Country and Climate Overview
Somalia is in the Horn of Africa, with both arid and desert climates and the longest coastline of any mainland African country. The landscape is characterized by plains in the south, highlands and plateaus in the north, and a mountain range along the northern coast. Somalia experiences two rainy seasons, one in April-June and one in October-December, and the Juba and Shabelle Rivers bring water through southern Somalia into the Indian Ocean. Somalia is one of the poorest countries in Africa, with seven out of ten Somalis living in poverty. The country faces governance issues such as low state capacity, particularly in its healthcare and education systems. This is exacerbated by the internal conflicts and violence Somalia has grappled with for decades, fueled by clan rivalries, political power struggles, and economic disparities. As of September 2023, about 3.7 million people (22 percent of the population) are facing high levels of acute food insecurity.

USAID Bureau for Humanitarian Assistance (BHA)’s resilience and food security investments are proposed to be focused in Mogadishu, Afgoye, Jowhar, Baidoa, Berdaale, Hudur, and Kismayo. These cities and towns fall in the “resilience zone,” which lies in southern Somalia. Somalia as a whole experiences climate hazards such as droughts and floods, which affect agricultural and pastoral sectors and displace local populations. During January 2021 to March 2023, Somalia faced its worst period of drought in four decades, killing 43,000 people, driving extreme food insecurity for more than 7 million people, and forcing more than 1 million people to leave their homes. The drought had amplified effects on women and girls, who faced increased risks of gender-based violence due to displacement and travel, and on pastoralists, many of whom lost their livelihoods.
Somalia also experienced several major cyclones from 2013-2020, such as Cyclone Gati in 2020, which affected 180,000 people and displaced 42,000.xii In the resilience zone, the biggest climate hazards are prolonged droughts, flash floods, and erratic rainfall patterns, which significantly impact agricultural productivity and livestock health, exacerbate food and water shortages for the local communities, and may result in higher incidences of waterborne diseases like cholera, malaria, and dysentery.xiii,xiv These climate change impacts disproportionately affect women and youth, ethnic minorities, and other populations who have been marginalized as they may lack adequate resources to adapt, as well as face increased risk of internal migration, food insecurity, poverty, health issues, and violence that results from climate impacts.

Climate projections indicate expected increases in annual average temperature by between 2040-2060, yielding an increase in average air temperature, very hot days, drought frequency, and drought intensity.xv,xvi Flood intensity and frequency are also expected to increase in Somalia,xvii and rising sea level is expected to affect Somalia’s coastal communities through coastal erosion, seawater intrusion into freshwater systems, and changes in marine habitat health.xviii,xix Resilience and food security investments in these locations must consider and adapt to changing conditions to reduce potential risks posed by climate change.

CLIMATE PROJECTIONS

KEY CLIMATE IMPACTS TO SECTORS

Crop Production
- Reduced availability of irrigation water, damage from extreme events, aggravated pest outbreaks

Livestock and Fisheries
- Worsened productivity of livestock and fisheries sectors

Water
- Reduced availability of water for drinking and agriculture

Conflict
- Exacerbated conflict, increased exploitation and vulnerability of marginalized populations

Human health, WASH, and nutrition
- Increases in water-borne diseases, vector-borne diseases, and malnutrition

Gender, youth, and ethnic minorities
- Worsened inequality due to disproportionate impacts of climate change on women, youth, and ethnic minorities

Climate Summary

Historical Climate

Somalia’s climate is characterized by desert and semi-arid conditions, with limited rainfall and high temperatures prevailing throughout most of the year.xx Since 1950, annual average temperatures in Somalia have ranged from approximately 25°C to 27°C, with more recent years exhibiting higher average temperatures. Specifically, average annual temperatures have been rising at a rate of approximately 0.1°C to 0.3°C per decade. The average annual temperature in the 2010s was approximately 26.7°C, which is 1.1°C higher than that during the 1950s.
Northern regions of the country are typically warmest from the months of June to September, while southern regions are warmest from December to March.\textsuperscript{xxi}

Somalia experiences, on average, very low precipitation levels year-round. Rainfall often manifests in the form of light showers or localized torrential downpours, with most occurring during the two rainy seasons: the Gu from April to June and the Deyr from October to December. Total annual precipitation averages approximately 200 mm across most of the country, with higher levels in the south (about 400 mm) and southwest (about 600 mm) and lower levels along the northern coast (about 50 mm).\textsuperscript{xxii}

Somalia has, in the past, experienced fluctuations in climatic conditions, including cycles of drought and occasional periods of heavy rain. Rainfall patterns are heavily influenced by El Niño-Southern Oscillation (ENSO) events, with increased precipitation and higher chances of flooding occurring during El Niño events, and heightened risk of drought occurring during La Niña events.\textsuperscript{xxiii} The most recent period of severe drought (2021-2023) was followed by extreme rainfall, which led to overtopping at the Shabelle and Juba Rivers and flash flooding throughout much of the country.\textsuperscript{xxiv} The flood event washed away homes, crops, and livestock, and caused school and hospital closures in some regions of the country. The Somali Disaster Management Agency estimated that the floods in Beledweyne alone, the hardest hit city, displaced more than 245,000 people. In some locations floods were so severe that entire houses were submerged, with only their roofs above water.\textsuperscript{xxv}

In addition to extreme fluctuations in precipitation, Somalia experiences an average of one tropical cyclone per year, predominantly impacting the northern regions of Puntland, Somaliland, and Galmudug. Cyclone Gati, which struck November 2020 as a Category 2 on the Saffir-Simpson scale, was the strongest cyclone on record to make landfall in Somalia, with sustained wind speeds reaching 170 km/hr and dropping more than an average year’s amount of rain in two days.\textsuperscript{xxvi} In some areas Cyclone Gati destroyed or damaged 75 percent of schools, health facilities, water access points, transportation infrastructure, and privately owned properties. Gati also damaged livestock populations and fishing vessels in areas where nearly 80 percent of the population are either pastoralists or fishing communities.\textsuperscript{xxvii}

**Future Climate**

**Nation-wide**

Projections show increases in average and extreme surface air temperatures across all regions of Somalia, with slightly higher increases occurring in the northern and inland regions of the country. Nationwide, annual average temperatures are projected to increase by almost 1°C by early century, and by 1.5°C to 2°C by mid-century, with the months of February and March exhibiting highest potential increases. Annual maximum temperatures are also projected to increase across Somalia through mid-century, with highest increases occurring in the
northwestern region of the country. Similarly, nationwide averages show that annual maximum temperatures could increase by almost 1°C by the 2030s, and by almost 2°C by mid-century.

Projections indicate small increases in precipitation totals across Somalia, with slightly higher increases occurring during the months of October, November and December. Nationwide, annual precipitation totals are projected to increase by approximately 15 mm by early century, and by approximately 50 mm by mid-century, though models show potential for both increases and decreases at both time horizons. Climate change is projected to drive increasing inter-annual variability in precipitation patterns, leading to increases in the intensities of both wetter and drier years.

**Resilience Zone**

Increases in annual average temperatures in the resilience zone generally mirror those of the larger country, with slightly higher temperature increases occurring in interior regions and during the months of February and March (Table 1). In the near-term (2020-2039), average temperatures in the resilience zone could increase by approximately 0.7°C, when compared to historical baseline temperatures of approximately 28°C (1995-2014 average). Regions of the resilience zone along the coast, such as in Shabelle Hoose and Juba Dhexe, are projected to experience relatively lower increases in temperatures, while those inland, such as in Bay, are projected to see slightly higher increases. Mid-century (2040-2059) projections show an even greater increase in average temperatures, and annual averages could slightly exceed 29°C in the resilience zone.

In addition to warming average temperatures, the resilience zone is also projected to see an increase in annual maximum temperatures. In the near term, projections indicate that annual maximum temperatures could increase by almost 1°C in both coastal and inland regions of the resilience zone, relative to a historical baseline (1995-2014), leading to highs of approximately 38°C. By mid-century, increases are projected to be higher, and the annual maximum temperature in the resilience zone could reach almost 39°C. For both average and maximum temperatures, March and April are projected to prevail as the warmest months of the year, while October and November remain relatively cooler. In addition to increasing daytime temperatures, the resilience zone is projected to experience warming nighttime temperatures, with highest increases in the months of March, April, and May.

Model average precipitation projections for the resilience zone demonstrate a high level of uncertainty and indicate minor changes in annual and monthly precipitation totals through mid-century, with the months of October and November getting slightly wetter, and the months of July, August, and September getting slightly drier. In the near-term (2020-2039), projections indicate that annual precipitation totals in the resilience zone could increase by approximately 20 mm (or 3 percent) relative to historical levels. Additionally, these regions could see annual precipitation totals increase by approximately 56 mm (or 9 percent) through mid-century, resulting in annual totals of approximately 650 mm. As stated above, climate change is projected to drive increasing variability in precipitation patterns, resulting in both wetter and drier extremes. As such, there is high potential for flash flood severity to increase in the future with more intense rainfall events, especially when following a period of prolonged drought.

In addition to changes in temperatures and precipitation patterns, the Somali Coast is expected to experience significant impacts from sea level rise. Somalia has the longest coastline of all countries in mainland Africa, and the resilience zone falls along the southern portion of this coastline. Projections show that sea level rise in 2030 could reach approximately 0.1 meter relative to a baseline average sea level of 1995 – 2014, and that by 2050,
this total could increase to approximately 0.24 meter.\textsuperscript{xxviii} Sea levels are projected to increase approximately 5.1 mm per year in the 2020-2039 period, and by approximately 7.2 mm per year from 2040-2059.

Climate change will also increase the likelihood of heat waves and severe drought in this region through mid-century.\textsuperscript{xxix} Studies show that increasing temperatures and evapotranspiration rates combined with changing rainfall patterns due to climate change have already made severe drought events 100 times more likely in this region.\textsuperscript{xxx} Additionally, projections show that climate change is expected to drive intensification of tropical cyclones and storms across the globe, increasing the extreme storm risk for the resilience zone through mid-century.\textsuperscript{xxxi}

Table 1: Key climate projections in the resilience zone in southern Somalia for the near and mid-term. Data for projections comes from RCP 8.5 CMIP5 ensemble projections and show values in the 10th to 90th percentiles in parentheses. Source: World Bank 2021

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Annual average temperature</td>
<td>27.8°C</td>
<td>+0.7°C (-0.2°C – +1.4°C)</td>
<td>+1.5°C (-0.5°C – +2.3°C)</td>
</tr>
<tr>
<td>Annual maximum temperature</td>
<td>37.2°C</td>
<td>+0.8°C (-0.7°C – +2.2°C)</td>
<td>+1.7°C (0°C – +3.1°C)</td>
</tr>
<tr>
<td>Number of days per year with maximum temperatures &gt;35°C</td>
<td>80 days (-33 days – +72 days)</td>
<td>+56 days (-12 days – +110 days)</td>
<td></td>
</tr>
<tr>
<td>Number of nights per year with minimum temperatures &gt;26°C</td>
<td>1 days (0 days – +22 days)</td>
<td>+35 days (+8 days – +85 days)</td>
<td></td>
</tr>
<tr>
<td>Precipitation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total annual precipitation</td>
<td>598 mm</td>
<td>+18 mm (-424 mm – +688 mm)</td>
<td>+56 mm (-403 mm – +718 mm)</td>
</tr>
<tr>
<td>Precipitation falling during the wettest days of the year</td>
<td>39.6 mm</td>
<td>+0.2 mm (-18.9 mm – +22.8 mm)</td>
<td>+12.6 mm (-16.4 mm – 42.8 mm)</td>
</tr>
</tbody>
</table>

Policy Context

Somalia’s Ministry of Environment and Climate Change, established August of 2022, is responsible for creating and carrying out federal policy on climate planning and adaptation. The Ministry is Somalia’s UN Framework Convention on Climate Change (UNFCCC) National Focal Point and the National Designated Authority for the Green Climate Fund. Another government body, the National Climate Change Committee, supervises climate change policy implementation. Somalia joined the UNFCCC in 2009, ratified the Kyoto Protocol in 2010,

Legal frameworks and documents guiding climate action in Somalia include the following:

- Somalia National Adaptation Programme of Action to Climate Change (2013)
- Initial National Communication to the UNFCCC (2018)
- Nationally Determined Contribution (Updated 2021)
- First Biennial Update Report to the UNFCCC (2022)
- Somalia’s National Adaptation Plan (NAP) Framework (2022)

Impacts and Vulnerabilities

In Somalia, multiple sectors related to food security and resilience face impacts under climate change. These include agriculture (which covers crop production, livestock, and food processing), fisheries, and water resources. Furthermore, food security activities need to consider the impacts of climate change on conflict in the country, human health and nutrition, and communities who have been marginalized such as women, youth, people living with disabilities, and ethnic minorities. The sections below describe how climate change is expected to affect these sectors, particularly in the resilience zone where activities will take place.

Priority impacts identified across these sectors include:

- **Crop production**: Increasing temperatures, changes in frequency and severity of extremes like droughts and floods, and sea level rise may lead to increasing damage to crops and farmland, reduced availability of irrigation water, adverse impacts on soil productivity, and aggravated pest outbreaks. Livelihood loss for farming communities is likely to worsen the drivers of food insecurity, conflict, and internal displacement in Somalia.

- **Livestock**: Climate hazards are likely to reduce fodder, increase mortality due to more severe and frequent droughts, increase the risk of disease, and lower overall livestock productivity.

- **Fisheries**: Warming conditions, ocean acidification, and increased cyclones will affect fisheries. These risks decrease fish stock and decrease access as boats and other fishing capital become more at-risk.

- **Water resources availability**: Somalia will face cycles of drought and flood, and without long-term water storage solutions, these hazards threaten drinking and agricultural water availability.

- **Conflict**: Conflict in Somalia, exacerbated by climate-induced scarcities, can escalate disputes between clans and is intensified by militant groups exploiting these crises, undermining the nation’s ability to adapt to changing climate conditions and further exacerbating the vulnerability of marginalized and already vulnerable groups.
• **Human health, WASH, nutrition, and health services:** Threats to clean drinking water availability may result in increased incidence of water-borne disease, while other climate hazards can increase vector-borne illnesses and malnutrition.

• **Gender, youth, and ethnic minorities:** Populations who have faced systematic marginalization are disproportionately affected by climate impacts due to the relatively fewer assets they can use to recover, which may provoke tensions surrounding natural resources and existing conflict.

### Crop Production

Agriculture, which includes crop production and livestock, accounts for almost 65 percent of Somalia’s GDP. Agriculture continues to be the main source of economic activity, employment, and exports in Somalia. However, growth in the sector has been stymied by vagaries of weather, extreme events, weak government institutions, lack of agricultural technology and extension services, deterioration of irrigation infrastructure, conflict, and political instability.

Before the civil war in 1991, crop production was the second largest contributor to both GDP and exports, after livestock. However, the share of crop production contributions to GDP and exports has since declined considerably, with total cereal production dropping by more than 50 percent compared to the 1980s baseline average. Somalia is plagued by constant food insecurity, with domestic production satisfying only 22 percent of per capita cereal needs on average, and remaining needs covered through imports and a persistent dependence on food aid. High rates of chronic malnutrition can be seen among farming communities, driven primarily by poverty, population growth, and frequent exposure to extreme weather events like droughts.

Despite this declining trend, crop production remains critical for Somalia’s food security. Nearly half of Somalia’s population lives in rural areas and 25 percent are engaged in cultivation of crops. Major rain-fed crops consist of sorghum and cowpea, while maize, sesame, and some fruits and vegetables are the main irrigated crops grown in the Juba and Shabelle river valleys. Production of staple food crops, such as sorghum and maize, and major export crops, mainly fruits like banana and grapefruits, have decreased in most of the agriculturally important regions of Somalia. Since 2020, major contributors to crop production difficulties have included pest outbreaks, plant diseases, lack of irrigation water, and difficulty accessing inputs like fertilizer and quality seeds.

Somali farmers are increasingly affected by climate variability and occurrences of extreme events like floods, droughts, and cyclones. More than 80 percent of the country’s land is classified as desert or semi-desert and only 1.6 percent of the land is considered arable. Of this, almost two-thirds, both rainfed and irrigated, is located in the floodplains of the Juba and Shabelle rivers in southern Somalia where agricultural potential is the highest (and where the resilience zone is located). A smaller rainfed area in the northwestern region along with some cultivated areas along the northeastern coast constitute the remaining area under crop production. Overall, around 2.3 million hectares are rainfed and 700,000 hectares have irrigation potential, although only a fraction of that land area (around 20 percent) is actually irrigated and cultivated. Frequent occurrences of both floods (including flash floods) and droughts in these river basins negatively impact crop production and farmlands. Poor irrigation and soil management, as well as deteriorated flood control infrastructure, compound the risks from extreme events.

Millions of Somalis continue to be impacted by the historic five-season 2020-2023 drought, which has led to acute food shortage, threatened the viability of agricultural livelihoods, increased food prices, induced large-scale
population displacement, and created a serious humanitarian crisis in many parts of the country. This has also led to increasing competition and tensions between farmers and herders over shared resources. The scarcity of water, in particular, has been a major political issue and source of social conflict, even in southern Somalia, where competition over water is relatively less compared to the central and northern regions. Tensions over water flare up during the dry seasons and dry years when groups of pastoralists settle in new areas, which may create conflicts with sedentary agricultural communities. On the other end of the spectrum, flooding in 2020, 2021, and 2023 wiped out crop production in major river basins and caused the displacement of more than 850,000 people. In April and May 2023, recurrent flooding of the Juba and Shabelle Rivers inundated both irrigated and rainfed farms in Hiiraan, Middle Juba, Bardhere district of Gedo, and Jowhar District of Middle Shabelle, destroying staple and cash crops on nearly 16,750 hectares of farmland in Hiiraan, 10,000 hectares in Middle Juba, and 70,000 hectares in Jowhar.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
</table>
| Increasing temperatures and extreme heat events | ● Lowered crop productivity, crop loss and failure  
● Increased pest invasions  
● Increased crop water demand due to increased evapotranspiration |
| Increased frequency and severity of droughts | ● Reduced availability of irrigation water  
● Increased salinity of river water, which can impact irrigated crops  
● Increased conflict and tensions between livestock herders and settled farmers over competing resource use  
● Shortages of agricultural inputs, such as seeds for replanting crops and irrigation water  
● Increased desertification, erosion of topsoil, and reduced soil fertility  
● Limited capacity of farmers to withstand extreme weather events |
| Increased frequency and/or severity of floods and cyclones | ● Destruction of standing crops  
● Topsoil erosion, gully erosion, and loss of soil fertility  
● Increased incidence of pest and diseases (e.g., maize stalk borer, coffee berry borer)  
● Water-logging of soil, which can lead to decreased crop productivity  
● Increased occurrences of soil-borne diseases that affect crops  
● Damage to fruit trees  
● Increases strain on farmers with limited resources to respond to increasingly unpredictable and frequent extreme weather events, such as women and smallholder farmers |
| Sea level rise | ● Saltwater intrusion in coastal areas, resulting in increased salinity of soil and groundwater used for irrigation  
● Inland migration of soggy marshland conditions that destroys nearby agricultural fields  
● Storm surges and inundation of farmlands in coastal areas |
Crop Pests

Changes in temperature and precipitation patterns may increase the risks of crop pests and disease-causing vectors and pathogens. Infestations by large mobile swarms of locusts have been increasing and causing widespread damage in Somalia in recent years. Regionally, Somalia has been identified as a key breeding ground for desert locusts. Although locust outbreaks are not historically uncommon in this region of East Africa, recent intense outbreaks have been linked to climate change and the increased frequency of extreme weather events. It is argued that increase in temperature and rainfall over some areas of the desert, coupled with strong winds associated with tropical cyclones, have created ideal conditions for locust breeding, development, and migration. Swarms of desert locusts feed on a range of green vegetation (for example, crops, grass, shrubs and trees), threatening both human and animal food security in Somalia and its neighbors.

Although pesticide use is currently limited owing to their high cost and limited availability in remote areas, increasing incidences of pest outbreaks in the future may lead to a shift towards increasing pesticide usage among Somali farmers.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Climate Sensitivities</th>
</tr>
</thead>
</table>
| Maize  | ● Optimal growing temperature between 17-32°C.  
   ● Tolerant to hot and dry conditions but risk of crop damage above 45°C.  
   ● Requires 500 to 800 mm of annual rainfall.  
   ● Relatively tolerant to water deficit in vegetative phase but water stress during flowering period, silking, and pollination can lead to reduced grain yield or reduced grain size. |
| Cowpea | ● Optimal growing temperature between 20-35°C. Extreme temperatures can affect crop growth and development.  
   ● Requires annual rainfall between 300 to 700 mm.  
   ● Long dry spells can reduce crop yield.  
   ● Excessive rainfall during flowering can damage flowers and impact yield. |
| Sesame | ● Optimal temperature between 25-37°C throughout the growing period.  
   ● Temperature above 40°C during the fruiting stage can adversely affect fertilization and capsule set.  
   ● Requires on average 625 to 1100 mm of annual rainfall.  
   ● Generally tolerant to drought but less tolerant to waterlogging and excessive rainfall. |
| Sorghum| ● Optimal temperature for growth is above 25°C, but high temperatures (>35°C) can lead to poor seed set, problems with ripening and reduced yields.  
   ● Average water requirement is between 450 to 600 mm.  
   ● Relatively drought tolerant but severe water deficits during the flowering stages can cause pollination failure or headblast which can result in yield reduction.  
   ● Not tolerant to long periods of water logging. |
| Banana | ● Optimal temperature for growth between 27-38°C.  
   ● Temperature above 38°C can reduce growth and cause heat stress such as leaf scorching.  
   ● Requires average annual rainfall in the range of 2000 to 2500 mm.  
   ● Water deficits during vegetative phase can affect leaf development, which in turn can impact flowering and bunch production; water deficits in the fruiting stage can affect both fruit size and quality. |
Livestock

Livestock is a foundational piece of Somalia’s economy. Around 60 percent of Somalia’s population practices pastoralism, and livestock makes up about 40 percent of GDP and over 50 percent of Somalia’s exports. The industry has been affected by multiple years-long livestock bans from Middle Eastern countries due to fear that livestock exports could transport Rift Valley Fever (RVF). Since 2020, other major contributors to livestock production difficulties have included lack of pasture, lack of veterinary services and inputs, and difficulty accessing feed. Women may experience significant impacts as particularly affected pastoralist families may marry off their daughters in exchange for livestock.

Drought, cyclones, and flood have had a large impact on Somalia’s livestock population. Between 2020 and 2023, five failed rainy seasons have led to a loss of fodder for livestock, three million livestock deaths, and reverberating effects through the dairy, grocery, and garment sectors. Floods and cyclones carry livestock away and wipe out crops used to feed livestock, as shown by Cyclone Gati, which killed over 63,000 sheep and goats. Livestock productivity and milk production can also decrease as a result of malnutrition and heat stress. Many households in the central and southern areas of the country have abandoned homes to find more hospitable conditions for livestock.

Climate change could also exacerbate RVF transmission. Both flash floods and water storage (built in response to drought) have the potential to spread RVF by expanding geographies that have standing pools of water that may be hospitable to RVF-transmitting mosquitoes. RVF is most often observed during El Niño because heavy rainfalls and the associated flooding expands mosquito breeding grounds. Because RVF can transmit from livestock to humans, this also poses a human health concern.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased frequency and severity of droughts</td>
<td>● Loss of water supplies for livestock</td>
</tr>
<tr>
<td></td>
<td>● Loss of livestock feed</td>
</tr>
<tr>
<td></td>
<td>● Decreased livestock productivity</td>
</tr>
<tr>
<td></td>
<td>● Increased water storage in response to drought brings risk of RVF</td>
</tr>
<tr>
<td></td>
<td>as it creates standing pools of standing water</td>
</tr>
<tr>
<td>Increased flooding resulting in higher incidence of Rift Valley Fever</td>
<td>● Disease transfer between livestock and humans</td>
</tr>
<tr>
<td></td>
<td>● Miscarriage among livestock populations</td>
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<tr>
<td></td>
<td>● Livestock fatality</td>
</tr>
<tr>
<td>Intensification of cyclones</td>
<td>● Increased crop production loss, decreasing food for livestock</td>
</tr>
<tr>
<td></td>
<td>● Livestock loss in floodwaters</td>
</tr>
<tr>
<td>Increased annual average and extreme temperatures</td>
<td>● Lower livestock productivity due to heat stress</td>
</tr>
</tbody>
</table>
Fisheries

With more than 1,800 miles of coastline along the Indian Ocean, the marine fishery dominates Somalia’s fisheries sector. Waters along Somalia’s northern coastline are enriched by the Somali Coastal Upwelling, making them some of the most productive waters in the world. This upwelling is less pronounced along the southeastern shoreline near the resilience zone, yet productive fishing still occurs in that area. Fisheries along Somalia’s coastline have historically contributed approximately about 2 percent to the nation’s GDP. Despite this modest contribution, the fishing industry holds significant potential for growth. The industry is currently limited by lack of a domestic market, advanced fishing infrastructure, comprehensive regulation, and centralized planning. Illegal, unreported and unregulated fishing became common during the Somali civil war, with foreign vessels fishing in Somalia’s Exclusive Economic Zone and domestic vessels fishing without a license. Approximately $300 million worth of fish are estimated to be taken illegally from Somalia’s seas each year. Social factors also influence Somalis’ willingness to expand into the fishing sector as fishing communities were historically excluded from agro-pastoralist communities. Before the Somali civil war, the government invested in training to develop the fishing industry, but this level of support has not since resurfaced.

The challenges facing the fishing industry are compounded by the threats associated with climate change. Warmer waters, which typically contain less oxygen, may be inhospitable to certain fish species, and could diminish fish populations while adversely affecting overall marine ecosystem health. Elevated ambient temperatures can also lead to spoilage of fish at markets and during transport, especially if coupled with a lack of sanitation. Additionally, increasing frequency and intensity of storms pose significant risks to Somalia’s already vulnerable fishing infrastructure. Tropical cyclones in particular have the potential to wreak havoc, causing extensive damage to boats and fishing equipment. While data on ocean acidification in the North Indian Ocean is extremely limited, acidification is also likely to degrade fish habitat and food webs along the Somali coastline.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
</table>
| Increased temperatures and extreme heat events | ● Increased rate of fish spoilage  
● Higher oceanic temperatures, creating oxygen dead-zones that kill marine life |
| Intensification of tropical cyclones     | ● Destruction of fishing boats and fishing supplies  
● Destruction of coastal community home and critical infrastructure, making it harder to maintain fishing communities |
| Ocean acidification                      | ● Fish habitat loss through reduction in reef formation, which may lead to loss of fish production and diversity  
● Diminished food chain for larger fish such as tuna  
● Loss of protection from storm events through reduced reef formation |
Food Processing, Storage, Imports, and Access to Markets

Food producers lack adequate food storage facilities to protect against environmental hazards. Partially because of this, agriculturalists rarely produce large surpluses. When such methods are available to them, agriculturalist communities utilize open-air covered shelters, underground pits, and hermetically sealed bags, which are found to protect crops from humidity-induced spoilage. Increases in temperature and flooding may pose a threat to food storage, but little is known about how storage methods respond to climate hazards.

Somalia’s fish markets are ill-equipped to handle heat as many communities lack working cold stores. Heat limits the profitability of fishing. Fishermen discard parts of the catch that spoil before they reach the shore, and are often forced to sell at the docks for low prices. Investments in cold storage have increased profitability and attracted more individuals to the profession. Without cold storage, increases in temperature would increase the rate and severity of fish spoilage.

Weather associated with the rainy season limits access to markets. In 2022, winds in the rainy season brought high sea tides that delayed ships bringing food to the Bosaso port, decreasing the total quantity of food delivered to the port that season. Rainy season floods can also block or severely damage roads that lead to Mogadishu, Somalia’s strongest economic hub. Challenges in sending goods to the market increase the high cost of transporting these goods and cause shortages in the variety of products. Potentially increased intense precipitation in the October-November rainy season could exacerbate these existing difficulties.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased extreme precipitation events</td>
<td>● Potential damage to crop storage systems</td>
</tr>
<tr>
<td></td>
<td>● Damaged transportation networks, hindering transport of imports and access to markets</td>
</tr>
<tr>
<td>Increased temperatures and extreme heat events</td>
<td>● Increased rate of fish spoilage</td>
</tr>
<tr>
<td></td>
<td>● Heat stress on livestock leading to decreased productivity</td>
</tr>
<tr>
<td></td>
<td>● Diminished crop productivity</td>
</tr>
<tr>
<td>Intensification of cyclones</td>
<td>● Limited access to ports</td>
</tr>
</tbody>
</table>

Water Resources Availability

In 2020, Somalia had 363 thousand cubic meters of renewable internal freshwater resources per capita, qualifying it as a severely water scarce country. Only 52 percent of people in Somalia have access to water to meet basic needs. Somalia experiences extreme drought punctuated by extreme floods and lacks almost any natural surface water storage. Due to the ongoing conflict, Somalia’s government has limited capacity to forecast droughts and floods or to communicate information that helps communities manage water resources effectively. Floods and drought have a disproportionate impact on women as internal displacement exposes women to gender-based violence from sleeping in open spaces or crowded camps. Women are also more likely to be exposed to gender-based violence in traveling longer distances to retrieve water.

Northern communities primarily depend on groundwater for domestic and agricultural needs. While most of Somalia’s groundwater resources are concentrated in the north, this water can have high salinity, affecting water
quality. Sea level rise has also led to seawater intrusion in groundwater near coastal areas, thereby decreasing the amount of freshwater available for drinking and agricultural uses. Southern Somalia has the Juba and Shabelle Rivers and typically receives 700 mm of rainfall each year. Communities in the south, where the resilience zone is located, depend mostly on precipitation to meet water needs, and most croplands use rainfed irrigation. Irrigation structures transporting water from the Juba and Shabelle Rivers were mostly destroyed over the course of the civil war. With groundwater and surface water combined, northern Somalia is still more water-stressed than southern Somalia, with southernmost regions containing up to three to four times the internally produced renewable water resources as some northern regions. However, southern Somalia remains vulnerable. Most areas in southern Somalia see 50 percent of cropland affected by drought in one out of every 5 to 10 years.

Recurring droughts cause extreme shortages in drinking water supplies. Without sufficient surface water storage facilities, many communities have had to depend on water trucking in times of drought. Water prices in Somalia show an average upward trend over time, although there is a wide range. Prices can reach up to USD 6 per barrel while average daily income per household is USD 1.25, but in Mogadishu the presence of competing private companies has brought water prices down to USD 0.30 per barrel. Rural areas are particularly hard hit as there are usually already no major water sources nearby.

Flash flooding in southern Somalia is common when the Juba and Shabelle Rivers overflow their banks in the rainy season. While floods recharge surface water, much more water is needed to alleviate the effect of prolonged drought. Somalia still lacks the water storage facilities necessary to capture flood waters and combat recurring droughts.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased prolonged drought</td>
<td>● Drinking water shortage and rising water prices&lt;br&gt;● Irrigation deficits for crops and livestock fodder&lt;br&gt;● Seawater intrusion into groundwater resulting from over-extracted aquifers near coastal areas&lt;br&gt;● Increased dependence on contaminated water storage</td>
</tr>
<tr>
<td>Increased flash flooding from overflowing rivers</td>
<td>● Destruction of water infrastructure&lt;br&gt;● Waterborne disease such as Acute Watery Diarrhea (AWD) and cholera from flooding of latrines&lt;br&gt;● Destruction of croplands&lt;br&gt;● Population displacement, with disproportionate impacts on women exposed to gender-based violence by sleeping in open spaces or crowded camps</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>● Salt water intrusion into groundwater sources for drinking water&lt;br&gt;● Salt water intrusion into groundwater sources for irrigation in northern Somalia</td>
</tr>
</tbody>
</table>

**Conflict**

**Background**

Conflict today in Somalia is rooted, at least in part, by the power vacuum left by the collapse of the central government in 1991, leading to civil war. The subsequent rise of the militant group, Al-Shabaab,
destabilized the region. This group, along with longstanding clan rivalries over resources and political influence, has perpetuated cycles of violence in the country, some of which has occurred within the resilience zone.

Climate Change Impacts
Although there are clear connections between conflict and climate change, the depth and type of these links vary based on numerous factors, and climate change is just one of several elements that can impact violence and civil unrest. Some examples of how conflict in Somalia can be indirectly linked to climate change include:

- **Competition for Resources:** Diminishing water sources and grazing lands, crucial for cattle, goats, and camels, exacerbates competition. As droughts worsen in severity and length, the amount of acceptable grazing areas may shrink. Water availability for communities may also decrease. This scarcity can lead to increased disputes among clans and communities over access to these diminishing resources.

- **Population Displacement:** Climate hazards, such as droughts and floods, may force populations to migrate in search of better living conditions. As people move, they might encroach upon lands owned or traditionally used by other clans, potentially triggering or intensifying territorial disputes. Those in internally displaced people camps are exposed to identity-based discrimination and may be targets of violence by armed groups or coerced into joining.

- **Exploitation by Armed Groups:** Militant groups often capitalize on severe climate events. They may take advantage of tumultuous circumstances to present themselves as rescuers, offering solutions to communities that lack governmental support. This strategy can better allow them to win loyalty and recruit from the affected communities. Additionally, armed groups may exert control over already scarce resources such as grazing lands, water, or wood used for the illegal charcoal trade. For example, in 2011, Al-Shabaab took control of arable land in many communities and charged them for the right to farm each hectare, diverting the flow of river water away from farmers who did not support them financially. By monopolizing these resources, local communities may, to some extent, become reliant on militant groups, exacerbating the cycle of recruitment and conflict.

The presence of conflict and violence also exacerbates food security issues strained by changing climate conditions within the country. For example, conflict can affect the supply of domestic produce, especially if the conflict affects major supply routes. The cost of importing food may increase as a result of violence as well, which has been witnessed with rice imports in rural areas.

Compounding these challenges, specific groups in vulnerable situations in Somalia — such as women, children, and older persons — experience exacerbated effects. With climate-induced resource shortages, women, often responsible for gathering resources, face heightened risks of gender-based violence. Children’s disrupted educational opportunities due to climate impacts make them more susceptible to militant group recruitment. Older persons might grapple more with the physical demands of rapid climate-induced displacements.

Furthermore, communities affected by violence are less likely to be able to address climate impacts due to the vulnerabilities associated with and magnified by violence. The degradation of institutions that manage and safeguard natural resources and provide essential services, as well as the absence of reliable law enforcement in areas experiencing violence, could stifle efforts to adapt to climate change.
Human Health: WASH, Nutrition, and Health Services

Somalia experiences a lack of clean drinking water and sanitation services. Only 52 percent of Somalis have reliable access to water, leaving nearly half the country reliant upon contaminated open wells and sources that are far from the home. Contaminated water intake can result in fatal diarrheal and respiratory diseases, intestinal worm infections, typhoid, polio, and more, and repeated infection contributes to pediatric stunting. Cholera is endemic and widespread throughout the country, particularly in drought- and violence-affected regions. During an outbreak at the heart of the recent drought (January to July 2022), 21.4 percent of stool samples from drought-affected populations tested positive for the bacteria that causes cholera. Affected areas included the Benadir region, South-West State, and Hirshabelle State; Baidoa, Daynile, Jowhar, and Afgoi reported the highest incidences of cholera.

Climate change is expected to continue to exacerbate existing health and sanitation issues in Somalia. Increasingly severe drought threatens water supply and forces more Somalis to rely upon unsafe water sources. Further, swaths of the population have been forced to seek refuge in encampments as flooding, drought, and violent conflicts destroy infrastructure or force displacement. Close quarters and damaged pipelines create rapid breeding grounds for waterborne disease and accelerate related infection. Flooding events also degrade water quality, which can increase risk of disease, and extreme precipitation creates standing water stores that may be contaminated and could expose people to risk of tetanus, gastrointestinal diseases, and skin infections.

The health implications of poor water quality are not equitable – women and children are disproportionately prone to harm. Women and girls are more often tasked with fetching water from distant sources, particularly when resources are sparse. These water source locations are often rife with conflict and women and girls are at heightened risk of violence and sexual assault en route to or at these sites. The time and labor-intensive excursion for water also detracts from time spent at school or work, and poor water quality is thus detrimental to the educational and economic well-being of these groups and their communities. Children are particularly susceptible to the effects of poor water quality; children under the age of five accounted for the majority of cholera-related mortality in Somalia over the past three years. From 2021 to 2022, wasting in Somali children increased from 11 to 16 percent and waterborne diseases led to excessive child mortality. Drought conditions and corresponding conflict through 2021 also increased the proportion of Somali children out of school by 15 percent to 4.8 million, due to increases in child labor, recruiting, gender-based violence, and early and forced marriage.

As weather extremes become more frequent, Somalis face increased risk of vector-borne disease. Heavy rainfall and flooding are acutely associated with increased incidence of mosquito-borne diseases. Transmission patterns are also affected by social and infrastructural conditions. Displaced populations face heightened risk of vector exposure due to crowded living quarters and temporary housing built of materials that are highly permeable to mosquitoes. Similarly, in times of severe drought, water stores dry out and become shallow waterbeds or require residents to be increasingly dependent on water collection barrels. These standing water stores serve as effective breeding grounds for mosquitoes.

Climate change impacts on other sectors also have implications for human health. The impacts described above to crop and livestock production can increase food insecurity and malnutrition. Malnutrition is a multifactorial health threat and is dangerous on its own, but it also increases susceptibility to bacterial and viral infection, particularly among pediatric populations. Furthermore, communities who have been marginalized...
disproportionately bear the brunt of climate-related health impacts. For example, with rising temperatures and extreme heat events across the country, the women and girls most often tasked with traveling for water will be at increasingly high risk for heat-related illness.\textsuperscript{cxlii}

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
</table>
| Increased temperatures and extreme heat                   | ● Altered vector habitats, prolonging exposure and expanding vector populations to new geographies  
                                                                 ● Increased incidence of heat-related illnesses |
| Increased frequency and intensity of drought              | ● Reduced access to clean drinking water  
                                                                 ● Increased exposure to waterborne disease |
| Increased frequency and intensity of extreme precipitation and flooding | ● Increased exposure to waterborne disease  
                                                                 ● Altered mosquito habitats due to standing water stores, increasing risk of mosquito-borne disease |

**Gender, Youth, and Ethnic Minorities**

Climate change disproportionately affects groups in vulnerable situations like women, youth and those living with disabilities. In Somali society, women and men have clearly differentiated domestic roles. Men are traditionally identified as breadwinners and primary decision makers, whereas women are responsible for the full suite of household chores and child rearing. In agro-pastoral communities, women and men share responsibilities where women account for nearly 45 percent of labor involved in livestock rearing, farming, and natural resource harvesting.\textsuperscript{cxliii} However, women’s productivity in the agricultural sector is constrained by weak land tenure and limited access to agricultural extension services. The farmlands owned by women are often less productive and rainfall dependent,\textsuperscript{cxliv} partly reflecting women’s lack of access to economic and market opportunities, as well as the complex socio-cultural norms that undermine women’s agency in Somali society. Combined, these factors drastically reduce their capacity to respond to climate stressors.\textsuperscript{cxlv} Narrowing gender gaps in agricultural production can have significant benefits for growth of Somalia’s economy, increased food security, and poverty alleviation.

Men and women have been shown to adopt different coping strategies in conditions of crises and conflict. Recurrent droughts have driven male members to migrate with their livestock or to urban centers to engage in other economic activities, while women have often stayed behind to care for the children, elderly, or sick animals. While both men and women are affected by this shift in traditional roles, women have been found to be more affected, finding alternate employment in often low-paying temporary jobs and in the informal sector.\textsuperscript{cxlvii}

Internal displacement triggered by climate and non-climate shocks and ensuing humanitarian crises also expose Somali women and girls to heightened levels of gender-based violence. Overcrowding in shelters for internally displaced people not only creates challenges for access to adequate sanitation services, but also exposes women and girls to increased risk of sexual assault and violence.\textsuperscript{cxlviii} There is also evidence that women, children, and other populations in vulnerable situations have been disproportionately disadvantaged by the COVID-19 pandemic, including an increase in incidences of gender-based violence.\textsuperscript{cxlix} Gender inequity already leads to higher rates of chronic malnutrition among women and girls, with high rates of infant and maternal mortality.\textsuperscript{cxl} Climate change may further limit the access of these vulnerable groups to food and nutritional resources.
The country also experiences inequality along ethnic lines. Somalis are indigenous to Somalia and make up the majority ethnic group, while Bantus make up the largest ethnic minority and mostly live in the lower Juba Valley. Historically, Bantus have faced discrimination, land seizures and insecure land tenure, and increased rates of poverty and displacement. Today, Bantus still face identity-based discrimination, particularly in internally displaced person (IDP) camps, or as targeted by al-Shabaab for religious and cultural reasons. Discrimination against Bantus and minority Somali clans is also visible in climate-related displacement; during the 2011 drought, the most affected people were Bantus and the agro-pastoral Rahanweyn, as better-connected groups diverted aid that could have benefitted those communities. Flooding along the Shabelle river basin has also displaced minority clans with fewer resources, and more powerful clans were able to seize the land when the waters retreated. As the severity of droughts and flooding increases under climate change, this can exacerbate competition over land and exploitation of minority groups that leads to land grabs.

<table>
<thead>
<tr>
<th>Climate Stressors</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>All climate stressors</td>
<td>● Funds to invest in activities for populations that have been marginalized may be reallocated to cover recovery costs incurred during severe weather events</td>
</tr>
<tr>
<td>Increased frequency and intensity of drought and flooding</td>
<td>● Increased distances for women and girls to walk to fetch water and wood ● Increased potential for internal displacement and potential for women and girls to face gender-based violence in shelters ● Climate-related displacement that may result in land seizures from ethnic minorities and other marginalized populations</td>
</tr>
<tr>
<td>Increased temperatures and increased frequency and intensity of drought</td>
<td>● Impacts to agricultural production, livelihoods, and access to water, health, and education services that will have a disproportionate impact on marginalized populations</td>
</tr>
</tbody>
</table>

Potential Intervention Measures

Designing and implementing resilience and food security activities in the context of changing climate conditions requires informed decision-making that takes into account the climate risks identified here as well as contextualized experience from existing and past activities in Somalia. The table titled “Potential Climate Risk Management Measures” provides a snapshot of potential climate risk management measures that can be considered by teams working in Somalia when addressing the risks identified above. In addition, the table titled “Selected Ongoing Experiences” outlines examples of concurrent or active projects in Somalia as of September 2023 that have a climate adaptation or food security focus and could present potential lessons learned or opportunities for collaboration. USAID’s Climate Risk Management (CRM) tools provide further examples and resources for systematically addressing climate risks throughout the programming cycle.

It is important to note that failure to account for climate risks in program or activity design and implementation can result in underperforming outcomes or even inadvertently increase vulnerability or risk. This can range from failed agricultural projects that do not consider future water availability or weather patterns, to underperforming health initiatives that do not target potential new areas where vector-borne diseases may spread. Understanding the disproportionate impact of climate change on populations that have been
marginalized is also critical to designing successful resilient food security activities. Furthermore, accounting for climate risks does not always guarantee successful adaptation; implementation of climate adaptation strategies that result in unintended harm to communities would be considered a form of maladaptation. Maladaptation especially affects populations that have been marginalized and underrepresented, such as women, ethnic minorities, persons with disabilities, displaced individuals, and other groups, as these populations may lack resources and political representation compared to those that hold more socioeconomic power. Furthermore, impacts of maladaptation may sometimes not be apparent for many years. For example, a crop production project developed to supplement agricultural products lost from climate hazards may result in the fragmentation of landscapes, isolation of animal populations, and loss of biodiversity, which could impact the food security and income of pastoralists or those dependent on hunting. Design and implementation of the risk management measures to address the climate risks outlined throughout this document must carefully consider and avoid potential adverse impacts given the environmental, social, and political contexts in the Somalia resilience zone. Ensuring that the activities improve access to information on climate risks and adaptation strategies for participants through training and mentoring and coaching can support building resilience.

In Somalia, populations living in vulnerable situations have unique perspectives and experiences to contribute towards efforts to manage climate risks and advance climate adaptation. Involving women, youth, and ethnic minorities in the process of identifying and leading climate risk management efforts can enable these efforts to be informed by diverse cultural values, traditional ecological knowledge, and local knowledge in addition to scientific knowledge. This can help prevent maladaptation, while local ownership can lead to more sustainable climate risk management and adaptation efforts in the long-term. Because climate change impacts disproportionately affect the most marginalized communities that BHA resilience and food security efforts support every day, all activities designed to strengthen climate resilience and food security should integrate diverse voices and perspectives and empower local communities, especially those of the most marginalized. Robust stakeholder engagement with participant communities and those who know the local context, such as civil society organizations, should be a part of designing and implementing climate risk management measures.

### Potential Climate Risk Management Measures

<table>
<thead>
<tr>
<th>Climate Risk Area</th>
<th>Potential Climate Risk Management Measures</th>
</tr>
</thead>
</table>
| Cross-cutting     | • Integrate climate activities into the core components of the graduation approach, particularly livelihood skill building and coaching.  
                   • Meaningfully integrate diverse voices and perspectives into the Refinement and Implementation periods through the use of stakeholder engagement and local partnerships to ensure benefits and adverse impacts of climate activities are distributed equitably and avoid maladaptation. When carrying out stakeholder engagement, consulting a social scientist knowledgeable in social inclusion techniques and having them fully engaged in the process can reduce the risk of missing diverse and innovative inputs.  
                   • Increase accessibility and usability of climate model-informed resources (such as early warning systems, FEWS NET products and assessments, national weather information, and climate alerts) for livelihoods of diverse populations, and consider alternative ways of knowledge, communication, and learning in order to ensure the best adoption and use of resources.  
                   • When possible, utilize or adapt local or traditional practices and knowledge in developing climate risk mitigation measures. |

CLIMATE RISKS IN BHA GEOGRAPHIES: SOMALIA | 18
<table>
<thead>
<tr>
<th>Climate Risk Area</th>
<th>Potential Climate Risk Management Measures</th>
</tr>
</thead>
</table>
| **Crop Production**                     | ● Facilitate trainings to strengthen information on climate risks and early warning for farmers.  
● Increase training for farmers on integrated pest management (IPM).  
● Improve access to low-emission, sustainable fertilizers, farm tools and equipment, high quality inputs and seeds, and sustainable pesticides/insecticides.  
● Practice sustainable land management practices, soil conservation, and reforestation to reduce soil erosion and soil degradation.  
● Link participants to climate resilient crop varieties through local seed production suppliers, seed cooperatives and banks.  
● Link participants to an agricultural credit system and agricultural cooperatives and associations.  
● Partner with local communities to identify and implement climate-resilient agricultural practices.  
● Increase accessibility and usability of climate model-informed resources for farmers and livelihoods of diverse populations.  
● Avoid planning cropland in flood prone areas, including coastal areas that may face inundation from sea level rise and storm surge.  
● Incorporate climate projections into monitoring and surveillance to identify potential new pests or diseases before an outbreak occurs.  
● Support culturally and context appropriate alternative livelihoods not dependent on crop production. |
| **Livestock**                            | ● Increase accessibility and usability of climate model-informed resources to help protect livestock and prevent RVF outbreaks.  
● Link participants to veterinary services to increase livestock vaccination to prevent RVF.  
● Link participants to veterinary services and inputs for livestock.  
● Promote cultivation of drought-resistant fodder.  
● Carry out sustainable pasture management in a way that reduces possibility of conflict and takes equity and land rights into account.  
● Promote climate-resilient livestock breeds.  
● Improve access to weather information for pastoralists through training and coaching  
● Support culturally and context appropriate alternative livelihoods not dependent on livestock. |
| **Fisheries**                            | ● Support training and skills development focused on sustainable management and governance of fish stocks and supply chains in the face of climate change.  
● Strengthen emergency plans and redundancies during severe storm events for coastal communities reliant on fisheries. |
| **Food Processing, Storage, Imports, Access to Markets** | ● Encourage use of hermetic bags, which protect against damage from humidity and pests, through training and coaching.  
● Conduct trainings on food preservation methods.  
● Strengthen farmers’ direct access to the market, increasing efficiencies and empowering them to make improved decisions to build resilience.  
● Link farmers relevant resources and information to reduce instances of price manipulation by distributors or enhance market information and transparency to protect farmers from price manipulation by distributors. |
<table>
<thead>
<tr>
<th>Climate Risk Area</th>
<th>Potential Climate Risk Management Measures</th>
</tr>
</thead>
</table>
| Water Resources Availability      | ● Improve land management to enhance water capture and natural storage.  
● Promote integrated water resources management, including nature-based solutions, to conserve water, through training and coaching.  
● Promote water conservation in agricultural, household, and business use through training and coaching.                                                                                                                                                                                                 |
| Conflict                          | ● Improve and protect livelihoods and natural resource management, including increasing awareness of land tenure rights and water and natural resource claims, including customary rights, of local peoples.  
● Engage youth to strengthen relevant skills and facilitate linkages with locally available services to support unemployed youth and reduce their potential recruitment into armed groups.  
● Use climate change, environmental sustainability, and sustainable natural resources and water resources management as entry points for mentoring and coaching to reinforce participant cohesion and engagement. |
| Human Health, WASH and Nutrition  | ● Monitor seasonal forecasts to determine how excess rainfall may change and thus affect seasonal prevalence of waterborne diseases and WASH infrastructure vulnerable to flooding [utilizing tools including the FAO Food Security and Nutrition Analysis Unit - Somalia] \[\textsuperscript{clvii}\]. |
| Gender, Youth, and Ethnic Minorities | ● Promote context-specific livelihoods that are likely to expand women and socially marginalized group’s participation in economic activities and address barriers to entry, such as time burden and social exclusion.  
● Encourage WASH and water resource providers to increase access to clean and safe drinking water in target areas, particularly during drought, to reduce the distances women and girls must travel to find water. |

Sources: Data in Emergencies (DIEM) - Monitoring of shocks and agricultural livelihoods in priority countries\[\textsuperscript{clviii}\], The Initial National Communication for Somalia to the UNFCCC\[\textsuperscript{clix}\], PreventionWeb, “Somalia Moves Adaptation Strategies for its Livestock and Fisheries Sectors Forward”\[\textsuperscript{clx}\], World Bank and FAO, “Rebuilding Resilient and Sustainable Agriculture in Somalia”\[\textsuperscript{clxi}\], Somalia Water and Land Information Management (SWALIM) and FAO, Flood Risk and Response Information Management and Drought Monitoring Tool\[\textsuperscript{clxii}\], CIMMYT, “Announcing CIMMYT-derived fall armyworm tolerant elite maize hybrids for eastern and southern Africa”\[\textsuperscript{clxiii}\].

Selected Ongoing Experiences

Diverse bilateral, multilateral, philanthropic and religious organizations work across the sectors mentioned above. The table below represents ongoing projects in natural resource management, agriculture production and value chains, food security, and climate adaptation.

The programs showcased in this table are meant to be illustrative; resilience and food security activities in Somalia are not expected to address the issues covered in the programs below. However, information from these programs could provide helpful lessons learned or context about climate adaptation and food security in Somalia.

<table>
<thead>
<tr>
<th>Program</th>
<th>Amount</th>
<th>Donor</th>
<th>Year</th>
<th>Implementer</th>
</tr>
</thead>
<tbody>
<tr>
<td>USAID BHA Support for Somalia</td>
<td>Varies</td>
<td>USAID</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>SERVIR’s Eastern and Southern Africa hub</td>
<td>N/A</td>
<td>NASA, USAID</td>
<td>2008</td>
<td>Regional Centre for Mapping</td>
</tr>
<tr>
<td>Program</td>
<td>Amount</td>
<td>Donor</td>
<td>Year</td>
<td>Implementer</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>------------------------------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Enhancing Climate Resilience of Vulnerable Communities and Ecosystems in Somalia</td>
<td>$21,792,737</td>
<td>Global Environment Fund Truste, UN</td>
<td>2015 - 2022</td>
<td>UNDP</td>
</tr>
<tr>
<td>Preparation of Initial Biennial Update Report</td>
<td>$235,121</td>
<td>UNEP</td>
<td>2018 - 2023</td>
<td>UNDP</td>
</tr>
<tr>
<td>Support for Integrated Water Resources Management to Ensure Water Access and Disaster Reduction for Somalia’s Pastoralists</td>
<td>$10 million</td>
<td>LDCF</td>
<td>2019 - 2023</td>
<td>UNDP, local and national governments, NGOs</td>
</tr>
<tr>
<td>Strengthen Climate Change Adaptation Planning</td>
<td>$2.7 million</td>
<td>GCF</td>
<td>2020 - 2023</td>
<td>UNDP</td>
</tr>
<tr>
<td>Rural Livelihoods’ Adaptation to Climate Change in the Horn of Africa - Phase II (RLACC II)</td>
<td>$10 million</td>
<td>GEF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somalia Crisis Recovery Project (SCRP)</td>
<td>$187.5 million</td>
<td>World Bank</td>
<td>2020 - 2025</td>
<td>Somalia national government</td>
</tr>
<tr>
<td>Improving Disaster Risk Management and Food Security to Strengthen Resilience in ‘Somaliland’ (RDRM)</td>
<td>N/A</td>
<td>GIZ</td>
<td>2020 - 2023</td>
<td>Ministry of Planning and National Development (MoPND) in ‘Somaliland’</td>
</tr>
<tr>
<td>FAO projects</td>
<td>Varies</td>
<td>FAO</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>Adaptive Agriculture and Rangeland Rehabilitation Project (A2R2) - Somalia</td>
<td>$17,039,450</td>
<td>GEF</td>
<td>Ongoing</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>Promoting the production and marketing of agricultural products in Somalia</td>
<td>N/A</td>
<td>GIZ</td>
<td>2021 - 2024</td>
<td>GIZ</td>
</tr>
<tr>
<td>Supporting food security and resilience in Kismayo</td>
<td>N/A</td>
<td>GIZ</td>
<td>2020 - 2023</td>
<td>Jubaland Ministry of Planning and International Cooperation</td>
</tr>
<tr>
<td>Somali Resilience Program (SomReP)</td>
<td>$113,945,068</td>
<td>SIDA</td>
<td>Ongoing</td>
<td>Multiple</td>
</tr>
</tbody>
</table>

Key Resources

1. Somalia Climate Change Analysis.docx (climatelinks.org)
5. Note: there is a paucity of published climate data in the BHA target geographies. This document contains information for all of Somalia and calls out details specific to the resilience zone when such information is available.
6. Somalia Climate Change Analysis.docx (climatelinks.org)
7. RCO_FACTSHEETS_CLIMATE.pdf (un.org)
12. Somalia - Vulnerability | Climate Change Knowledge Portal (worldbank.org)
15. Climate Risk Profile: Somalia | adelphi
16. Somalia Climate Change Analysis.docx (climatelinks.org)
17. Somalia Climate Change Analysis.docx (climatelinks.org)
18. Somalia Climate Risk Profile: Somalia | adelphi
19. Somalia - Sea Level Rise | Climate Change Knowledge Portal (worldbank.org)
23. Somalia Climate Risk Profile Somalia_1.pdf (adelphi.de)
27. Tropical Cyclone Gati - Nov 2020 | ReliefWeb
32. Somalia's Adaptation communication to UNFCCC 2022
33. WFP 2021 Climate Response Analysis for Somalia
34. Work Bank FAO Rebuilding Resilient and Sustainable Agriculture in Somalia 2018
35. IMF 2018 Food Security in Somalia
36. Work Bank FAO Rebuilding Resilient and Sustainable Agriculture in Somalia 2018
37. Work Bank FAO Rebuilding Resilient and Sustainable Agriculture in Somalia 2018
38. Somalia’s FNC to UNFCCC 2018
40. WFP Climate Response Analysis 2021
41. UN Gender Climate and Conflict analysis 2022
42. PIK and Adelphi Climate Risk Profile for Somalia 2022
43. Work Bank FAO Rebuilding Resilient and Sustainable Agriculture in Somalia 2018
44. Work Bank FAO Rebuilding Resilient and Sustainable Agriculture in Somalia 2018
45. SWALIM 2016
46. FEWS-Net Somalia Food Security Outlook for June 2023-January 2023, USAID.
47. Somalia National Adaptation Plan of Action 2013, USAID.
48. World Bank FAO Somalia Rebuilding Resilient and Sustainable Agriculture 2018
49. Almost 250,000 flee floods in Somali city that ‘became like an ocean’ | CNN
50. Floods drive over 650,000 Somalis from their homes in 2020 | UNHCR
51. Flooding in Somalia displaces 200,000 people: official (phys.org)
52. FEWS NET Food Security outlook for June 2023 to January 2024
53. Somalia NAP Framework 2022
54. WFP Climate Response Analysis 2021
55. UN Gender, Climate and Conflict Analysis, 2022
58. World Bank FAO Somalia Rebuilding Resilient and Sustainable Agriculture 2018
59. https://oec.worldbankprofile/country/som
60. Somalia’s Adaptation communication to UNFCCC 2022