



Climate Change in Somalia *Turning Challenges into Opportunities*

Key Policy Messages

1. Somali people are highly vulnerable to climate change because the bulk of their livelihoods depend on climate sensitive natural resources. Climate change is therefore an important development problem that requires urgent attention.
2. Climate change in Somali has two dimensions. First, the country has a fragile ecosystem with a naturally constraining production environment which is highly sensitive and exposed to climate risk. Second, weak technical, institutional and legislation capacity has lead to widespread degradation of land resources.
3. Through collaboration between local communities, government agencies and development partners, a range of actions can be taken at different levels to address climate change in Somalia.
4. These include, among others: (i) Setting national targets for climate change adaptation and mitigation linked to relevant sustainable development goals; (ii) Capacity development of relevant community and government institutions complemented by enhanced partnership, collaboration and coordination among these institutions; (iii) Short, medium and long term investments plans for the development of the Juba and Shabelle rivers; (iv) Development and promotion of easy to adopt water use efficiency packages, and (v) Development and promotion of natural resources management manual and guidelines that can be adapted to the natural, economic and social conditions prevailing at the local level.



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Attribute to:
Somali Institute for Development & Research Analysis 2016.

Risk

Climate change poses the risk of eroding the progress made in rebuilding the country and moving it towards long term development

1. Introduction

Climate change poses a great risk to the livelihoods of the Somali people. This is because the Somali natural environment and associated production systems are highly vulnerable to climate change.

From a physical dimension, the natural environment experiences constraints that limit its production potential and increase its sensitivity and exposure to climate risks. From a social economic dimension, land related development challenges affect the ability of the natural environment and production systems to effectively adapt to present and future climate risks. Climate change is therefore an important development problem which needs to be urgently addressed.

It affects the livelihoods of the Somali people and poses the risk of eroding the progress made in rebuilding the country and moving it towards long term development.

This policy brief addresses this problem by: (1) Assessing the key bio-physical constraints faced by the Somali natural environment, (2) Examining development challenges that reduce the adaptive capacity of the natural environment and production systems, (3) Based on 1 and 2, identifying actions that can be taken by government, local communities and development agencies to reduce climate change vulnerability.

The brief aims to provide recommendations that would reduce the risk that climate change poses to Somali livelihoods and therefore contribute to the social and economic development of the country.

Low Adaptive Capacity

Developing countries are highly vulnerable to climate change because their human systems have very low adaptive capacity

80%

The percentage of Somali population that draws their livelihood from natural resources based sectors

Somalia NAPA

Somalia National Adaptation Programme of Action focuses on 8 sectors and prioritizes 5 areas of action organized along three work packages

2. Background Information

Climate change is defined by the United Nations Framework Convention on Climate Change (UNFCCC) as change in the climate attributed directly or indirectly to human activities, which alters the composition of the global atmosphere (UN, 1992).

Climate change is mainly the results from emission of Green House Gases (GHGs) into the atmosphere through human activities, leading to warming of the atmosphere and changes in the climate system. Climate changes result in higher temperatures, variable rainfall and frequent and severe droughts and floods (United States Environmental Protection Agency, 2016).

The degree to which the different systems are

affected by climate change depends on their level of exposure, their sensitivity to the effects and their capacity to adapt to these effects (Cardona et al, 2012). Generally, developing countries are highly vulnerable to climate change because their human systems have very low adaptive capacity.

Like other developing countries, Somalia is highly vulnerable to climate change. This is evident from the climate change related studies carried out in the country (Federal Government of Somalia, 2013 and 2015; Puntland Ministry of Environment, Wildlife and Tourism, 2014; Ingrid et al, 2009; Lemma et al, 2011; etc). The findings obtained from these studies are summarized in Box 1 below.

Box 1 - Findings of Climate Change studies in Somalia

- Climate changes studies carried out in Somalia have addressed a large number of issues including traditional weather forecasting, agriculture and livestock productivity, biodiversity, land use, seasonal migration and social and economic development.
- Local communities experience many climate hazards and have very low levels of resilience. Most of the adaptation initiatives put in place among local communities are organized by development partners and therefore may not be sustainable in the long term. Among pastoral communities, climate change mostly effects water and pasture with profound impacts on food security and livelihoods.
- Impacts of climate change extend beyond the land based livelihoods. Fishermen have reported severe impacts such as very strong winds that limited the fishing hours, rising sea level that destroy fishing infrastructure, unpredictable weather patterns increase fishing risk and high temperature that significantly increase the cost of refrigeration.
- Climate change in Somalia is amplified by widespread land degradation. Land degradation results from uncontrolled charcoal production, over-exploitation of rangelands, over exploitation of marine resources through illegal and uncontrolled fishing, frequent natural disasters including droughts, floods and cyclones and poor disaster management systems.
- Climate change in Somalia poses a risk to sustainable development and security as Somalia economy is largely dependent on livestock, agriculture, pastoralism and fisheries, which are very sensitive to climate change. It is estimated that nearly 80% of the population draws its livelihood from these sectors.
- The Somalia National Adaptation Programme of Action focuses on 8 sectors (Water; Agriculture and Food Security; Animal husbandry, Grazing and Rangelands; Health; Marine and Coastal Resources; Biodiversity; and Natural Resources) prioritizes 5 areas of action organized along three work packages (Sustainable land management; Water resources management; and Disaster management) for comprehensive and mutual enhancement.
- Somalia is benefitting from a number of initiatives that are implementing climate change related activities at the local level. Two such initiatives are the "Your Environment is your Life" implemented by ADESO, CARE International and Puntland Ministry of Environment, Wildlife and Tourism through the support of European Union and the "Enhancing Climate Resilience of the Vulnerable Communities and Ecosystems in Somalia" implemented by United Nations Development Programme.
- Climate change adaptation initiatives have been proposed by the different studies. Those that are frequently cited include enforcing of environmental regulation, implementation of land rehabilitation projects such as re-seeding of rangelands, reforestations, soil and water conservation, rain water harvesting, increasing community knowledge to improve adaptation, participatory resource use planning, dialogue platform for better resource sharing and conflict resolution, building community resilience through social services and safety nets and improving early warning systems.

3. Materials and Methods

The analysis done for this policy brief is based on desk review of available literature and assessment of publically published data. Most of the data assessed was obtained from the FAO Somalia Water and Land Information Management (SWALIM) programme and weather, water and land datasets published on its online data portals.

4. Bio-physical constrains of the natural environment

The Somali natural environment experiences bio-physical constrains that limit its production potential and increases land users (pastoral, agro pastoral, tree product gathers) exposure and sensitivity to climate risk. The key bio-physical constrains that the country experiences are summarized below:

- i. **Rainfall:** Large areas of the country receive very low rainfalls (Figure 1). Almost half of the country (48%) receive less than 300mm in a year and only very few areas (1%) receive more than 600mm per year. Rainfall is therefore low across the country except for some areas in the South and the North West parts where rainfall conditions are a little better.
- ii. **Evaporation:** Complicating the problem of low rainfall is the high evaporation loss that leads to big differences between water input (rainfall) and output (evaporation) in the country. Actually, the production potential of an area can be assessed by comparing rainfall and evaporation; with areas here rainfall is close to or exceeds evaporation being considered to have good production potential. In many areas of Somalia, evaporation far exceeds rainfall and therefore very limited production potential (Figure 2). Few areas, especially in the South and North West of the country have smaller difference between rainfall and evaporation and therefore better production potential.
- iii. **Growing periods:** The big difference between rainfall and evaporation results in very short growing periods. In the north of the country, the growing period is less than 60 days except for small areas in the North West where the growing period reaches 120 days. In the South, the situation is much better and the growing period varies between 90 days to 180days.
- iv. **Surface water:** Despite its big land area, Somalia has only two perennial rivers, Juba and Shabelle, both of which are in the South of the Country. The two rivers have their watersheds in neighboring countries and therefore are shared resource with Somalia not having full control on management of these rivers. The high flows experienced in the wet season in the months of May, September, October and November (Figure 3) are not utilized and cause flooding and destruction in some seasons. The potential of the runoff from the land surface is highlighted by lack of detailed data limited its development and utilization.
- v. **Ground water:** With limited surface water, Somalia depends on ground water for its water supply. The bulk of the ground water sources are dug wells and boreholes, which make up to 80% of the water sources (Figure 4). Development of the Somali ground water however faces many challenges including high salinity levels, deep aquifers that increase cost of drilling and frequent borehole failures due to lowering of the water table as a result of over exploitation.
- vi. **Soils:** Soil types vary across the country with different types of soils from deep clay soils to shallow stony soils (Figure 5). In the north, soils are shallow and stony except for small pockets of deep clay soils in the North West. In the Central part, soils are sandy along the coast and deep loams further inland. In the South, soils are mostly clay and loam with some soils being saline and other being poorly drained. Soil fertility and water storage capacity are low due to overuse without fertilizing and widespread soil erosion.
- vii. **Vegetation:** Somali has 4 major vegetation cover types with most of the land area covered by woody vegetation (Figure 6). The cropped area (both rain fed and irrigated) is limited and is less than 5% of the total area. A substantial area (12%) is bare with no or little vegetation cover thereby making this area prone to degradation through various agents of degradation such as water and wind.

48%

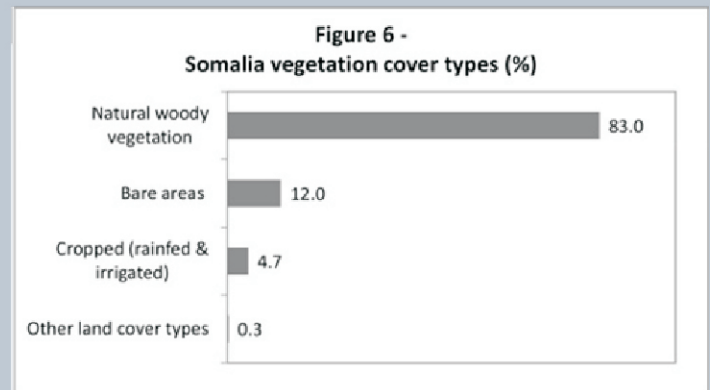
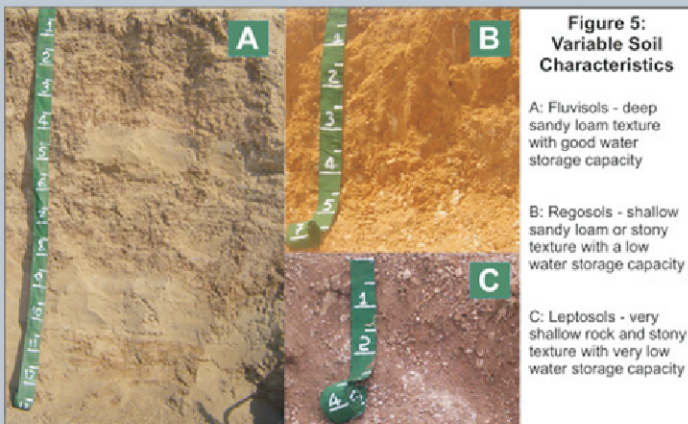
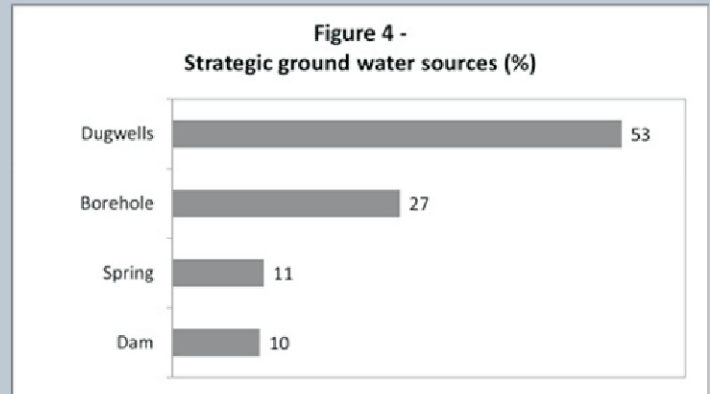
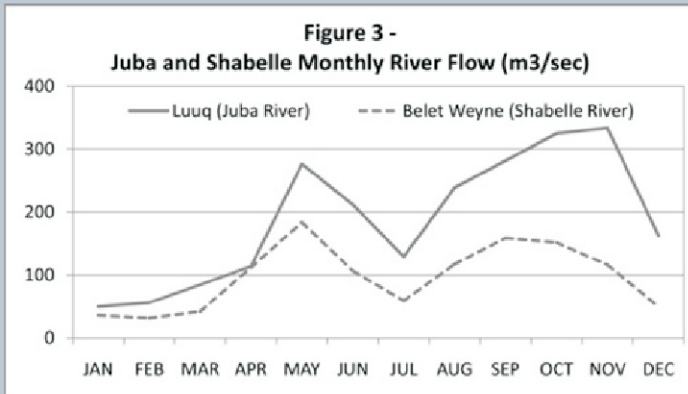
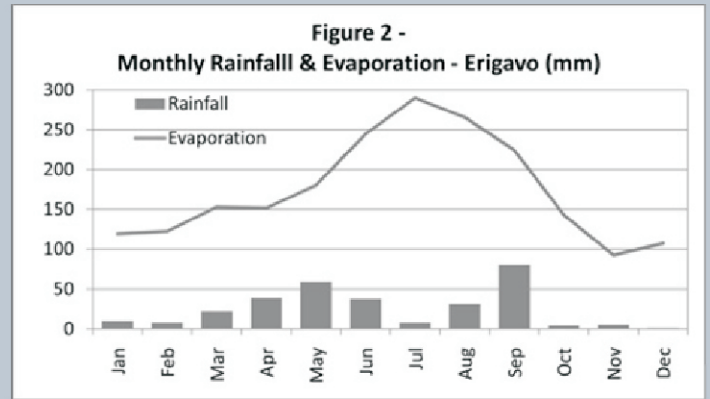
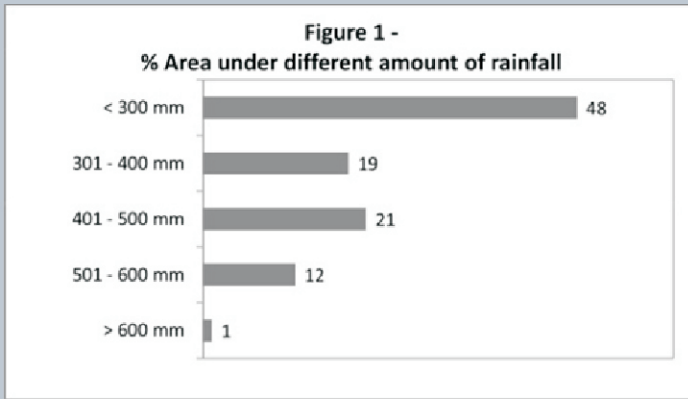
The total areas of the Somalia that receives less than 300mm o rainfall per year

Bare Land Surface

A substantial area (12%) of the country is bare and is prone to degradation forces such as water and wind

5. Land related development challenges

Somalia is currently facing land related development challenges which are affecting the capacity of the natural environment and Somali production systems to adapt to climate risks. These development challenges are summarized below:



Data Source: FAO Somalia Water and Land Information System (SWALIM) online databases

5. Land related development challenges (Continued)

Land Degradation Types

Vegetation cover loss, soil erosion, gully formation, spread of invasive plant species, decline of soil moisture and fertility

- i. **Land degradation:** Somalia is experiencing widespread land degradation. Many parts of the country have lost vegetation cover with the Central, North East and Southern parts of the country being the most affected. Vegetation cover loss has mostly resulted from cutting of trees for charcoal production. Studies carried out to assess the problem have estimated different rates of vegetation loss with values ranging from 1.5 to 6% cover loss per year. Loss of vegetation cover coupled with poor land use have accelerated other types of land degradation with soil erosion, gully formation and spreading of invasive plant species being major problems across the country. Further, reduction in soil

moisture and soil fertility has been observed. Overall, land degradation has become a huge problem in Somalia and has turned large areas of the land into badlands.

- ii. **Low technical capacity:** A study carried out to assess the capacity development needs of water, land and environment sector government ministries (FAO SWALIM, 2014) reported low technical capacity compared to the institutional mandates. Further, technical personnel's were few and their remuneration levels low. The led to a vicious circle where personnel who acquired good technical skills through ongoing capacity development initiative left the government

5. Land related development challenges (Continued)

Scale Jump Challenge

Weather data summarized on regional basis may not capture the high weather variability observed at the local level. Soil and water conservation technology developed for a given livelihood unit may not accommodate high soil texture variability observed at the local level.

- ministries to join other organizations leaving the government ministries with a perpetual technical capacity gap.
- iii. **Weak organizational systems:** The FAO study revealed that institutions lacked strong systems and processes. In some cases, institutional mandates were not very clear and mandate overlapped were observed between institutions. Investments in operational and production infrastructure were limited. Partnership and coordination mechanisms among sector institutions were few as well as efforts to create synergy and capitalize on institutional competitive advantages. Further, capacity development efforts made by development partners to address these problems were not well coordinated and therefore risk of duplicating development initiatives.
 - iv. **Many policy gaps:** The study also flag many policy gaps. Out that of 24 sector strategies, policies and acts in Somaliland and Puntland, only 10 were current. 11 were in draft form and 3 had become obsolete. Twenty three new legislations were planned. This indicated huge policy and legislation need in the sector.
 - v. **Low community skills:** Local communities lack the skills required to engage fully in climate change assessment and interventions. An exercise carried out to assess climate change adaptation at the community during a climate change training workshop (SIDRA, 2015) revealed that local community have low skills in understanding of climate change, its impacts and potential adaptation and mitigation measures. Further, workshop participants felt that efforts made by development agencies to address climate change at community level are not coordinated and therefore may fail to build on other ongoing efforts or to learn from the lessons learnt among other communities experiencing similar challenges.
 - vi. **Scale jump constrain:** Assessment made during this study on the available climate change tools and data systems revealed that most of these tools and systems are developed and implemented at national and regional level and lack the details and structured to facilitate effective application at the local level. Weather data summarized on regional basis may not capture the high weather variability observed at the local level. Soil and water conservation technology developed for a given livelihood unit may not accommodate high soil texture variability observed at the local level.

6. Options to reduce vulnerability to climate change

In response to the bio-physical constrains and land development challenges that the Somali natural environment and production system faces and considering the projected climate change for Somalia (within the horn of Africa) that includes possible low and highly variable rainfall, high evaporation water losses from plants and soil surfaces and severe and frequent drought and floods, the follow options are suggested to reduce vulnerability to climate change:

- i. **Improve local water use efficiency:** Adapt the current production systems to ensure maximum water use efficiency. This can be achieved through harvesting of rainfall and surface runoff and minimizing evaporation losses. Successful technologies that have achieve water use efficiency in other similar environment and livelihood systems can be selected from existing databases such as the WOCAT database and adapted to the local production environment and livelihood systems.
- ii. **Characterize surface runoff:** Undertake detailed studies on the runoff generated from the land surface to provide the data required to fully characterize this important high value but frequently lost water resource. The studies should provide data and information on runoff amounts available in the different sub catchments, source and sink areas in each sub catchment and potential storage sites. The studies should also include social and environmental impact assessment and should provide linkage to regional and national integrated water resources management.
- iii. **Harness wet season river flow:** Harness the wet season river flow of the Juba and Shabelle rivers by building and rehabilitating existing wet season (flood) control and storage infrastructure within the two rivers. This investment will also reduce the damage caused when the two rivers flood during the wet seasons. This is particularly a large investment that will require several feasibilities studies, integrated water resource planning and development of medium and long term investment plans.

Surface Runoff

The studies should provide data and information on runoff amounts available in the different sub catchments, source and sink areas in each sub catchment and potential storage sites.

6. Options to reduce vulnerability to climate change (Continued)

- iv. **Coordinate ground water development:** Coordinate the development of ground water resource under the leadership of the relevant government agencies to ensure continuous monitoring of ground water sources and aquifers, functional and up to date ground water information systems and development and implementation of relevant ground water development strategies, policies and legislation.
- v. **Develop adaptable NRM guidelines:** Develop locally adaptable Natural Resources Management guidelines and manuals aimed at supporting local communities address land degradation problems at the local levels. The guideline and manuals will support communities select the best and most appropriate technologies and approaches to solve local land degradation problems taking into account the prevailing climate, soil and vegetation types and the locally available resources. Use of global tools such as the WOCAT system can play an important role.
- vi. **Promote participatory NRM:** Through participatory processes, create awareness on land degradation at the community level and promote appropriate and simple natural resources management actions that local communities can implement collectively to address their land degradation problems.
- vii. **Develop government and community institutional capacity:** Build long term government and community institutional capacity that comprehensively address the three dimensions of capacity i.e. technical capacity, functional capacity and efficient enabling environment including policy and legislation development and implementation. This is an ambitious action that requires close coordination of all stakeholders through a relevant government agency.
- viii. **Localize tools, information and early warning systems:** Adapt tools, data and Early Warning (EW) information by expanding the existing monitoring systems to represent key ecosystems and providing enough data and information details to allow modeling and extrapolation of data, information and EW to the local community conditions. This involves large and coordinated investment in monitoring and information systems of the relevant government agencies.

Participatory NRM

Create awareness on land degradation at the community level and promote appropriate and simple natural resources management actions that local communities can implement collectively

7. Recommendations

To implement the proposed actions, a number of recommendations are made to the government, development agencies and local resource users as presented below.

Government could undertake the following actions:

- i. Setup a Somali version of the World Overview of Conservation Approaches and Technologies (WOCAT) database and build capacity for its use within the relevant institutions. Identify Somali specific water and land conservation success cases and upload them into the database.
- ii. Establish national targets for climate change adaptation and mitigation that are linked to the relevant Sustainable Development Goals (SDGs).
- iii. Through a participatory process including all stakeholders, lead the process of identifying priority catchment for detailed surface runoff studies.
- iv. In collaboration with development partners, develop short, medium and long term investment plans for the development of wet season (flood) water control and storage infrastructure on the Juba and Shabelle rivers.
- v. With the support of development partners, review, enhance and expand where necessary water and land monitoring and information systems within the relevant government institutions and develop the capacity to maintain and run the systems.
- vi. Develop, review, update and implement water, land and environment conservation and management strategies, policies and laws through a participatory process that actively engages all stakeholders.
- vii. Promote participatory NRM among local communities through awareness creation and establishment of resource user field schools.
- viii. Review existing water, land and environment sector mandates of the relevant government ministries and agencies with the aim of improving the performance of individual ministries and agencies and strengthening coordination, information sharing and collaboration among them.

About SIDRA

SIDRA is a registered independent, not-for-profit Research and Policy Analysis Think Tank based in Garowe, Puntland, Somalia.

Our Vision

Somalia in which social justice prevails and inclusive economic growth benefits all and improves the well being of all people.

Our Mission

A centre of development and research that generates relevant and original knowledge for dynamic policy environment support, institutional capacity development and alliance.

Contacts



Website >
www.sidrainstitute.org



Email >
info@sidrainstitute.org



Facebook > The Somali Institute for Development & Research Analysis (SIDRA)



LinkedIn > The Somali Institute for Development & Research Analysis (SIDRA)



Twitter > SIDRA Institute

7. Recommendations (Continued)

Development agencies (UN agencies, local and international NGOs and donors) could undertake the following actions:

- i. Support research and studies to develop Water Use Efficiency (WUE) packages that can be adopted easily by pastoralist, agro-pastoralist and other land resources users to maximize the use of the limited available water resources.
- ii. Support the establishment and promotion of resource users' field schools as a model for creating awareness on land degradation, building skills and capacity to address land degradation problems and bring local resource users together for collaborative learning and peer to peer knowledge sharing.
- iii. Commission studies on surface runoff with priority sub catchment to generated detailed data on the amount of surface runoff available, source and sink areas, potential surface runoff storage sites and social and environmental impacts of surface runoff harvesting.
- iv. Commission feasibility studies on the Juba and Shabelle rivers to generated data and information to guide integrated water resources management and the development of short, medium and long term water resources development investment plans for two rivers.
- v. Support the development of adaptable NRM manuals and guidelines aimed at promoting community level water, land and environment conservation and management and guiding selection of locally appropriate approaches and technologies.
- vi. Assess government and community capacity development needs of the water, land and environment sector and develop and support implementation of capacity development action plans to address the needs identified.
- vii. Support establishment of national, regional and district water, land and environment information centers to support sharing of data, information and early warning alerts to the local communities.

Local communities and resource users could undertake the following actions:

- i. Actively participate in resources users' field schools in their local areas.
- ii. Actively participates in implementing local water, land and environment conservation actions to address land degradation problems within their local communities.
- iii. Participate in piloting of WUE packages and study and share the experiences and lessons learnt.
- iv. Participate actively in the review, update and development of water, land and environment strategies, policies and acts and ensure their local concerns and needs are incorporated.

References

1. Cardona, O.D., M.K. van Aalst, J. Birkmann, M. Fordham, G. McGregor, R. Perez, R.S. Pulwarty, E.L.F. Schipper, and B.T. Sinh, 2012: Determinants of risk: exposure and vulnerability. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation UN, 1992: United Nations Framework Convention on Climate Change (UNFCCC)
2. Federal Government of Somalia, 2013: National Adaptation Programme of Action on Climate Change.
3. Federal Government of Somalia, 2015: Somalia Intended Nationally Determined Contributions.
4. Ingrid Hartmann, Ahmed Jama Sugulle, Ahmed Ibrahim Awale, 2009: The impacts of climate change on the pastoral societies of Somaliland. Candlelight Report.
5. Lemma Belay, Ahmed Jama Sugulle, Ahmed A. Elmi (eds.), 2011: The impacts of climate change and adoption of strategic coping mechanism by agro-pastoralist in Gabiley region, Somaliland. Candlelight Report.
6. Puntland Ministry of Environment, Wildlife and Tourism, 2014: climate change vulnerability assessment of pastoral communities in Dangorayo, Gardo and Beyla Districts.
7. Somalia Marine Resource Conservation Organization, 2007: Climate shock at the Somali coast. A case study of how climate change affects the livelihood of Laskoreh fisher community.
8. United States Environmental Protection Agency, 2016: Climate change indicators in the United States. Retrieved March 29, 2016, from <https://www3.epa.gov/climatechange/science/indicators/ghg/>