

Vulnerability, Risk Reduction, and Adaptation to Climate Change

DJIBOUTI



GFDRR
Global Facility for Disaster Reduction and Recovery



COUNTRY OVERVIEW

Djibouti is a small country located in the Horn of Africa. It is a young nation, having gained its independence from France only in 1977. The country's terrain is craggy, interspersed with plateaus and plains as well as mountains, the highest of which is 2,000 meters. Since it is located in an area of tectonic plate separation, the landscape is largely made up of volcanic formations.¹ Thanks to its geographical position (between three strong nations – Ethiopia, Eritrea, and Somalia) and its strategic value as a port, Djibouti plays an important role in international economics and political issues. In 2009, the population was estimated at nearly 865,000 inhabitants, out of which more than two-thirds (87.7%) live in the capital and therefore near the coast.² In the rural areas, 96.5% of the population lives below the poverty line.³

In the past decades, Djibouti's economy has experienced many political crises and economic and natural shocks (in particular, droughts, and floods) that have deteriorated the country's competitiveness. In 1995, the per capita income fell by over 25% compared to its 1984 level, while the state budget deficit reached 10.1% of GDP. However, in 2008 Djibouti's GDP reached almost US\$1 billion, driven mainly by foreign direct investments (FDI) in construction and maritime services.⁴ The country's agricultural and industrial sectors are underdeveloped, but represent key livelihoods.

The vast majority of Djibouti's rural population is highly susceptible to climatic uncertainty – they live in deserts or marginal and infertile areas, often with highly erodible soils, poor ground cover and limited water supplies, where food security is a serious concern. Djibouti imports nearly all of the cereals consumed in the country, and food aid represents almost 10% of total imports.

Djibouti is vulnerable to extreme events such as droughts, floods, earthquakes, volcanoes, and fires. Moreover, Djibouti is at risk of sea level rise. These natural hazards are increasing in frequency, affecting population food security, drinking water supply and irrigation, public health systems, environmental management, and lifestyle.

Key Sectors

Agriculture
Coastal Zones and Marine Ecosystem
Water Resources
Health
Forestry

Source: Djibouti's National Adaptation Program of Action, 2006

PRIORITY ADAPTATION MEASURES

According to the National Adaptation Program of Action, which was submitted in 2006 by the Government of Djibouti, the following actions have been identified as priorities in response to current and projected climate variability and change:

➔ Coastal areas

- Improve coastal management to reduce the risks of erosion and storm surges.
- Restore marine protected areas through the protection of corals and regeneration of the mangrove coastal zone.

¹ First National Communication of the Republic of Djibouti to the United Nations Framework Convention on Climate Change (UNFCCC), 2001.

² World Bank Data Portal

³ National Adaptation Program of Action of Djibouti (NAPA), 2006.

⁴ Ibid. note 2

- Protect and restore shorelines.
- ➔ Agriculture, livestock, and forestry
 - Introduce of adapted forage species to increase productivity in areas impacted by recurrent droughts.
 - Promote agro-livestock diversified farms.
 - Promote new agricultural and irrigation techniques suitable for water scarcity and increased salinity in agricultural areas.
 - Promote the development and diversification of crops resilient to climate variability.
 - Promote regeneration of *Acacia nilotica* and other species tolerant to floods in flood-prone areas.
 - Restore degraded agricultural lands.
- ➔ Water sector
 - Promote appropriate actions for planning and management of water resources.
 - Promote appropriate measures for the protection of the capital's water resources.
- ➔ Health
 - Research and increase prevention for epidemics, in particular cholera and malaria.

CLIMATE BASELINE AND CLIMATE FUTURE

CLIMATE BASELINE

Djibouti's climate varies across the country. The inland is hot, with average temperatures above 30°C during the summer months (May-September). Nights are warm, with average temperature around 17°C. At the peak of the hot season, temperatures have been known to top 45°C. The cooler season runs from October to March/April with average temperatures of 25°C. Climate on the coast varies from the north to the south. The average temperatures are around 24-25°C and the wettest months are April, July, and August, with a monthly average of 30 mm.⁵ January, June and December are the driest months, with average rainfall of 10 mm or less. The humidity is very high with peaks of 90%.⁶

Major Climate Processes

El Niño

Inter-Tropical Convergence Zone (ITCZ)

Impacts on Climate

Droughts associated

Regulates rainfall

⁵ World Bank Climate Change Data Portal

⁶ Ibid note 1.

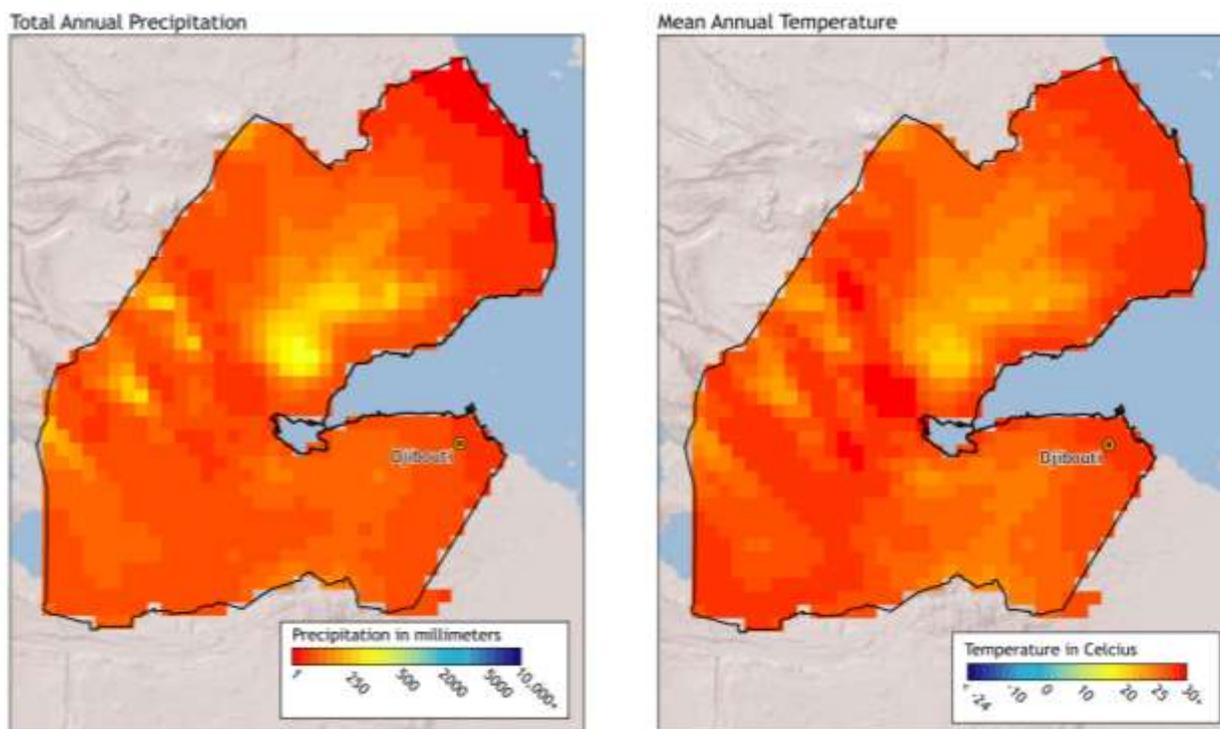


Figure 1: Annual climate across Djibouti: rainfall (Left), temperature (Right)⁷

There are occasional catastrophic floods resulting in massive damages to people and properties. For example, the drought in 1986-1988 was followed in 1989 by a record rainfall of 692.9 mm.⁸

RECENT CLIMATE TRENDS

Climate variability and change already strongly influence activities across Djibouti. The following is a summary of recent climate trends for the country (since 1960, unless otherwise noted)⁹:

- ➔ All average temperatures in the past decades have been higher than normal, and the period between 1991 and 2000 was one of the warmest decades on record.
- ➔ An increase of between 0.5°C and 1.5°C has been observed in the absolute maximum monthly temperatures in the past three decades. The average increase in minimum temperature is 1.5°C and the increase is most significant in June and July.
- ➔ Significant decrease in rainfall has been registered for the months of April-July.
- ➔ Significant increase in rainfall has been registered for the months of January and October.

⁷ Source: Worldclim 1960-1990 Averages. Robert J. Hijmans, Susan Cameron, and Juan Parra, Museum Of Vertebrate Zoology, University Of California, Berkeley, in Collaboration with Peter Jones And Andrew Jarvis (Ciat), and with Karen Richardson (Rainforest Crc). www.worldclim.org/current

⁸ Ibid note 1

⁹ Ibid note 3

CLIMATE FUTURE

The climate science community sources a suite of models to inform decision makers on future climate. GCMs (Global Climate Models), RCMs (Regional Climate Models), downscaling techniques (both empirical and statistical), and several comprehensive reviews are available on the subject. GCMs are our primary source of information about future climate. They comprise simplified but systematically rigorous interacting mathematical descriptions of important physical and chemical processes governing climate, including the role of the atmosphere, land, oceans, and biological processes. Climate projections for Djibouti and the eastern Sahel are particularly challenging due to the large climate variability observed over the 20th century, which makes it difficult to provide clear attributions to climate change. The following insights into a changing climate are derived for the Horn of Africa region as a whole, as well as for Djibouti, from a suite of GCMs used by the Intergovernmental Panel on Climate Change. Specific projections through 2050 are based on the ISP2a emissions scenario.

- ➔ Temperatures across Djibouti are projected to increase between 0.6°C and 2.4°C through 2050.
- ➔ Sea level rise is estimated between 8 cm and 39 cm, with an average increase of 20 cm, as compared to the 1990 sea levels.¹⁰

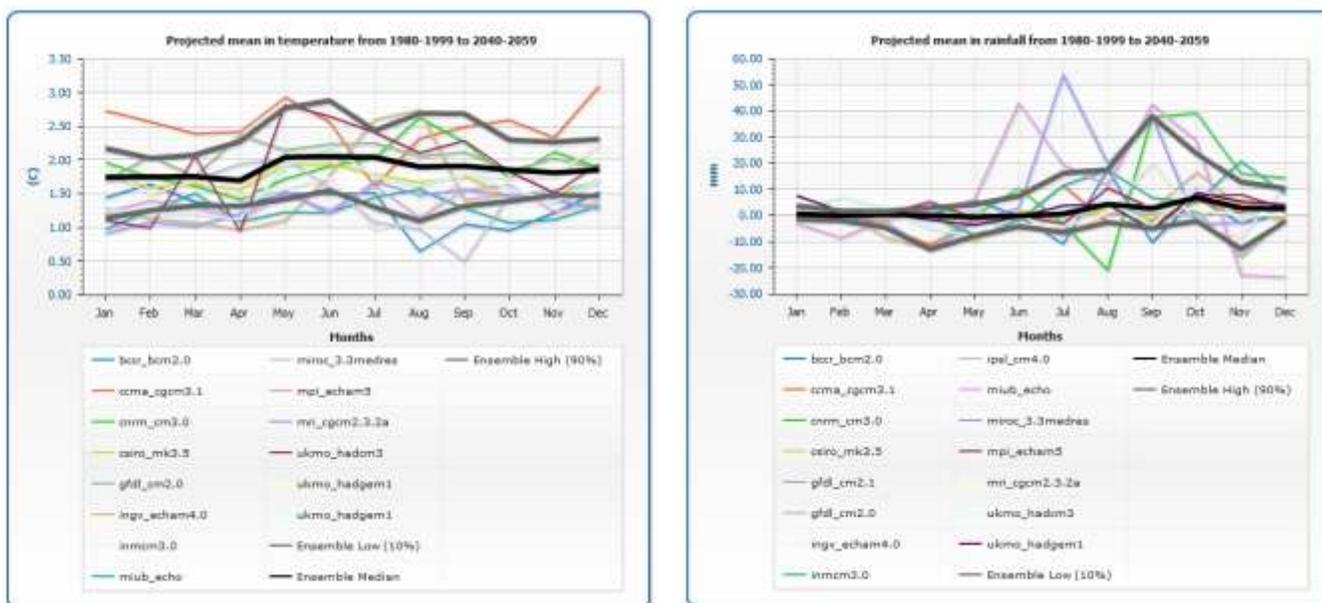


Figure 2: Projected changes in rainfall and temperature for the period 2040-2059 as compared to data from 1980-1999, based on 15 IPCC models.¹¹

- ➔ Future precipitation changes for Djibouti remain unclear. This is due to large model uncertainties, with multi-model analyses of the Sahel suggesting a drying trend, and some individual models suggesting a more humid future. What is clear, however, is that climate variability and extreme events will increase in the future. Figure 2 shows the projected changes in rainfall and temperature for 2040-2059 as compared to the historical values of 1980-1999 for the south coast of the country. While the Global Circulation Models (GCMs) for temperature

¹⁰ Ibid note 3

¹¹ World Bank's Climate Change Knowledge Portal

are more consistent, the rainfall projections vary significantly. Three GCMs (cnrm_cm3.0, miroc_3.3medres, miub_echo) are far from the median value (black line) for the summer months (June-September).

➔ Critical rainfall periods, which feed the central lowland grazing zones during the months April through August are predicted to decrease. In addition, the Hays-Dadaac or winter rains, which occur during the months of September-February are on average predicted to decrease, with marked changes expected during the range growing period of September-October.

CLIMATE CHANGE IMPACTS ON NATURAL HAZARD VULNERABILITY

AT A GLANCE

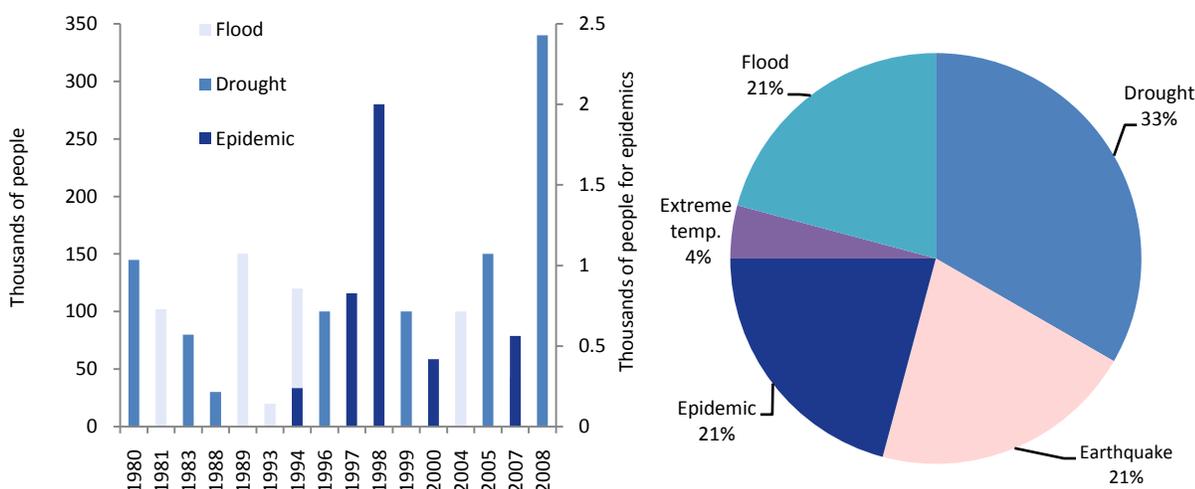


Figure 3: Disaster statistics for Djibouti: Number of people affected by the top 3 natural hazards (right) and average distribution of disasters types (left)¹²

Djibouti has a low capacity to adapt to climate change because of its poor socioeconomic development. From 1980 to 2010, 24 natural hazard events have been registered affecting almost one and a half million people and causing economic damages for 3 million.¹³ The vast majority of Djibouti’s rural population is highly susceptible to climatic uncertainty – they live in deserts or marginal and infertile areas, often with highly erodible soils, poor ground cover, and limited water supplies where food security is a serious concern. Observational data for the 1980-2001 period show that droughts, floods, sea level rise, and epidemics, whose frequency, occurrence, and impacts have increased in recent years, already pose a significant risk to the country’s vulnerable population. The country is home to a large pastoralist population, living on poor quality pasture lands, and the impact of climate-related changes on livestock production could be significant. Many groups that rely on winter grazing grounds are already extremely vulnerable and forced to migrate to Sudan due to pasture degradation made worse through increasing population pressures. The most common hazards include:

¹² EM-DAT: The OFDA/CRED International Disaster Database, Université Catholique de Louvain, Brussels, Belgium. Data version: v11.08.

¹³ EM-DAT: The OFDA/CRED International Disaster Database

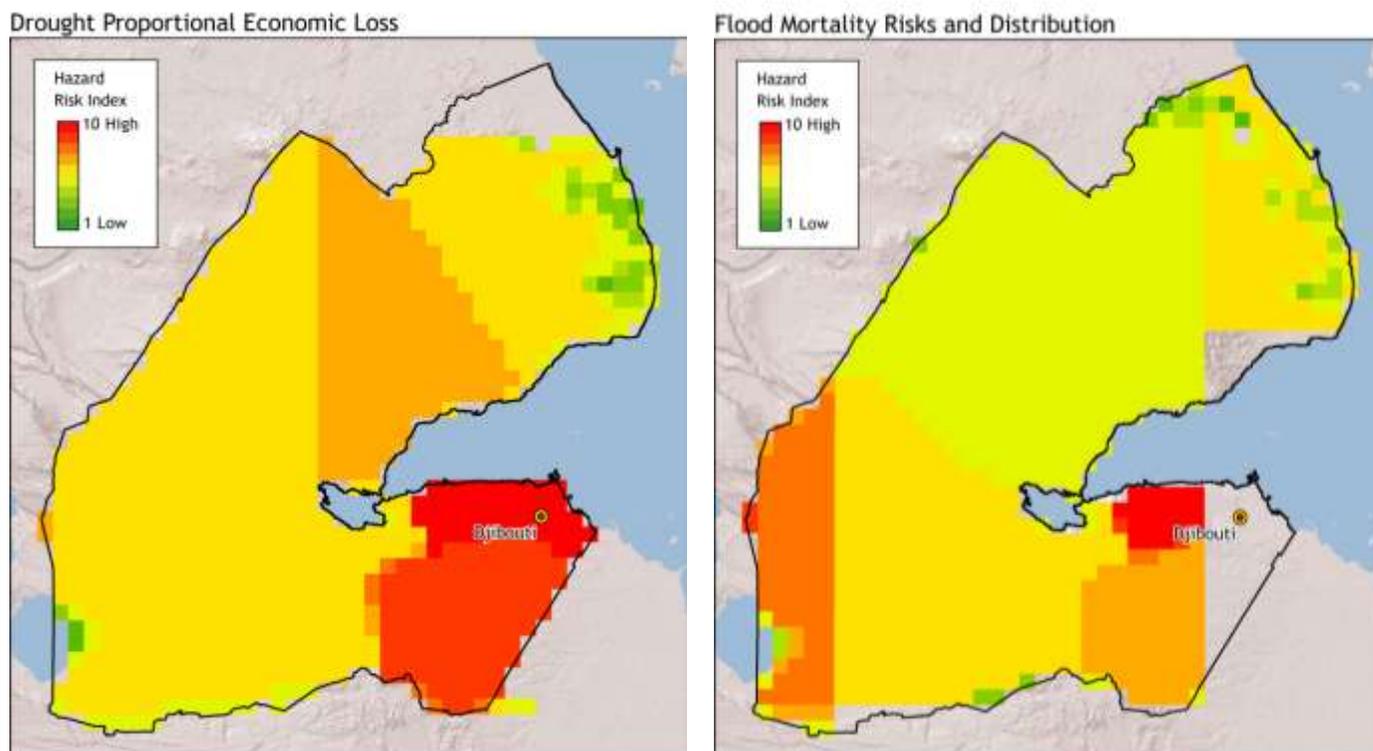


Figure 4: Impact of Droughts and Floods across Djibouti¹⁴

➔ **Droughts** – Droughts pose a severe challenge to the already limited water stocks, frequently necessitating emergency food and water assistance. Drought conditions in 2005 triggered infrastructure rehabilitation and aid, in the form of food and water supplies, to nearly 28,650 people in the northwest pastoral, southeast border, and central lowlands, especially near Obock. Historical observations indicate that aid efforts such as this are likely to increase over time.

Critical rainfall periods, that feed the central lowland grazing zones during the months April-August, are predicted to decrease. In addition, the Hays-Dadaac or winter rains, which occur during the months of September-February are on average predicted to decrease, with marked changes expected during the range growing period of September-October. The impact of these changes on livestock production could be significant. Many groups that rely on these winter grazing grounds are already extremely vulnerable and forced to migrate to Sudan due to pasture degradation, made worse through increasing population pressures. During extreme droughts in the 20th century, the average rainfall reduction reached almost 100%, with implications for water resources and for the agricultural sector.¹⁵

Eight major droughts have affected the country over the past 30 years. The severe drought of 2008 affected 340,000 people and caused a loss of 50-70% of the total livestock population.¹⁶ In more remote rural zones, such as the Northwest and Central Pastoral areas, the persistent droughts of the winter season (Hays-Dadaac; October

¹⁴ WorldClim 1960-1990 averages. Robert J. Hijmans, Susan Cameron, and Juan Parra, at the Museum of Vertebrate Zoology, University of California, Berkeley, in collaboration with Peter Jones and Andrew Jarvis (CIAT), and with Karen Richardson (Rainforest CRC). www.worldclim.org/current

¹⁵ Security Implications of Climate Change in the Sahel Region © West Africa Club Secretariat (SWAC) 2010.

¹⁶ Disaster Assistance (USAID), 2010.

(http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/djibouti/template/index.html)

through February) have led to reduced pasture areas. Coupled with decreasing rains during the summer months (May through September) in the higher altitudes, which feed a number of interior plains and favor the growth of summer pastures, there are significant livelihood challenges for the growing pastoral population. As a result, many have moved to neighboring countries and others have reported large livestock losses and growing malnutrition.

- ➔ **Floods** - High rainfall variability and intensity pose a significant threat to the region's Southwest Pastoral regions, whose sandy soils are already vulnerable to episodic floods brought by extreme rainfall events. Flood-induced infrastructure damage can render critical water pumps and other delivery infrastructure unusable, leading to further water shortages. Heavy seasonal rains and the resultant floods of April 2004 affected nearly 100,000 people, causing 51 deaths, leaving 1500 people homeless, and damaging the Wea bridge on the road to Ethiopia. Five floods occurred in Djibouti between 1980 and 2010.¹⁷ In 1994 and in 2004 two major floods killed 100 and 300 people, respectively, and affected more than 200,000 people.¹⁸ On April 13, 2004, a heavy rainfall (100cm) caused damages to roads, houses, and several infrastructures.¹⁹
- ➔ **Epidemics** - According to the Government of Djibouti Ministry of Health (MOH), in 2007 the limited access to safe drinking water and poor sanitation and hygiene conditions led to a surge in diarrhea and cholera cases affecting Djibouti city and nearby districts.²⁰
- ➔ **Sea Level Rise** - Sea level rise poses significant threats to already declining water quality, particularly with respect to saltwater intrusion into the coastal aquifer. In urban areas such as Damerdjog, coastal development activities have eliminated the protection afforded previously by the rapidly deteriorating mangrove forests. Coupled with excessive pumping of groundwater, as well as overexploitation of surface and groundwater for municipal use, saltwater intrusion into the aquifer from projected sea level rise poses a severe risk to the country's urban areas. This is especially critical during the northeast monsoon season (October-May), when the predominant tides flow from the Red Sea, bringing high salinity levels.

Implications for DRM

- ➔ Increase in sea level and floods might increase coastal erosion, affecting people and marine ecosystems along the coasts.
- ➔ Increase in sea level and floods are expected to lead to saline intrusion affecting the rivers and the groundwater.
- ➔ Increase in temperatures along with a decrease of rainfall might lead to longer and severe droughts.
- ➔ Increase in temperatures is expected to contribute to the spread of epidemics, in particular cholera and malaria.
- ➔ Decrease of winter rains, in particular during the months of September and October, might be have significant impacts on livestock production.
- ➔ Rainfall variability and more intense extremes might pose a significant threat to the Pastoral regions.
- ➔ Increase in floods is expected to damage water infrastructures.
- ➔ Increase in droughts might force pastoral groups to migrate permanently out of the country with economic and social implications for Djibouti.

¹⁷ Ibid. note 13

¹⁸ Ibid note 13

¹⁹ Djibouti floods: Assessment Report by World Health Organization (WHO), 2004.

²⁰ Ibid note 16

SECTORAL CLIMATE RISK REDUCTION RECOMMENDATIONS

The following impacts, as well as policy and program options, are summarized in Djibouti's NAPA and other country documents as listed in the references.

AGRICULTURE AND FOOD SECURITY

Agriculture in Djibouti remains underdeveloped and most of the food consumed is imported due to poor climate and soil conditions. According to the Government of Djibouti, only 10,000 hectares (24,700 acres) of arable land exist in the country. The majority of the agriculture is irrigated and domestic food production satisfies only 20% of the grain needs and 10% of the fruit and vegetable requirements of the population. Palm oil, refined sugar, and rice accounted for a combined 25.9% of total imports in 2007.²¹ Animal pasture is another of the country's major industries. The fishing sector employs only about 1,000 people. Due to the limited number of either permanent or intermittent water sources, rainfall is a key determinant of food security in the country.

Climate change is expected to limit the productivity of agriculture in Djibouti, making the population more food insecure. Severe droughts in the past years (for example the one in 2008), followed by extreme floods, affected thousands of people. The Department of Agriculture estimated a loss between 4% and 5% of arable land.²² The increase in temperature and shifting rainfall patterns due to climate change are expected to lead to a decrease in yields of several crops, including vegetables and fruit. The government has signed agreements to lease land in Sudan and Ethiopia to grow wheat, sorghum and vegetables, while investors from Arab countries are building greenhouses in Djibouti to grow vegetables.²³ Examples of adaptation efforts in agriculture and food security should include:

- ➔ Improved soil management and conservation initiatives, including implementing changes in cropping patterns, introduction of temperature-resistant and low-water varieties;
- ➔ Developing and implementing innovative water saving techniques and improved water resource management;
- ➔ Exploring innovative desalination technologies to increase water availability;
- ➔ Improving farmers' knowledge about proper use of weather information in carrying out agricultural activities to avoid risks of climate change; and
- ➔ Improving information on climate variability and seasonal climate forecasting to reduce production risk.

PUBLIC HEALTH

Djibouti's public health sector is vulnerable to climate variability and change, particularly with regard to the increased incidences of nutritional deficiencies, diarrhea, and vector-borne diseases. Cholera, diarrheal diseases, tuberculosis, and malaria are all endemic in Djibouti. The last cholera epidemic was in 2007, with 562 people affected and 6 deaths. In 1998, an epidemic caused 43 deaths and affected more than 2000 people.⁵ In 2006, there were 38,673 cases of malaria and 114 deaths.²⁴ Over the last decade, Djibouti has seen an increasing number of patients with undefined fever and other diseases due to malnutrition and improper hygienic conditions caused by

²¹ Country Brief Djibouti by EstandardsForum Financial Standards Foundation (FSF), 2010

²² Ibid note 3

²³ Ibid note 22

²⁴ Ibid note 22

extreme events. The number of people with respiratory infections has also increased.

Sea level rise, higher temperatures, and increased droughts are expected to pose additional challenges to the already precarious public health sector. The rise in sea level might increase the salinity of aquifers, threatening the availability of drinking water. Severe droughts might lead to a decrease in agricultural production and the livestock sector, increasing malnutrition especially in children. The increase in temperatures might lead to a greater number of people affected by cholera, malaria, and diarrheal diseases. Adaptation efforts in the health sector should include:

- ➔ Strengthening the country's health services – paying particular attention to increasing the system's rapid response capacity with regard to diseases that have a direct climate link, including monitoring and awareness raising;
- ➔ Increasing coordination among the country's health sector and broader developmental players to ensure that health concerns related to climate change are mainstreamed into development activities;
- ➔ Promoting research on climate change and health – there is an urgent need to understand and attribute the health impacts of climate change in Djibouti, especially for vulnerable populations;
- ➔ Securing local drinking water supplies and proper drainage: an essential step towards curbing diseases of water quality.

WATER RESOURCES

Water is a major constraint on Djibouti's development and more extreme dry conditions are predicted into the future. Groundwater is used for agriculture and urban consumption. Djibouti's surface waters are composed of non-perennial rivers, part of which flow into plains, located below the sea level. Therefore, the threat to water resources comes from both floods and droughts. A decrease in rainfall could lead to a lower volume of water infiltration and recharging of the groundwater. Moreover, higher temperatures might increase evapotranspiration, contributing to a decline of the groundwater level.

Climate change is expected to exacerbate the already critical water situation and place even more stress on the limited fresh water resources. Both the quantity and quality of fresh water resources could be in danger. High population growth rates (2%)²⁵ and the high rate of per capita consumption of fresh water - due to temperature increases - could lead to chronic water scarcity.²⁶ Moreover, the increase in sea level, along with rainfall deficit, gradually generates an accentuated intrusion of seawater in coastal areas and a reduction in the volume of water infiltrated. In addition to the predicted decreases in rainfall, the average number of days with rain is expected to decrease throughout the year and GCM model output also suggests an increase in more intense, episodic rainfall events. This could have significant implications for water availability in the area because intense rains, coupled with sparse vegetative cover, cause most rainfall to be lost as run-off or evaporation, with only a small percentage available for groundwater recharge. Adaptation efforts in the water resources sector should include:

- ➔ Promoting appropriate protection measures for the water resources of the city of Djibouti;
- ➔ Promoting the development and management of surface waters, including improved water resource management and investments in water monitoring and information systems, as a basis for more efficient and equitable use of water resources in all sectors;

²⁵ Ibid note 2

²⁶ Impact of Climate Change on Arab Countries. Report of the Arab Forum for Environment and Development (AFED), 2009.

- ➔ Developing and implementing water saving infrastructure for different types of water use;
- ➔ Conducting awareness raising campaigns at the community level to promote greater responsibility for managing water resources in view of climate change and variability.

COASTAL AREAS

Djibouti's coastline is 314 km long.²⁷ The greatest part of the country's infrastructure and population (88%) is located in the coastal area, and is therefore particularly at risk from sea level rise and flooding as well as droughts, fires, and earthquakes. The fragile coastal ecosystems—including coral reefs, estuaries, and mangroves—that play a key role in the subsistence of coastal communities and also serve as buffer zones against flooding, are already showing significant signs of degradation due to climate change and anthropogenic pressures. In 1998 a severe coral bleaching was observed at Seven Brothers Islands, causing a loss of between 20% and 30% of the coral cover across the country.²⁸ Moreover, the increase in the frequency of droughts might lead to a growing number of people moving to the coastal urban areas.

Anthropogenic pressures are continually leading to habitat destruction along the coast, particularly in the areas surrounding the capital and the northern coastal zone near Khor Angar. The impact of mangrove destruction through wood collection and overgrazing is already evident in declining fish and shrimp catches. Beach contamination and damage to coastal and marine biota are already severe. Reduced water quality is already a factor, due to urban development activities such as excessive exploitation of surface and groundwater for municipal use as well as lack of sewage treatment plants. Adaptation efforts in the coastal areas should include:

- ➔ Building (soft and hard) coastal protection structures in order to preserve critical coastal land/development (including Infrastructure);
- ➔ Promoting integrated coastal resource management, including support for research on coastal vulnerability.

ADAPTATION

A number of climate change projects and activities have been carried out in Djibouti, many of which are set to offer significant insights and experiences on current and potential adaptation strategies for addressing climate change risks in the country. Some exemplary efforts in this regard are listed below. It is nevertheless important to note that these are only a stepping stone to a broader set of activities, starting with the country's priorities identified in the NAPA, which will need to be implemented and fully funded in order to address the detrimental impacts of climate change.

Ongoing Efforts- At a Glance

Description of Project

- ➔ Least Developed Countries Fund (LDCF) project grant, Global Environment Facility (GEF)
- ➔ DRM Strategy, United Nations Development Program (UNDP)
- ➔ Drought Prevention Water Management, European Commission (EC)

²⁷ Ibid note 22

²⁸ Ibid note 3

- ➔ Urban Poverty Reduction Program, World Bank
- ➔ DJ-Rural Community Development & Water Mobilization / PRODERMO, World Bank
- ➔ Solar Desalination Offers Hope Against Risk of Aquifer Pollution by Seawater, World Bank
- ➔ Enabling Activities for the Preparation of Initial National Communications Related to the United Nations Framework Convention on Climate Change, GEF

GFDRR Interventions

- ➔ Djibouti: Capacity Building in Damage and Loss Assessment
- ➔ Integrating Disaster Risk Management in Investment Decisions in the MENA region
- ➔ Natural Disaster Risk Assessment and Monitoring System
- ➔ Preparatory activities and methodology to develop a risk map for Djibouti-ville

EXISTING ADAPTATION FRAMEWORK/STRATEGY/POLICY AND INSTITUTIONAL SET-UP

Over the past decades the Government of Djibouti has taken steps to identify priority activities that strengthen the country's capacity to protect its natural resources and to adapt to past and present adverse climatic variability and to future climate change. Several programs, plans, and institutions have been established to improve disaster risk management and to reduce the vulnerability of the country to natural hazards, in particular droughts, floods, and epidemics. Among these are:

- ➔ **The National Plan of Action (NAPA):** The National Plan of Action was initiated in September 2003. It contains 8 urgent and immediate adaptation activities, for a total resource requirement of US \$7.4 million.²⁹
- ➔ **Poverty Reduction Strategy Paper (PRSP):** The Poverty Reduction Strategy Paper, adopted in 2004, describes the country's macroeconomic, structural, and social policies and programs over a three-year or longer time horizon to promote broad-based growth and reduce poverty, evaluate associated external financing needs, and identify major sources of financing.³⁰
- ➔ **The Hyogo Framework for Action (HFA):** The Hyogo Framework for Action was adopted by the Government of Djibouti in 2005.³¹
- ➔ **The National Initiative for Social Development (INDS):** The National Initiative for Social Development was launched in 2007 by the President of the Republic of Djibouti to promote greater equity in access to basic social services and a better distribution of economic benefits.³²
- ➔ **Djibouti's Disaster Risk Management Strategy (DRM Strategy):** The Disaster Risk Management strategy is a priority of the Government of Djibouti and is an integral part of the process of development planning and poverty reduction. This strategy aims to increase national leadership and commitment to the sustainability of DRM through the implementation of HFA; to enhance collaboration and coordination among national stakeholders in order to increase disaster risk reduction (DRR) knowledge and understanding; to increase

²⁹ Ibid note 3

³⁰ The Poverty Reduction strategy paper, 2004

³¹ The Hyogo Framework for Action, 2005.

³² Ibid. note 31

national commitment to protect vulnerable households; and to serve as a national focal point in the United Nations International Strategy for Disaster Reduction (ISDR) system.³³

- ➔ **National Committee for Disaster Management (NCDM):** The National Committee for Disaster Management is the principal organization in the institutional structure for DRR and DRM.³⁴
- ➔ **Executive Secretariat for Risk and Disaster Management (SEGRC):** The Executive Secretariat for Risk and Disaster Management was established in 2006 and it advises the National Committee on natural disaster matters, as well as coordinates prevention, mitigation, and response activities.³⁵
- ➔ **Country Assistance Strategy (CAS):** The Country Assistance Strategy was endorsed by the World Bank's Board of Executive Directors in May 2009, covering the period FY2009-2012. This strategy supports PRSP and helps in building on the investment and structural adjustment programs started under the previous CAS.³⁶
- ➔ **Common Country Assessment (CCA):** The Common Country Assessment was adopted by the Government in 2007 and analyzes and identifies the key development issues that need to be addressed in order for the country to meet its Millennium Development Goals. Four themes were selected on the basis of development priorities: Poverty and Environment, Health and Vulnerable Populations, Education and Empowerment of Women, and Governance and Partnership.³⁷
- ➔ **Comité National de Crise (ORSEC):** The *Comité National de Crise* is tasked with responding to emergencies and was launched in 2004 after the big floods that killed 51 and affected almost 100,000 people.⁵ This committee is a national multi-sectoral crisis group led by the *Commissaire* of Djibouti City and is composed of representatives from the following entities: key ministries including the MOH; the main referral hospitals; the national and French armies; the Red Crescent; electricity, water, and telecommunications agencies; UNDP; and UN agencies.³⁸
- ➔ **National Center for Scientific Study and Research (CERD):** The National Center for Scientific Study and Research is the main think tank of the country and provides policy makers and citizens access to training, workshops, and knowledge on: (i) environmental studies; (ii) social sciences; (iii) international strategic studies; (iv) cartography and geography; and (v) information technologies.³⁹

INSTITUTIONAL AND POLICY GAPS^{40,41}

- ➔ Mainstreaming climate variability and change into national policy and planning processes is yet to be achieved in Djibouti. The government's efforts focus on poverty reduction but lack explicit consideration of climate change risks and suggestions for responding to them.
- ➔ Engagement of stakeholders at both local and national levels in decisions and identification of options for addressing climate change risks are required, as is a significant investment in public awareness-building on issues of climate change (which is generally low in Djibouti due to limited communication channels and lack of materials available in the requisite local languages). Awareness of climate change and the direct involvement

³³ Disaster Risk Management Programs for Priority Countries Middle East & North Africa – Djibouti, Global Facility for Disaster Reduction and Recovery (GFDRR), 2009.

³⁴ Ibid. note 34

³⁵ Ibid note 34

³⁶ World Bank Country Assistance Strategy, 2009.

³⁷ Country Assistance Strategy for Djibouti, 2007.

³⁸ Ibid note 20

³⁹ Ibid note 34

⁴⁰ Ibid note 32

⁴¹ World Bank, Djibouti-Natural Disaster Risk Assessment and Monitoring System

of communities in workshops, meetings, and activities that address adaptation options is a key pillar in responding to climate change risks.

- ➔ As previously noted, there has been a relative lack of support for agricultural initiatives in subsistence farming, and this gap must be addressed in order to guarantee Djibouti's future food security. From an institutional and policy perspective, this requires a concerted effort to support agricultural activities and favorable price policies.
- ➔ Accountability is lacking under Djibouti's currently limited environmental regulations, as are appropriate monitoring systems to deal with potentially vulnerable populations.
- ➔ Poor coordination among stakeholders responsible for climate risk management and environmental protection is commonplace across the country. Issues of coordination must be addressed in order to build a system of knowledge transfer within and across organizations and to respond proactively and effectively to climate risks, both now and in the future.

RESEARCH, DATA, AND INFORMATION GAPS

Djibouti's location and economy make the country particularly susceptible to the effects of climate change and extreme events. Projected population growth rates indicate that difficult times lie ahead for the country. Increasing population pressures are likely to pose more severe threats on forests and woodland resources, further degrading ecosystem services upon which livelihoods depend. Djibouti has made significant steps to address disaster risk management. However, there are substantial data and information gaps, making the task of developing short-term response or disaster-reduction strategies extremely difficult. Existing information deficiencies are outlined below.

RESEARCH GAPS

- ➔ Specific research is required on new methods to improve water use in agriculture, in particular in those regions that are currently facing water deficits during the dry season.
- ➔ An often ignored research gap is the understanding of what is needed (particularly at the community level) to build the socioeconomic capacity to adapt and to manage disaster risks. Indeed, a better understanding of the differential nature of vulnerabilities within the country's high-risk geographic regions is necessary. Analyses of sector impacts must be complemented by social, economic, and political assessments of vulnerability and resilience.⁴²
- ➔ Water supply and demand studies need to be conducted across the country. Responding to climate change in the water sector is hampered by a limited understanding of how water supplies will be impacted by rising temperatures.
- ➔ Comprehensive vulnerability maps could support disaster planners in preparing communities for worse-case impacts as well as help local communities take an active role in identifying appropriate response mechanisms.
- ➔ Community risk assessment and participatory risk assessment methodologies should be promoted with a direct link to action and planning at the sub-national and local levels.
- ➔ Climate change, particularly the projected changes in rainfall across the Horn of Africa, remains uncertain in part because of a lack of understanding of the processes that generate tropical rainfall. There is a need to

⁴² CARE. Making National Adaptation Plans Work for the Poor. Malawi Case Study.

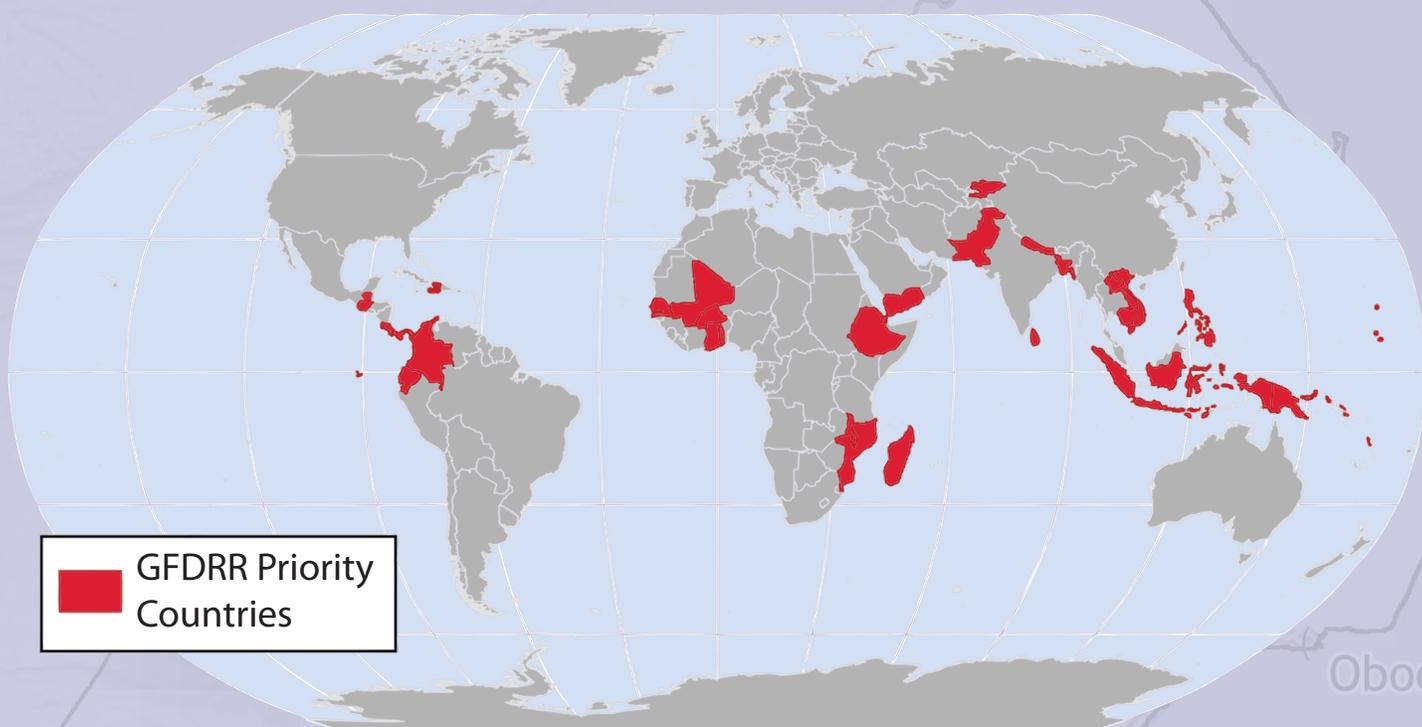
increase our understanding of and ability to reproduce realistic inter-annual and inter-decadal rainfall variability and more research should be directed in this area.

DATA AND INFORMATION GAPS

- ➔ There is a general lack of sector-specific data, including data on fisheries and agriculture, which needs to be addressed in order to develop appropriate response measures.
- ➔ Anecdotal evidence of changes in climate needs to be formally catalogued across the country. For example, there is evidence that water quality and quantity are being reduced, but these dynamics are not well understood due to limited assessment of the country's hydrometeorological systems. In many cases, there are no weather monitoring sites that could provide key information on flash floods and water flows to managers downstream.
- ➔ The use of existing meteorological information is limited to specific agencies. This information needs to be tailored to decision makers across a wider series of sectors, including water resource management.
- ➔ Observation and forecasting in existing climate forecasting mechanisms should be improved and appropriate early warning and crop forecasting systems should be introduced where appropriate.

Climate Risk and Adaptation Country Profile

This Country Profile (<http://countryadaptationprofiles.gfdr.org>) is part of a series of 31 priority country briefs developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) as part of its Disaster Risk Management Plans. The profile synthesizes most relevant data and information for Disaster Risk Reduction and Adaptation to Climate Change and is designed as a quick reference source for development practitioners to better integrate climate resilience in development planning and operations. Sources on climate and climate-related information are linked through the country profile's online dashboard, which is periodically updated to reflect the most recent publicly available climate analysis.



Acknowledgments: The *Country Profiles* were produced through a partnership between the Global Facility for Disaster Reduction and Recovery and the Climate Change Team of the Environment Department of the World Bank, by a joint task team led by Milen Dyoulgerov (TTL), Ana Bucher (co-TTL), and Fernanda Zermoglio. Additional support was provided by Sarah Antos, Michael Swain, Carina Bachofen, Fareeha Iqbal, Iretomiwa Olatunji, Francesca Fusaro, Marilia Magalhaes, Habiba Gitay, and Laura-Susan Shuford. IT, GIS, and map production support was provided by Varuna Somaweera, Katie McWilliams, and Alex Stoicof from the Sustainable Development Network Information Systems Unit (SDNIS). Jim Cantrell provided design. The team is grateful for all comments and suggestions received from the regional and country specialists on disaster risk management and climate change.

© 2011 THE WORLD BANK GROUP
1818 H Street, NW
Washington, DC 20433
Internet: www.worldbank.org
Contact: Milen Dyoulgerov,
mdyoulgerov@worldbank.org

This volume is a product of the World Bank Group. The World Bank Group does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgement on the part of the World Bank Group concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

All rights reserved.



GFDRR
Global Facility for Disaster Reduction and Recovery



DJIBOUTI