security challenges make the country a strong candidate for global climate focus on particularly arid economies. Indeed, the livelihood challenges faced in arid economies will be further exacerbated by anthropogenic climate change so, if implementation of the 2030 Agenda for Sustainable Development is to fulfil its commitment to 'leave no one behind', the need to identify routes to supporting adaptation and climate resilient development in these areas is especially pressing (FAO, 2016).

Overall, the analysis in this study indicated that Somalia is very much short in engagement in international platforms that entertain climate policy agenda. Similarly, the primary data analysis also revealed that both national institutions and international development partners strived to do their best to incorporate climate projects and strategies into their activities. However, their efforts admittedly leaves much to be desired in terms of crafting coordinated, efficient, and robust climate policy at a national level and integration at an international level.

3.1. Aligning Resilience Concerns with Global Development

Given the disastrous impacts of increasingly frequent natural disasters, cyclical food insecurity, and limited funding, international development and humanitarian agencies have recently begun to focus heavily on resilience (Cisse and Barrett, 2019). Its prevalence is also increasing in development discourses and policy making (DFID 2011). Despite this, attempts to build resilience at a national, community or household level is at its infancy and is in most cases taken up as an adaptation activity. This implies that a greater effort is required to craft and implement resilience-focused activities and strategies.

3.2. Integrating Climate Adaptation and Resilience Building in the National Plan

As noted before, adaptation and resilience building in Somalia are limited to ad hoc activities, which lack national or sectoral guidance. This calls for producing a nationally-based plan that also embeds expanding adaptive and resilience capacity in all sectors of the economy. In line with this, Gagnon-Lebrun, F.; Agrawala, S., (2006) argue that the development and implementation of climate adaption should be part of national plan of a country that maps the capacities at different levels ranging from the national to local level and thus creating opportunities for climate adaptation related investments. One way of doing this is developing a climate adaptation financing framework based on successful practices in sub-Saharan African countries and other low income countries, as well as learning from important adaptation failures.

Such endeavor is critical to filling the gaps identified in sections 1 and 2 of this chapter. Specifically, better integration of Somalia's adaptation and resilience building priorities into international platforms requires making clear planning and decisions of national climate adaptation efforts. Furthermore, understanding the local level climate risks and incorporating them into the local financial decision making requires evaluating the vulnerability, exposure, and response to the climate at a national level. Such planning also helps to identify opportunities to invest in climate resilience that will also include the alignment of the financial system toward such investment.

3.3. Incorporating Context, Heterogeneity and Scale in Adaptation and Resilience Building

The study has largely assessed broader opportunities and challenges in identifying ways to enhance adaptation and resilience building in Somalia. However, the study did not allow for assessing different policy relevant steps that can be taken to enhance resilience in the context of the considerable heterogeneity in livelihood strategies that exist in the country. One example is how different sub-groups within pastoral economies might differ in terms of risk exposure, risk mitigation, and overall resilience to the multidimensional shocks.

This is important in contexts where most of the traditional coping strategies adopted, particularly those associated with a wider range of shocks, have insurance tools that are characterized by partiality, localization and scope limitation (provide only a partial insurance (Mogues, 2011; Dercon, 2009) implying that resilience strategies of farm households differs across geographic locations. In particular, the diverse agro-climatic zones means that the degree of vulnerability and resilience capacity varies across the different parts of the country; calling for a context specific approach to building resilience.

It is increasingly being recognized that the current adaptation efforts are incremental with locally based initiatives as these address problems and can become sustainable initiatives that address climate change [Climate Policy Initiative., 2018]. Hence, in addition to diversity and heterogeneity, the

scale (scaling up) of adaptation is also important matter to consider. This is particularly essential in the context of Somalia where most initiatives are project type, ad-hoc, sector-focused, and by all indications not strategy focused and unsustainable.

3.4. Mainstreaming Gender into Climate Policy

The importance of incorporating gender into climate adaptation and policy cannot be overstated. For instance, Somalia's current elections now advocate for one-third representation of women in both houses of Parliament. Although the final results may not achieve this target, there is considerable pressure being made towards gender inclusion in all decision making platforms. Such advocacy and planned strategies should be part of addressing clear vulnerabilities of women to climate change impacts. Moreover, specific adaptation and resilience building plans should also be accompanied by national recognition of the importance of enhancing gender mainstreaming in climate change actions and of supporting policies and programs.

One of the reasons there is a specific need to incorporate gender into climate policy is that national policies on gender may not be the answer to dismantle socio-cultural barriers to inclusive private sector adaptation. Instead, the way forward may require a move away from simple policy statements, to designing and reinforcing clearer and more inclusive implementation platforms, which ensure that the broader enabling frameworks, established in national policy, are mainstreamed and implemented at ground-level.

4. Actions to be taken to increase effectiveness in solicitation and utilization of climate finance

Both analysis from primary and secondary sources point to the overwhelming lack of financial resources necessary to undertake meaningful adaptation and resilience building activities. To increase the effectiveness of raising and utilizing funds for these purposes, the study results point to the following:

4.1. Identifying suitable sources of finance for Somalia and crafting effective solicitation methods

The directly available sources of finance Somalia is entitled to include Green Climate Fund, Climate Investment Fund, Development Fund Local institutions at different levels and international development partners operating in Somalia need to work on positioning institutionally and increase capacity building to solicit funding from these sources. Further Somalian institutions could model their funding utilization and solicitation on sources like the Sahel Alliance.

4.2. Identifying financial access methods based on experiences from similar settings

-Based on a financial accessing experience of Ethiopia, the study also identified the following areas where funding applications for Somalia could be improved upon. These include:

- *design projects that are suitable for grant-based climate financing,*
- *incorporate into project the relevant context of climate vulnerabilities and develop activities addressing the identified risks, vulnerabilities and impacts,*
- *design projects that have adaptation as central features for efficient use of climate finances,*
- *Project actions and objectives regarding gender equality need to be transformative,*
- *participatory & inclusiveness, government sectors having defined roles and resource, targeting most vulnerable and building skills & capacity,*

- *Target as sources with established routines for climate financing such as The OECD's climate-related development aid database, World Bank (WB), African Development Bank (AfDB), United States (US) and United Kingdom (UK).*
-

4.3. Maximizing Synergies in Climate Financing

As discussed in the literature and in the key informants' discussions, one of the serious impediments to climate adaptation and resilience building in Somalia is limited climate finance. Given the opportunities and challenges identified with respect to climate finance in Chapter V of this study, future climate financing efforts will need to focus on identification of tools that will help the country on how to plan and implement climate finance and opportunities to access climate adaptation finance from international, bilateral and private as well as local finance sources. This would enable the planning and implementing agencies in Somalia to come up with practical and technical solutions to climate finance constraints.

To ease the constraints to climate finance and thereby increase climate change related adaptation investment, it might be essential to include in the planning the use of blended (private, multi-lateral and local financing) in climate adaptation. This works through developing and implementing a local based adaptation financing framework that will simultaneously leverage opportunities that come from international source of climate financing and facilitate the realization of climate adapting and climate-resilient *Somalia. In exploring the opportunities of private and other local based funding sources, a Somalia could create opportunities to utilize such funds to close gaps in global funding thereby maximizing the synergies between the two sources of funding.*

No matter the sources of financial resources, their efficient, transparent and accountable utilization would lead to sustainability in raising funding. For that, clear operational guidelines and financial management tools that guide climate operations are required. Necessary structures as well as checks-and-balances would also be needed to be in place to ensure transparent, corruption-free management of resources that adheres to strict rules and regulations put forth by the body responsible for climate financing.

Along with the mainstreaming of climate financing activities, there is a need for thorough and intensive process of organizational establishment, capacity mobilization, stakeholder engagement, partnership building, program planning, preparation of activities, and actually conducting the financial plan.

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