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DJIBOUTI BIODIVERSITY AND TROPICAL FORESTS: 118/119 ASSESSMENT



November 2012

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ACRONYMS

ADDN	The African Drought Risk and Development Network
AEWA	Agreement on the Conservation of the African-Eurasian Migratory Waterbirds
ARD	Republic Alliance for Democracy
AU	African Union
AWF	African Water Facility
CBJ	Congressional Budget Justification
CGD	Convention on Biological Diversity
CIA	Central Intelligence Agency
CITES	The Convention on the International Trade in Endangered Species of Wild Fauna and Flora
COMESA	Common Market for Eastern and Southern Africa
DEFRA	The Department for Environment, Food, and Rural Affairs
FAO	Food and Agriculture Organization of the United Nations
FRUD	Front for the Restoration of Unity and Democracy
GEF	Global Environment Facility
GER	Gross Enrollment Rate
GORD	Government of the Republic of Djibouti
IGAD	Inter-Governmental Authority on Development
IJMR	Infant-juvenile Mortality Rate
IMF	International Monetary Fund
IMR	Infant Mortality Rate
INDS	National Initiative for Social Development
IUCN	International Union for Conservation of Nature
MHUEAT	Ministry of Home, Urbanism, Environment and Land Planning
NGO	Non-governmental Organization
NGSAP	National Biodiversity Strategy Action Plan
PDD	Djibouti Development Party
PERSGA	The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
PND	National Democratic Party
PPSD	People's Social Democratic Party
PRSP	Poverty Reduction Strategy Paper
RPP	People's Rally for Progress
UDJ	Union for Democracy and Justice
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UPD	Union of Reform Partisans

USAID	United States Agency for International Development
WCS	The Wildlife Conservation Fund
WFP	World Food Programme
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

This Biodiversity and Tropical Forest: 118/119 assessment for Djibouti was completed via a desktop audit and literature review including the use of publicly available databases and the use of VirginiaTech's online University Library to search for peer-reviewed articles and other scholarly works. Consultation with Tim Resch from USAID, Bureau for Africa and Matthew Edwardsen, Africa Program Coordinator for the United States Forest Service International Programs provided information on USAID programs in Djibouti and assessment guidance. Monique Chiasson of the Convention on Biological Diversity Secretariat confirmed that no Djibouti national reports in English are available but the National Biodiversity Strategy and Action Plan and four subsequent National Reports are available in French. One of the main challenges in completing this assessment is that the data on the status of Djibouti's natural resources including any recent inventories is lacking or limited and seems to be updated infrequently (for English reports on Djibouti environment, please visit PERSGA website at www.persga.org).

Situated in the Greater Horn of Africa and bordered by Eritrea, Ethiopia, and Somalia, Djibouti has a land area of 23,200 square kilometers and an estimated population of 889,000. The majority of the country is desert with a dry, torrid, and unusually hot climate. While this desert land supports a surprisingly large number of species including 826 species of plants and 1,417 species of animals, the country has been described as having a lack of natural resources due to having limited arable land, desertification, no permanent fresh water source, and limited vegetation. It often faces drought conditions and is currently in its seventh consecutive year of drought. It is thought that this might be the new normal.

Threats facing the conservation of biodiversity and tropical forests in Djibouti include:

Habitat degradation. Due to overgrazing by pastoralists, deforestation for firewood and charcoal, and clearing of forests to provide land for agriculture much of Djibouti's land base is considered to be degraded. The amount of vegetation is vastly less than it has been historically. Coral reefs and beaches are seeing degradation due to anchors, trampling, littering, souvenir collection, sewage pollution, litter, sedimentation, and overfishing.

Drought and desertification. As mentioned previously, Djibouti is in its seventh consecutive year of drought. While Djibouti does periodically face drought conditions, they have become more numerous in the past 10-20 years.

Climate change. As the climate gets even warmer in Djibouti the amount of vegetation may be at risk of lessening even more. It is predicted that the Horn of Africa will see more frequent extreme weather events and sea levels will rise.

Pollution. Djibouti experiences high levels of air pollution. In addition, it has poor waste management and sewer systems that results in pollution of surface and groundwater.

Invasive species. Djibouti's main invasive species, the *prosopis chilensis*, has taken over at least 200 km² of land, is poisonous to both people and livestock, crowds out native plants, and extracts a significant amount of water from the soil.

Political instability. There is a sense of political instability in Djibouti due to its authoritarian nature. Furthermore, many of its citizens do not view the government as transparent and ultimately believe it is corrupt. Many of Djibouti's laws and policies are made through a unilateral Presidential Decree.

Health issues. AIDS and Tuberculosis are both present in Djibouti. Furthermore, healthcare services and employees are quite limited.

Population growth and urban development. While Djibouti's population is not growing nearly as fast as other countries, it is expanding at a quick rate. In addition, partially due to the ongoing drought, more and more people are moving to the cities where basic services, such as sanitation infrastructure, are being stressed.

Poverty, unemployment, and lack of skilled workforce. Djibouti has a high rate of poverty and unemployment. Furthermore, the literacy rate is somewhat low and few citizens go on to secondary education. Consequently, there is a dearth of an educated, skilled workforce.

Refugees. While Djibouti has long been a place for Somalia and Ethiopian refugees to flee, there has been an increase in the numbers of refugees more recently which further stresses a country already struggling to meet the basic needs of its citizens.

Lack of human and financial capacity. In terms of having the means to conduct conservation projects, Djibouti is lacking in both human resources as well as financial resources especially since the country is often facing food and water insecurity.

Limited governmental, institutional, and legal capacity. This limited capacity makes it even more difficult to monitor ecologically sensitive areas, enforce appropriate regulations, and implement conservation programs.

Food and water insecurity. Many of the citizens living in Djibouti struggle regularly to have their basic needs met. Potable water is not readily available throughout much of the country. The lack of arable land makes it impossible for Djibouti to grow all of its own food and therefore the country is very reliant on other countries for much of their food. Furthermore, the consistent years of drought have added to both the food and water insecurity.

Fortunately, Djibouti's strategic location and somewhat stable government, compared to other African countries, has brought much aid to them from many international donor countries and multi-lateral organizations. Furthermore, both France and the United States have a large presence in Djibouti.

Actions Necessary to achieve conservation and sustainable management of tropical forests and biodiversity. Fortunately, there are many actions that Djibouti can incorporate that will help in

conserving their natural resources and biodiversity. Some of these would include stabilizing the government by making it more transparent and improving its election process, habitat improvement projects such as reforestation and agroforestry, increasing the size and number of protected areas, climate change adaptation measures such as coastal protection and reforestation of mangroves, improving its sanitation and sewage treatment systems, combating invasive species, improvement of governmental, institutional, and legal capacity, the introduction of environmental education programs, implementing trans-boundary and cross-border approaches to deal with natural resource issues, increasing NGO presence and awareness, and enhancing food and water security.

While GORD has shown an interest in conservation and biodiversity and has become a party to many environmental treaties and conventions, their follow through has not been as strong and consistent as one would like. Based on their National Reports, this would appear to be due mostly to financial and human constraints. However, it seems as though this has begun to change as they have recently taken on projects to provide cisterns and water storage tanks as well as a sustainable sanitation system in Djibouti City. Furthermore, additional conservation activities have been undertaken in terrestrial and marine protected areas. Please refer to the PERSGA website.

Previous USAID funding has focused on Peace and Security, Investing in People, Governing Justly and Democratically, and Humanitarian Assistance. However, moving forward it may prove beneficial for future USAID funding to be used for some conservation projects such as a large scale reforestation effort.

A. INTRODUCTION

Situated in the Greater Horn of Africa and bordered on the north by Eritrea, on the west and south by Ethiopia, and on the southeast by Somalia, Djibouti has a land area of 23,200 square kilometers (slightly smaller than Massachusetts) and an estimated population of 889,000 (UNDESA 2010). The coastline, which plays a major role in Djibouti's economy, is 314 km long. The majority of the country is defined as desert and consequently the climate is torrid and dry throughout most of the country (CIA 2012). From May to September the climate is particularly hot with daily temperatures of

approximately 40°C (104°F). Mid-October to mid-April is considered to be the cooler season with temperatures averaging about 25°C (77°F) in addition to being the time that there is occasional rain (Lonely Planet 2012). However, average annual rainfall is generally no more than 150 mm or approximately 6 inches (World Travel Guide 2012). Djibouti has three distinct geographic areas: the coastal plains which are emphasized by white, sandy beaches; the volcanic plateaus in the southern and central part of the country; and in the north, the mountain ranges where the elevation can be as high as 2,000 meters above sea level. While most of the terrain is desert, there are some pockets of forest and dense vegetation in the north (Lonely Planet

2012). The country is divided into five administrative districts: Djibouti, Ali-Sabieh, Dikhil, Tadjoura, and Obock (USAID/REDSO 2005).

Figure 1. Map of Djibouti



Source: [United States Department of State 2012](#)

A1. Environmental and Natural Resource Management Context in Djibouti

Djibouti has been described as having a lack of natural resources. In addition, others have described it as one of the most inhospitable, barren environments on the planet with limited arable land, desertification, no permanent fresh water source, and very little vegetation (Brass 2008).

The country is in the midst of facing its seventh consecutive year of drought (UN 2011). Food insecurity has increased, especially during the 2010-2011 drought disaster with food production from both livestock and crops being extremely poor. Several environmental threats and threats to biodiversity persist such as poverty, decreasing vegetation due to climate change, overgrazing, deforestation, increased development around the coastal zones, depletion of mangrove forests due to grazing, firewood extraction, and timber, continued loss of wildlife habitat due to overgrazing, overexploitation, uncontrolled hunting and fishing, predation by invasive species,

and indiscriminate refuse dumping due to poor handling, management, and disposal of solid waste (CIA 2012, CBD 2012, and USAID/REDSO 2005).

While Djibouti is a party to quite a number of international environmental agreements and treaties, its government has only recently begun to more actively participate in sustainable environmental practices and conservation. In addition, while the government initially began making some good progress on its Poverty Reduction Strategy, there has been limited completion of projects (17% as of April 2008) as well as very limited implementation of projects (just over 43% as of April 2008). This is partially due to the fact that the ministries responsible for ownership of the strategy are considered to be weak (Republic of Djibouti 2008).

In order to conserve Djibouti's biodiversity, several factors will need to be addressed such as environmental education, empowering communities to manage natural resources, meeting basic needs by increasing food security and accessibility of potable water, improving health care, increasing accessibility of education, reducing poverty, and development of a more equitable and transparent government.

A1a. Political Environment

Despite being a democracy, Djibouti is often called authoritarian in nature. Consequently, Djibouti continues to remain at the bottom of the Economist Intelligence Unit's 2011 democracy index (The Economist Intelligent Unit 2012). Furthermore, efforts to curb corruption have not had the desired effect as Djibouti was ranked 91 out of 178 countries surveyed in Transparency International's 2010 Corruption Perceptions Index (Freedom House 2011). Many in Djibouti do not have confidence in the electoral process. As a result, USAID has implemented projects that work towards strengthening election management and procedures, encourages voter participation, improves oversight, and engages political parties in constructive dialogue (United States Agency for International Development/Djibouti 2012, *Governing Justly and Democratically*).

Political power is technically shared by a Somali Issa president and an Afar prime minister however the country's first president, Hassan Gouled Aptidon, installed an authoritarian one-party state dominated by the Issa community. The office of the president and the president himself make many of Djibouti's laws and policies through unilateral Presidential Decree. Additionally, since the legislature is only in session for two months each year, the other branches of government have little say (Brass 2008).

Part of French Somaliland since 1888, Djibouti gained independence in 1977 from France and Hassan Gouled Aptidon became its first president serving until 1999. A civil war broke out during the 1990s, due to unrest among the Afars minority, which ended in 2001. This resulted in a peace accord between Afar rebels and the Issa-dominated government. Djibouti's first multi-party presidential election culminated in the election of Ismail Omar Guelleh who has since been re-elected to a second and third term. In 2010 parliament passed a constitutional amendment that overturned the two-term limit for presidents in addition to reducing the presidential terms from six years to five. Guelleh is now expected to be in office until 2016 (CIA 2012).

While the judicial system is based on French civil code, Sharia (Islamic law) prevails in family matters. Consequently, women face serious discrimination under customary practices related to inheritance and other property matters, divorce, and the right to travel. Additionally, as in many African countries, female genital mutilation is widespread. However, recently there has been some good news for women since approximately 50% of girls now receive primary education and a law has been passed that requires at least 10% of elected offices to be held by women.

The government of Djibouti is a republic. The constitution was ratified in September 1992 by referendum. The Branches of the government are as follows: *Executive* – president; *Legislative* – 65 member parliament, cabinet, prime minister; *Judicial* – based on French civil law system, traditional practices, and Islamic law. Political parties include the following: People's Rally for Progress (RPP); National Democratic Party (PND); Front For The Restoration of Unity and Democracy (FRUD); Djibouti Development Party (PDD); People's Social Democratic Party (PPSD); Republican Alliance for Democracy (ARD); and Union for Democracy and Justice (UDJ); Union of Reform Partisans (UPR) (U.S. Department of State 2012).

Djibouti has strong ties with both France and the United States while also maintaining good relations with Ethiopia and Somaliland. It hosts the only U.S. military base in Africa, which includes approximately 2,200 troops, and the only warehouse not based in the United States that prepositions American food aid for Africa and Asia (USAID/Djibouti 2012, *Country Profile*). Regarding its connection with France, Djibouti's security is supplemented by a formal security accord with the Government of France who maintains one of its largest military bases in Djibouti outside of France (U.S. Department of State 2012).

Regarding media, the government maintains restrictions on the licensing and operation of broadcast media and there are no privately-owned TV or radio stations. The government owns the main newspaper and the national radio and TV, Radiodiffusion-Television de Djibouti (RTD) (BBC 2011, CIA 2012).

A1b. Economic Environment

One of the main economic activities in Djibouti is the Port of Djibouti, due to its strategic location near the Gulf of Aden and the Red Sea and its status as a free trade zone in the Horn of Africa. Additional economic activities include the banking sector, the airport and the operation of the Addis Ababa-Djibouti railroad. Djibouti's economy is closely tied to transportation for its landlocked neighbor, Ethiopia, and a large foreign expatriate community. Imports and exports from Ethiopia account for 70% of the port activity at Djibouti's container terminal, the Doraleh Container Terminal. During the last ten years or so Djibouti has seen increased private sector capital investment and has significantly improved its finances. While mineral deposits do exist in the country, aside from the salt deposit at Lac Assal, they have not been exploited (U.S. Department of State 2012, CIA 2012).

Due to limited natural resources, a harsh climate, and limited industry the nation is quite dependent on foreign assistance. In addition, limited rainfall reduces their crop production resulting in the majority of their food needing to come from imports. In urban areas the unemployment rate is quite high at approximately 60% while in rural areas in 2007 was reported

to be 83% (CIA 2012). According to Brass (2008), part of the high unemployment rate is due to the uneducated and unskilled laborers in Djibouti necessitating the importing of skilled employees from other countries.

There appears to be some good economic news, however. According to the Economist Intelligent Unit, “Real GDP growth is expected to pick up from an estimated 4.6% in 2011 to 4.9% in 2012 and 5.6% in 2014 as transit traffic through Djibouti’s ports is expected to recover and the second-stage expansion of the Doraleh container terminal is likely to begin over the forecast period” (The Economist Intelligent Unit 2012).

A1c. Religious Environment

As part of its overall policy to promote human rights, the U.S. government discusses religious freedom with the government of Djibouti. More than 99% of the population is Sunni Muslim with a small number of Roman Catholics, Protestants, Copts, Ethiopian Orthodox, Greek Orthodox, Jehovah’s Witnesses, Hindus, and Bahais. If one does not officially identify with another religion, they are automatically considered Muslim. The U.S. State Department found that in general, the government of Djibouti generally respected religious freedom in law and in practice. No reports or incidences of abuses, including religious prisoners or detainees, were found in the country. While it is required that the president and other government employees take religious oaths and it is an official custom, there is no penalty for noncompliance. In addition, a small number of non-Muslims hold civil service positions without discrimination. Overall, the report found that while the government generally respected religious freedom in law and in practice, there were occasional reports of societal discrimination based on religious affiliation, belief or practice. Furthermore, Djibouti custom discourages conversion from Islam (U.S. Department of State 2011).

A1d. Djibouti’s current efforts

Djibouti’s first Poverty Reduction Strategy Paper was adopted in May 2004 since the incidence of extreme monetary poverty had risen from 34.5% in 1996 to 42.2% in 2002 and relative poverty had risen from 64.9% to 74.4% during the same time frame. Several goals were then set with the hope that they would help Djibouti achieve the Millennium Development Goals. These included the following: to increase average GDP growth over the period 2004-2006 to 4.6%; to reduce the incidence of extreme poverty to 36.1%; to increase the gross enrollment ratio (GER) to 73%; and to reduce the infant mortality rate (IMR) to 90 per thousand and the infant-juvenile mortality rate (IJMR) to 110 per thousand. While there were some achievements reported during the first three years of implementation, such as improved access to primary education, improved literacy rate among women between 15 and 24 years of age, significant IMR decrease, and rebound in economic growth, shortcomings were found in the implementation of the priority actions listed in the first PRSP with implementation at just over 43% and fully complete actions just less than 17%. Furthermore, over one third of the planned actions had not yet been started. Consequently, the President of the Republic launched the National Initiative for Social Development (INSD) which requires the adoption of integrated policies, as part of a global and coherent project in which all aspects are related and complementary. Major priorities are also set including the following: promotion of access to basic social services; restructuring of the national productive base; and assistance to highly vulnerable people. By 2011 the main goals to

be achieved were as follows: reduction of the incidence of extreme poverty and of relative poverty; increase in average annual economic growth to over 7%; increase in the GER to 83% in primary schools and to 61% in secondary schools, with a reduction in gender and geographical disparities; and reduction in the IMR to 60 per thousand, in the IJMR to 80 per thousand, and in the Maternal Mortality Rate (MMR) to 400 per 100,000 live births. Four strategic approaches were selected including the following: acceleration of growth and preservation of the main macroeconomic balances; development of human resources and achievement of universal access to basic services; promotion of harmonious and balanced local development and preservation of the environment; and consolidation of good governance principles and capacity building (Republic of Djibouti 2008).

According to the INDS report, the main challenges facing Djibouti center on the following:

- Strengthening of the rule of law and consolidation of democratic achievements;
- Creation of conditions enabling the people and enterprises of Djibouti to benefit fully from:
 - (i) the huge influx of foreign investments; and (ii) the opportunities created by the promising consolidation of Djibouti's situation as an essential transit and transshipment hub to countries in the region;
- Development of competitive and efficient human resources, able to lead the country out of poverty and into sustainable development;
- Solution of the fundamental questions of access to water and access to energy;
- Harmonious and balanced land use.

Consequently, the INDS became the frame of reference for the country's economic and social development strategy (Republic of Djibouti 2008). Progress on this most recent poverty reduction effort has not yet been reported.

A search of recent news articles found encouraging, increased involvement by Djibouti in biodiversity conservation and poverty reduction. For example, on March 26, 2012 Djibouti's Ministries of Housing and Higher Education held the country's first international conference on wildlife preservation. During this conference the Minister of Higher Education and Research renewed the government's commitment to protect natural resources and wildlife in the interest of future generations (*Djibouti holds international conference* 2012). In an effort to improve the skills of the citizens of Djibouti, in March 2012 the Secretariate of State for National Solidarity initiated a program to train young people in road construction in order to give them access to employment opportunities. Additionally, the Ministry of Agriculture's PRODERMO project was highlighted which includes the construction of dams, reservoirs, and underground tanks to cope with drought. Prefect Mohamed Cheikho Hassan indicated that the objective of these projects was to improve the living conditions of rural people and to fight the rural exodus (*Dikhil prefect fights unemployment* 2012). Lastly, in order to work toward eradicating hunger and reducing poverty through agriculture, the government of Djibouti is planning to set aside 10% of the national budget for agricultural development in order to achieve 6% annual agricultural growth (*Djibouti to reduce poverty* 2012).

A2. Current U.S. Government Programming Efforts in Djibouti

U.S. government assistance to Djibouti continues to invest in three objectives: Peace and Security; Investing in People; and Humanitarian Assistance. The FY 2012 CBJ estimates a total of \$5.285 million in foreign assistance for Djibouti with the funding broken up as follows in the tables below (United States 2012).

Table 1. USAID Funding Requests

Request by Account and Fiscal Year

(\$ in thousands)	FY 2011 Actual	FY 2012 Estimate	FY 2013 Request	Increase/Decrease
TOTAL	13,391	5,285	4,815	-470
Development Assistance	4,000	1,650	1,700	50
Food for Peace Title II	4,823	-	-	-
Foreign Military Financing	1,996	1,500	1,000	-500
Global Health Programs – State	1,800	1,800	1,800	-
Global Health Programs – USAID	400	-	-	-
International Military Education and Training	371	335	315	-20

Request by Objective by Account, Program Area and Fiscal Year

(\$ in thousands)	FY 2011 Actual	FY 2012 Estimate	FY 2013 Request	Increase/Decrease
Djibouti	13,391	5,285	4,815	-470
1 Peace and Security	2,368	1,835	1,315	-520
Foreign Military Financing	1,996	1,500	1,000	-500
1.3 Stabilization Operations and Security Sector Reform	1,996	1,500	1,000	-20
International Military Education and Training	372	335	315	-20
1.3 Stabilization Operations and Security Sector Reform	372	335	315	50
3 Investing in People	6,200	3,450	3,500	50
Development Assistance	4,000	1,650	1,700	50
3.2 Education	4,000	1,650	1,700	-
Global Health Programs – State	1,800	1,800	1,800	-
3.1 Health	1,800	1,800	1,800	-
Global Health Programs – USAID	400	-	-	-
3.1 Health	400	-	-	-
5 Humanitarian Assistance	4,823	-	-	-
Food for Peace Title II	4,823	-	-	-
5.1 Protection, Assistance and Solutions	4,823	-	-	-

Source: [CBJ FY 2012](#)

Regarding Peace and Security, Djibouti is threatened by ongoing conflict in Somalia, border incursions by Eritrea, and piracy. Instability in the Horn of Africa along with the presence of Camp Lemonnier has combined to heighten the U.S.'s interest in the country. Consequently, border protection and military capacity-building programs are part of U.S. assistance. Furthermore, the U.S. works with other European Union nations and other allies on counter-piracy operations.

While previous U.S. assistance has led to progress in health and education in terms of increasing immunization coverage rates by 300%, reducing child mortality by 27% in four years, and increasing primary education access rates from 49% in 2003 to 72% in 2010, Djibouti continues to be challenged to meet the needs of its poor population. Therefore, FY 2013 funding will support education programs that increase social equity and enhance workforce participation (United States 2012).

A3. Background on USAID Activities in Djibouti

USAID began its development assistance to Djibouti in 1978. Total USAID contributions between 1979 and 2010 equaled \$100.3 million.

While USAID's estimated 2012 and requested 2013 contributions do not provide funding for Governing Justly and Democratically, this has been a priority program in the recent past. For example, between the years 2001 – 2010, funding was provided in eight out of ten of those years with the highest being in 2010 when \$1.4 million was donated (USAID 2012). Due to high levels of corruption, political marginalization, and porous borders, USAID programs have attempted to strengthen civil society organizations, promote political competition, and address anti-corruption. In the past USAID worked with the Government of Djibouti to help ensure a free and fair electoral environment and aimed to combat increasing levels of political apathy, cynicism, and tendencies to disengage from formal political processes (USAID/Djibouti 2012, *Governing Justly and Democratically*).

Literacy rates and school life expectancy in Djibouti have traditionally been quite low. According to a CIA report (2012) the average literacy rate is 67.9% (with males being at 78% and females at 58.4%) and the school life expectancy is approximately only 5 years (CIA 2012). Consequently, USAID often funds projects to improve education and literacy. During the years 2001 – 2010 the majority of USAID funding to Djibouti was for Basic Education, Health, and Emergency Response (USAID 2012). The purpose of USAID's Basic Education program has been to improve the quality of teaching and learning, strengthen education strategies and systems, advance the Ministry of National Education's management capacity, increase opportunities for out-of-school youth, and address gender in all activities. Fostering a Healthier Society has also been a priority for USAID in the past. These programs focused on detecting, treating, and mitigating tuberculosis (TB), polio, and malnutrition. Since Djibouti has the third highest TB prevalence rate in the world, USAID provided TB technical assistance and training to build laboratory capacity. In order to maintain high quality work of the staff providing polio immunizations, USAID emphasized training and communication activities. Additionally,

USAID has worked with the U.S. military at Camp Lemonnier on civil affairs activities that focus on school and health infrastructure (USAID/Djibouti 2012, *Program Overview*).

A4. Rationale for a 118/119 Assessment in Djibouti

The U.S. Foreign Assistance Act (FAA) of 1961, as amended by Sections 118 and 119, requires that all USAID Missions conduct a periodic country analysis of the conservation and sustainable use of tropical forests and biological diversity. Specifically, FAA Sections 118 and 119 require that all country plans include:

1. an analysis of the actions necessary in that country to achieve conservation and sustainable management of tropical forests (118) and conserve biological diversity (119); and;
2. the extent to which current or proposed USAID actions meet those needs

By mandating these analyses, Congress is recognizing the fundamental role that tropical forests and the conservation of biodiversity play in sustainable development.

In 2005 a report entitled “Djibouti Environmental Analysis: Tropical Forests, Biodiversity and Environmental Management” was completed by USAID/REDSO. While it is not clear when Djibouti will do a CDCS (or some variation thereof) it will be doing a Strategic Planning document in the near future (Resch 2012) and, therefore, this report is required by law.

B. LEGISLATIVE AND INSTITUTIONAL STRUCTURES AFFECTING BIODIVERSITY AND FORESTRY

Djibouti's nascent government had a bit of a rocky start, however, has recently been making progress toward developing a stable and more democratic political system. In order for the government to continue moving toward a democracy, GORD needs to strengthen election management and procedures, encourage voter participation, improve oversight, and engage political parties in constructive dialogue. Additionally, a willingness to participate in productive dialogue on the part of opposition groups to find solutions to longstanding grievances will be especially helpful. To help build a free and fair electoral environment, USAID has helped GORD by providing training for polling agents on electoral oversight, trained the Election Commission in best practices on election administration, and worked with civil society organization to promote political participation and voter education. USAID assistance has also focused on opening avenues for increasing political participation and competitive balance (USAID/Djibouti 2012, *Governing Justly and Democratically*).

Islam is the major religion in Djibouti and it has a great influence in government. However, while this religion teaches the importance of maintaining balanced relations with the other elements of creation consequently encouraging the protection of biodiversity, the environmental sector of the government receives only a small part of the budget. In addition, Djibouti has a limited number of environmental protection laws. These items combined with an inadequate amount of human resources have resulted in great difficulty in enforcing biodiversity protection. Consequently, seven years after the adoption of its National Biodiversity Strategy and Action Plan, only 10 out of 33 projects had been implemented .

B1. Environmental Policies, Legislation, and Treaties

Djibouti's environmental protection was integrated into the socio-economic development policy beginning in the early 1990s. The first national report on the environment was completed in 1991. Then, in 1995 the environment was recognized as a national priority and the governing of it was put under the Ministry of Planning, Environment, Land Planning and Co-operation. In 1996 the main guidelines regarding the environment were established. Also in 1996 the Department of the Environment and Land Planning was developed along with the National Action Plan for the Environment which recommended the integration of the environmental dimension into economic and social projects and programs. As of 2006, the country had adopted several important environmental plans and programs including the National Action Plan for the Environment 2001-2010, the National Desertification Programme, and the National Strategy and Action Plan for the Biological Diversity (Republic of Djibouti, MHUEAT, *Biosafety Framework* 2006). Additionally, with the assistance of GEF funding, in 2004 a National Capacity Needs Self-Assessment for Global Environmental Management was developed with UNDP. Furthermore, in 2005 Djibouti's Ministry of Home, Urbanism, Environment and Land Planning held a national dialogue to continue to raise awareness on actions linking global environmental commitments to Djibouti's national priorities (UNDP 2012). Moreover, the environment has been integrated into other national planning instruments such as the Strategic Framework for Poverty Reduction.

B1a. Legislation

According to Djibouti's Minister of Home, Urbanism, Environment and Land Planning, "a legal framework for environmental protection has been implemented with the adoption by the Government of several laws and regulations: the Environment Code, law on the establishment of protected areas, decree establishing the procedure of environmental impact assessment, biodiversity protection decree, decree on the regulation of the transportation of dangerous products, and a decree on the regulation of substances that deplete the ozone layer" (MHUEAT, A Word from the Minister).

Four main themes are the focus of Djibouti's policy, legal, and environmental framework: desertification control; biodiversity conservation; improvement of the population's living; and management of the water supply (Geographic Environmental Solutions/Cortec 2008). Djibouti's environmental laws provide guidelines for the protection of inland water, marine water, air, the terrain, and for the protection of fauna and flora. It also provides laws for the production and disposal methods for toxic and dangerous wastes and indicates potential fines for any infringements. The definition of toxicity and danger levels of waste are drawn from the relevant clauses of the United Nations agreed systems (World Health Organization) and the World Bank Group. As of 2008 Djibouti did not have guidelines for acceptable noise and vibration levels. Article 42 of the Environmental Laws for Djibouti recommended the use of United Nations guidelines for those times that there is an absence of Djiboutian guidelines. Additionally, there are no guidelines in the environmental laws on safe limits for air quality, and water and sediment quality (African Development Fund, 2008).

B1b. Treaties

Djibouti is party to quite a number of international treaties on environmental issues. The following table lists the international treaties that Djibouti has ratified and/or is a signatory to.

Table 2. List of Treaties

Official Title	Date of Signature	Date of Ratification
Stockholm Convention on Persistent Organic Pollutants	22/05/2001	
Cartagena protocol on biosafety to the convention on biological diversity	24/05/2000	
Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade	10/09/1998	
Kyoto Protocol to the UN Framework Convention on Climate Change	11/12/1997	12/3/2002
Amendment to the Montreal Protocol on substances that deplete the ozone layer, adopted at the ninth meeting of the Parties	17/09/1997	
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	17/06/1994	12/6/1997
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	25/11/1992	
Convention on biological diversity (CBD)	05/06/1992	27/08/1995
Basel Convention on the control of transboundary movements of hazardous wastes and their disposal	22/03/1989	
Montreal Protocol on substances that deplete the ozone layer	16/09/1987	
Vienna Convention for the protection of the ozone layer	22/03/1985	
United Nations Convention on the Law of the Sea (UNCLOS)	10/12/1982	

Official Title	Date of Signature	Date of Ratification
Convention on the physical protection of nuclear material	03/03/1980	
Convention on the conservation of migratory species of wild animals (Bonn Convention)	23/06/1979	
Constitution of the Food and Agriculture Organisation of the United Nations (FAO)	16/10/1945	
Agreement on the conservation of the African-Eurasian Migratory Waterbirds (AEWA)	5/1/2004	
The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization	29/10/2010	
The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)		7/2/1992
United Nations Framework Convention on Climate Change (UNFCCC) (Djibouti is a non-annex party to the convention)		27/08/1995
Ramsar Convention on Wetlands (1 site designated in Djibouti = 3,000 hectares)	22/03/2003	
World Heritage Convention		30/11/2007

Source: European Commission; [Treaties Office Database 2012](#)

Of particular importance to this analysis is that Djibouti ratified the Convention on Biological Diversity (CBD) on August 27, 1995 and in 2002 completed their first National Biodiversity Strategy and Action Plan. These plans are to be aimed at the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans and programs.

Djibouti's First National Report identified three main biodiversity goals: to strengthen the institutional capacity of the public bodies involved in the preservation of biodiversity and sustainable use; to carry out an assessment of biological diversity, to develop a national strategy and a Program of Action for biological diversity, and to prepare a national report to the Conference of the Parties; and to motivate key stakeholders to retain biological diversity and sustainable use. They also planned to establish a national office of biodiversity and create a steering committee (CBD 1999).

The 2002 Thematic Report on Forest Ecosystems identified that Djibouti had very limited human and financial resources sufficient to meet the obligations of the recommendations however indicated that the country planned to integrate conservation and sustainable use of biological diversity of forests while taking into consideration the social and cultural implications. However, the report identified that Djibouti had not identified methodologies to enhance the integration of conservation and sustainable use. The report also found that annual losses of the forest sector were estimated to be 3% which was mainly due to recurrent drought and concentration of sedentary nomads around forests (CBD 2002, *Thematic Report on Forest Ecosystems*).

Later in 2002 Djibouti finalized its National Biodiversity Strategy Action Plan. "According to the plan, the principal uses to be addressed include: alleviation of advanced degradation caused by anthropogenic pressures; revision of the urban scheme and an improvement in the management of solid and liquid wastes; motivation and implication of all stakeholders; promotion of new sustainable activities such as ecotourism; decentralization of environmental information which must reach the ensemble of districts and encouragement of sustainable

development at the local level” (CBD 2002, *National Biodiversity Strategy Action Plan*). The plan also identified the importance of biodiversity on the survival of the nomads and emphasized the importance of maintaining balance with other elements of creation and the encouragement of protecting biodiversity in the Islam religion (CBD 2002, *National Biodiversity Strategy Action Plan*).

Djibouti’s Third National Report reiterated throughout the document that the lack of financial capital and human resources has kept them from implementing all of the projects within the NBSAP as well as their biodiversity conservation goals despite the fact that GORD does give a high priority to biodiversity. The report also revealed that due to high levels of poverty, the programs that encourage sustainable use of resources are often not respected. In general the report indicated that Djibouti’s protected areas had no monitoring or control except that the marine environment did have a monitoring program for the health of their coral reefs due to funding from PERSGA. While the NBSAP provides for the establishment of additional protected areas, creation and management of these areas is lacking. This was found to be due to a lack of specific infrastructure, lack of qualified people, and a lack of financial means. Furthermore, while the trade of endangered species is prohibited, the control and monitoring on the ground is minimal or lacking. The NBSAP does include projects for alien species however no action has been taken. On a positive note, programs to train and educate tourism operators to increase their awareness of the impacts of tourism on biodiversity and to enhance the technical capacity to minimize these impacts had begun through a regional workshop. Furthermore, an environmental guide for basic education was developed and the training of researchers in the methods of conservation and sustainable use of biodiversity was organized (CBD 2006).

The First National Report on the Implementation of the Cartagena Protocol on the Prevention of Biotechnological Risks identified that as of mid-2008 Djibouti had not yet taken any necessary measures to implement the Protocol but that administrative measures had been taken to appoint a national of the Cartagena Protocol Focal Point whose role will be to receive requests for permission for the import, export, transit, and development of genetically modified organisms (CBD 2008).

Lastly, the Fourth National Report indicated that since the first biodiversity assessment carried out between 1998 and 2000, the general trends regarding loss of biodiversity have only become more pronounced. The mountain forests continued to show a decreasing trend of a linear regression of 0.03% per year and the vegetation of the plateaus and hills has suffered from the effects of climate change combined with anthropogenic actions. Coral reefs were found to be rapidly declining primarily in areas frequented by tourists. Once again this report found that the implementation of the NBSAPs was constrained by lack of financial, human, and material resources, by weak institutional arrangements for coordination between different ministries, and by low involvement of the private sector and civil society. Consequently seven years after adoption of the NBSAP the record of implementation is low with only 10 out of 33 projects being implemented (CBD 2009).

Important and/or interesting information about some of the other treaties is summarized below.

AEWA is the largest of its kind of agreement and covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle. The agreement covers 119 countries and the European Union. The agreement calls for coordinated action by the Range States throughout the migration system to which it applies. Some of the conservation actions include species and habitat conservation, management of human activities, research and monitoring, education and information, and implementation. The geographic area covered by the Agreement begins in the northern reaches of Canada and the Russian Federation down to the southernmost tip of Africa. Unfortunately, at the fourth session of the meeting of the parties, which occurred in September 2008, Djibouti did not submit their required report (AEWA 2012).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has as its aim the assurance that international trade in specimens of wild animals and plants does not threaten their survival. While CITES is an international agreement to which countries adhere to voluntarily and it is legally binding on the Parties such that they have to implement the Convention, it does not take the place of national laws. Through CITES, all international trade of specimens of certain species are subject to certain controls through a licensing system (CITES 2012). During the years of 2006, 2008, and 2010 the Secretariat to CITES recommended that trade with Djibouti be suspended for their failure to provide written indication of their legislative progress (CITES 2011).

Many rural Djiboutians make their living as pastoralists. Due to several years of consistent drought, herders have lost up to 70% of their animals in the last several years. To support these citizens, FAO has implemented a Technical Cooperation Programme project to provide vegetables and fodder crop seed to 7,000 vulnerable farming families. Additionally, the program provides hoes, rakes, watering cans, and salt licks all with the goal of enabling pastoralists to strengthen their herds. Furthermore, the UN's Central Emergency Response Fund has assisted 85,000 pastoralists by supplying them with seeds, tools, vitamins, and vaccines. The UN will also help families construct underground cisterns and other water storage devices to expand irrigation for food crops and fodder (FAO 2012).

B2. Principal Institutions of Djibouti Involved with the Environment

Similar to what was found regarding information pertaining to environmental laws, at the time of this assessment, there was very limited information available pertaining to the principal institutions of Djibouti involved with the environment.

The Environment Department at The Ministry of Housing, Urbanism, Environment and Land Use Planning (MHUEAT) oversees environmental matters in Djibouti. The goal of the unit is to provide an integrated approach to tackling environmental issues. In addition, Djibouti is a member state of the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA). PERSGA is an intergovernmental body that is dedicated to the conservation of the coastal and marine environments found in the Red Sea, Gulf of Aqaba, Gulf of Suez, Suez Canal, and Gulf of Aden. Other member states include Egypt, Jordan, the Kingdom of Saudi Arabia, Somalia, Sudan, and Yemen. PERSGA falls under the umbrella of the Arab League and its legal basis stems from Article XVI of the Regional Convention for the

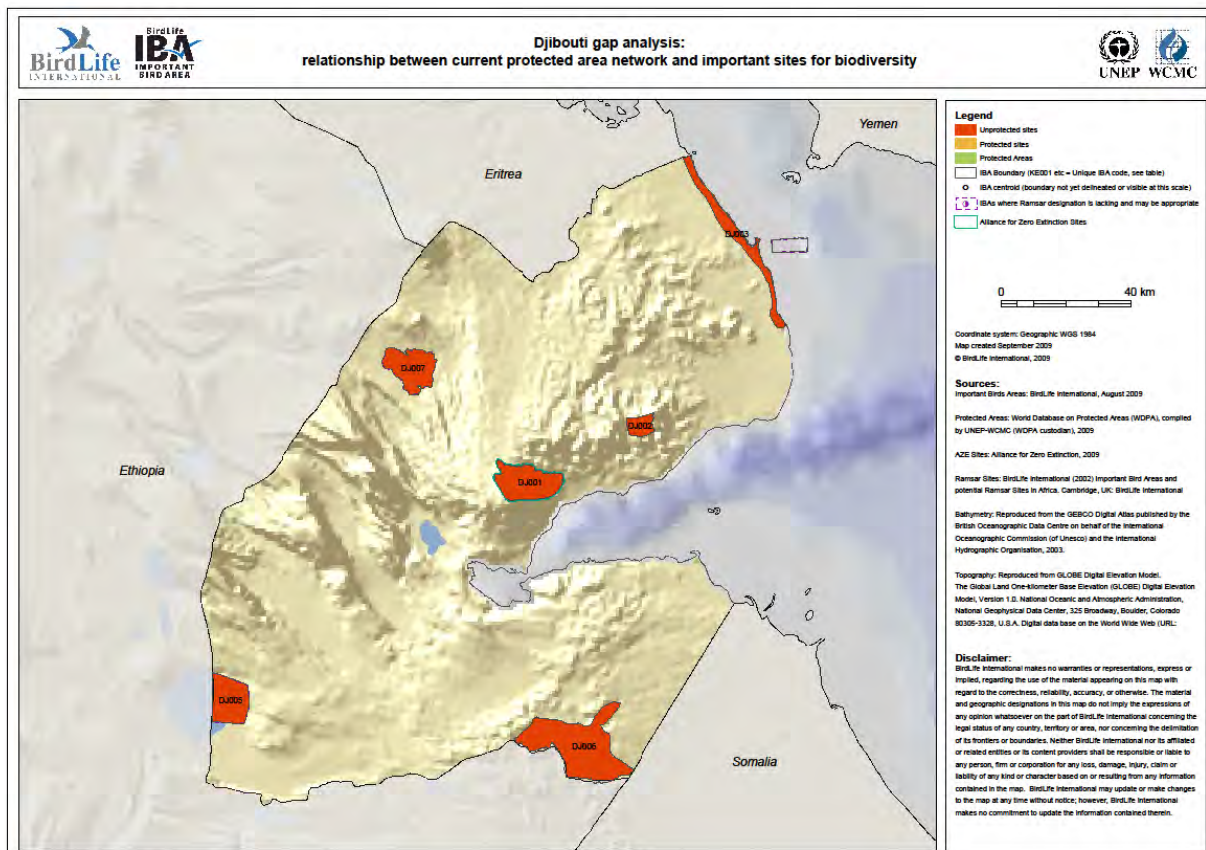
Conservation of the Red Sea and Gulf of Aden, known as the Jeddah Convention (PERSGA 2012).

B3. The Local and International NGO Community

According to the Darwin Initiative, Djibouti’s NGO program is quite underdeveloped. However, several NGOs were found to have a presence in Djibouti and are described below.

BirdLife International Africa Partnership is a global partnership of NGOs that strives to conserve birds, their habitats, and global biodiversity by working with people towards the sustainable use of natural resources. Thus far, the program covers twenty-four countries. Djibouti Nature is the BirdLife International local affiliate in Djibouti. In addition, the African Bird Club has worked in conjunction with BirdLife International on efforts to save the Djibouti Francolin. Several unprotected but key areas for birds in Djibouti have been identified and mapped by the BirdLife Important Bird Areas program as per Figure 2. The hope is that these lands will be protected in order to expand protection for migrating birds in the region.

Figure 2. Unprotected important bird areas in Djibouti.



Source: [BirdLife International](http://www.birdlife.org)

CARE is a humanitarian organization that works to fight global poverty. They deliver emergency aid to survivors of war and natural disasters. Many of CARE’s community-based

efforts work with women to improve basic education, prevent the spread of disease, increase access to clean water and sanitation, expand economic opportunity and protect natural resources. Due to the dire food security situation in Djibouti, CARE recently set up a temporary location in Djibouti (CARE 2012).

The Horn of Africa Regional Environment Centre and Network (HoA-REC/N) focuses on environmental concerns and sustainable development within the Horn of Africa. The Network encompasses approximately forty organizations including civil society organizations and institutions of higher learning to enhance environmental governance and management in the Horn of Africa by employing the following strategies:

- Promoting and advocating environmental knowledge, awareness and behavioral change
- Influencing the adjustment of environmental policies and legislation based on enhanced and enlarged dialogues on environmental issues
- Building institutional and human capacity in the environmental sphere
- Stimulating and facilitation selected environmental programmes of CBOs, NGOs, research institutions and academia (HoA-REC/N 2012)

The achievements of this network have however been limited since its creation in 2006. Aside from holding several conferences, to date there have been no environmental activities implemented that benefit Djibouti.

African Water Facility (AWF) will be piloting a program that utilizes run-off harvesting technology for drinking water, irrigation, and livestock in two districts in Djibouti in 2012 (AWF, 2012).

World Wildlife Fund Eastern Africa Regional Programme Office (WWF-EARPO) is defined by ten countries including Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania and Uganda. While focusing on thirteen global initiatives, WWF-EARPO strives to conserve biodiversity and reduce humanity's impact on nature.

The Ruffords Small Grants Foundation provides small grants that are aimed at small conservation programs and pilot projects. Djibouti has received two such grants both focusing on the endangered Djibouti Francolin (The Ruffords Small Grants Foundation 2009 and 2012).

The Wildlife Conservation Society (WCS) mission is to save wildlife and wild places around the globe. In Djibouti as in other areas, they are focusing on the Whale Shark. In order to determine their status and needs, WCS is studying their environmental and habitat preferences, site preferences, and movement in order to help develop appropriate conservation plans (WCS 2012).

Al-Biri Organization and the Women's Association NGO have participated in Community Participation Projects in Djibouti to help raise the level of participation in environmental conservation by the local communities. Al-Biri Organization is an African NGO that is a moderate Islamic charitable organization that works on many fronts to improve the living conditions in Djibouti. Projects that they have been involved in are those whose objective is to

maintain shark stocks by raising awareness about sustainable fishing, methods and tools and another project to conserve marine turtles. The Women's Association NGO has been involved in a project to raise public awareness and participation in conservation plans ([PERSGA 2012](#)).

B4. Donor Organizations

Many international countries and organizations have contributed funding to help conserve Djibouti's natural resources as well as help with food security, health initiatives, and poverty alleviation.

The Department for Environment, Food and Rural Affairs (DEFRA) is the UK government department responsible for policy and regulations on the environment, food, and rural affairs. In 2007 they initiated a forest regeneration program and held a training session in research and conservation techniques. They have also been involved in a project to conserve the endangered Djibouti Francolin and its habitat, the Forest du Day (DEFRA).

Many other countries have also contributed to Djibouti. For example, Japan and Djibouti signed an agreement for a \$47 million project to install underground water tanks in the Tadjourah region (*Sabahonline* 27 February 2012). In January, 2012 an agreement between the European Union and Djiboutian ministers was made to develop a sustainable sanitation program in Djibouti City (*Sabahonline* 25 January 2012). According to the General Profile for Djibouti the top 10 bilateral donors to Djibouti in 2010 were the following, in order of highest to lowest net disbursements: France, Japan, United States, Kuwait, United Arab Emirates, Turkey, Italy, Norway, Korea and Germany (Organisation for Economic Co-operation and Development 2012).

Several donor organizations have contributed funding and other resources to Djibouti. These include the following: International Monetary Fund (IMF) who provides funding to help Djibouti achieve its sustained growth and poverty reduction objectives; UNICEF who has been established in Djibouti since 1981 and whose goal is to create an environment where children are guaranteed a good start in life and access to quality basic education; the World Food Programme (WFP) whose mission is to achieve food security in the countries to which they donate; and the World Bank who is working on a Disaster Risk Management (DRM) program in collaboration with five Djibouti DRM agencies (*The International Monetary Fund* 29 March 2012, UNICEF n.d., World Food Programme 2012, and The World Bank 2009).

B5. Multilateral Organizations

A host of multilateral organizations have a presence in Djibouti or are involved in some other manner.

The African Drought Risk and Development Network (ADDN), sponsored by the United Nations Development Programme's Dryland Development Centre and the United Nations' International Strategy for Disaster Reduction, seeks to provide a network to exchange experiences on managing the risk of drought in various sub-regions of Africa (UN-ISDR, UNDP-DDC, and UNECA 2008).

African Union (AU) includes all of the countries of the Horn of Africa. AU has a division on environment and natural resources under the Rural Economy and Agriculture department. Its goal is to enhance sustainable natural resource use in member states while its vision is to have full political integration (van de Giessen 2011).

Common Market for Eastern and Southern Africa (COMESA) includes all states in the Horn of Africa with the exception of Somalia. The organization's vision is focused on enhancing the economy of the region through trade and investment (van de Giessen 2011). It is a free trade area which was formed in 1994 replacing a Preferential Trade Area which had existed since 1981. Through COMESA a Comprehensive Africa Agriculture Development Programme was created with the vision for restoration of agricultural growth, food security, and rural development in Africa (COMESA 2009).

The Global Environment Facility (GEF) addresses global environmental issues by uniting 182 member governments. The GEF provides grants to developing countries and countries with economies in transition for projects related to biodiversity, climate change, land degradation along with several other environmental areas. Funded projects are those that benefit the global environment and promote sustainable livelihoods. GEF partners with other agencies such as UNDP and FAO. GEF also serves as the financial mechanism for a variety of conventions such as CBD, UNFCCC, and UNCCD. Projects which have been funded in Djibouti include one that established effectively managed marine protected areas, one that focused on the Red Sea and Gulf of Aden ecosystem management, and one which worked on the conservation of Migratory Soaring Sea Birds (GEF 2012). In addition, along with PERSGA, MHUEAT, and UNEP a project supported by GEF in 2010 provided for restoration and management of Khor Angar mangroves (PERSGA 2011).

Inter-Governmental Authority on Development (IGAD) also includes all of the countries of the Horn of Africa. IGAD aims to harmonize natural resource management policies and to implement programs to achieve regional food security, sustainable development of natural resources and environmental protection (van de Giessen 2011).

United Nations High Commissioner for Refugees (UNHCR) has as its primary purpose the safeguarding of the rights and well-being of refugees. It has supported Djibouti for many years. In 2012 UNHCR worked with its partners to maintain adequate health, nutrition, and sanitation services at camps Ali Addeh and Holl-Holl which supported refugees from Somalia, Ethiopia, and Eritrea (UNHCR 2012).

Finally, according to the Organisation for Economic Co-operation and Development, the following Multilateral Organizations have recently donated money to Djibouti: the European Commission; Islamic Development Bank; the African Development Fund; the Arab Fund for Economic and Social Development; the Global Fund; United Nations Fund for Population Activity; and the United Nations Development Programme (Organisation for Economic Co-operation and Development 2012).

C. STATUS AND MANAGEMENT OF NATURAL RESOURCES

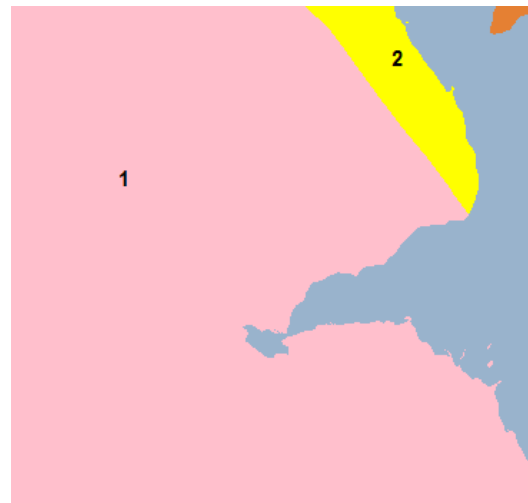
The data on the status of Djibouti's natural resources including any recent inventories is lacking or limited and seems to be updated infrequently. That has made this portion of the assessment more challenging.

According to the Convention on Biological Diversity, Djibouti is made up of rich and varied terrestrial and aquatic ecosystems (CBD 2012). However, the majority of the country is defined as desert with a climate that is torrid and dry throughout most of the country. Djibouti has three distinct geographic areas: the coastal plains which are emphasized by white, sandy beaches; the volcanic plateaus in the southern and central part of the country; and in the north, the mountain ranges where the elevation can be as high as 2,000 meters above sea level. While Djibouti continues to take steps to make an effort to conserve biodiversity and natural resources in general, several factors working together continue to limit the country's success. These would include high levels of poverty, continued deforestation, and a lack of human, financial, and technical capacities (CBD 2012).

C1. Djibouti's Natural Resources

Djibouti contains several different types of ecosystems however over 90% of the land is desert. The terrestrial ecosystem is separated into the mountainous region and the semi-arid lowlands. Shrubby and partially treed grasslands and steppes dominate the lowland ecosystem. Species that are adapted to dry climates, such as acacias, can be found here (CBD 2012). The majority of the land in Djibouti is included within the Ethiopian xeric grasslands and shrublands ecoregion as indicated in pink in Figure 3 which is an arid, semi-desert area bordering the Red Sea and the Gulf of Oman. Much of the floral richness that can be found in Djibouti is found only in the small outlying patches of the Ethiopian montane forest. The Eritrean coastal desert ecoregion is found along the northern coastline and is indicated in yellow in Figure 3. This area forms the southern shore of the Bab-el-Mandeb straits which forms the entrance to the Red Sea from the Gulf of Aden. A huge bird migration is found along the shores of Djibouti each fall (Encyclopedia of the Earth 2012, *Djibouti*). It is for this reason that Djibouti was included in the Agreement on the Conservation of African-Eurasian Migratory Waterbirds. Some of the species that can be found here include the Black Stork (*Ciconia nigra*), White Stork (*Ciconia ciconia*), Little Stint (*Calidris minuta*), Kittlitz's Plover (*Charadrius pecuarius*), Common Crane (*Grus Grus*), Lesser Crested Tern (*Sterna bengalensis*), Great Crested Tern (*Sterna bergii*), Greater Flamingo (*Phoenicopterus ruber*), Lesser Flamingo (*Phoenicopterus minor*),

Figure 3. Map of Djibouti's ecoregions



Source: The Encyclopedia of the Earth 2012, *Djibouti*

Great White Pelican (*Pelecanus onocrotalus*), Pied Avocet (*Recurvirostra avosetta*), and Spur-winged Plover (*Vanellus spinosus*) (AEWA 2012).

According to the 2011 State of the World's Forests report, only about 6,000 hectares or less than 1%, of Djibouti's land area is forested (FAO 2011). Many of the forested areas including the Day forest have experienced deforestation due to overgrazing and climate change. The remaining vegetation in Djibouti has been described as limited to poor although dry closed forests with a rich and varied flora can be found in the vicinity of the Goda and Mabla massifs which have a more humid climate due to sea winds. Additionally, patches of mangroves can be found around the Gulf of Aden (Djibouti Nature 2006). Approximately 78% of those living in Djibouti base their livelihoods on agriculture. Consequently, a large portion (56%) of the land is allocated for agricultural activities with much of that being used for pasture (van de Giessen 2011).

Much of Djibouti's natural resources can be found along the coast which comprises a rich marine biodiversity. Djibouti has 370 km of coastal area along with four principal islands. Two well-known areas are the Bay of Ghoubbet which is one of the world's most dependable places to see Whale Sharks and Les îles des Sept Frères Archipelago which is a notable scuba diving site (Lonely Planet 2012). Known marine and terrestrial biodiversity is as follows: 826 species of plants and 1,417 species of animals including 493 invertebrates, 455 fish, 40 reptile, 3 amphibian, 360 bird and 66 mammal species (CDB 2012).

Djibouti's Lake Assal is considered to have the world's largest sea salt reserve. Consequently, at least four concession areas exist around the lake for the extraction of the salt. Unfortunately, many believe that the salt is not being exploited properly which is having a negative impact on the environment in and around the lake (Geographic Environmental Solutions/Cortec 2008).

The ecosystems considered to be threatened include mangroves, wetlands, semi-desert, and marine. The main direct threats to these ecosystems include overgrazing, overfishing, pollution, and firewood collection (van de Giessen 2011). In addition, the beaches and reefs near Djibouti City are threatened as turbidity, litter, and raw sewage pollution was high according to a 2003 report (PERSGA 2003).

C1a. Status and Management of Protected Areas

Two areas of coral reefs found around the islands of Maskali and Moucha, called the Marine Protected Areas of Moucha and Maskali, are designated as protected areas. Moucha Regional Park, to be renamed as above, encompassing 3 km², was designed in 1972 and in 2004 and the Maskali Reserve, totaling 10 km², was designated in 1980 and 2004. Artisanal fishing, defined as fishing using a traditional technique for no longer than one to two days, is the only fishing allowed in these protected areas. Coral and mollusk collection is prohibited (Arab Cultural Trust 2012). Aside from confirming that these continue to be protected areas, further information regarding their status and management was unable to be found. However, African Bird Club (2011) indicates on their website that "Enforcement of conservation and environmental legislation is largely non-existent."

In addition, the 3,000 hectare Haramous-Loyada wetland has been designated as a Ramsar Wetland of International Importance and the GORD declared it as Marine Protected Area in 2004. It provides nesting and is a refuge for approximately 70 waterbird species. (Arab Cultural Trust 2012). Furthermore, there is one wildlife refuge called the Decan Wildlife Refuge. Decan stands for Discover and Aid Nature. It was founded in 2003 with a mission to protect wildlife and to offer an opportunity to learn about nature in Djibouti (Lonely Planet 2012).

In 2004 Djibouti passed a law on protected areas which designated four different terrestrial protected areas: the Day Forest, Mabila Forest, Abbe Lake (which is primarily in Ethiopia), and Assal Lake.

C1b. Threats to Protected Areas

The main threat to protected areas is that due to limited human resources, technical capacities and financing, they are not currently under surveillance. In addition, with regard to the Marine Protected Areas of Moucha and Maskali, the Gulf of Tadjoura suffers from impacts such as maritime transport, port related activities, and other anthropogenic coastal pressures which have caused deterioration (PERSGA 2010). Threats to the Haramous-Loyada wetland include expansion of the port of Djibouti, over-collection of fuelwood, and overgrazing (Arab Cultural Trust 2012).

C2. Status and Protection of Endangered Species

According to the CBD, about 20 terrestrial species are identified as being endangered at a global level. Included in this summary are animals such as the greater spotted eagle, the warthog, and the cheetah. CBD reports that 4 mountain tree species, 2 marine mammals and 4 marine turtles are also considered threatened (CBD 2012). EarthTrends profile of Djibouti from 2003 indicated that the following number of species were threatened with extinction: 2 higher plant species, 4 mammals, 5 breeding birds, an unknown number of reptiles and amphibians, and 1 fish species (EarthTrends 2003). Regarding animals, IUNC's 2011 Red List identifies Djibouti as having 1 as being critically endangered, 10 as being endangered, and 75 as being vulnerable. With regard to plants, IUCN's 2011 Red List identifies 1 plant species as being Endangered and 1 as being Vulnerable (IUCN 2011).

In 2008 the beira antelope (*Dorcatragus magalotis*) was put on IUCN's Red List as being vulnerable. Giotto et al. surmise that one of the main threats to this species is competition for grazing with domestic goats. Additionally, the species was not found in massifs located near villages suggesting that it may be negatively affected by human activities (Giotto et al. 2009). The African wild dog is listed by IUCN as being critically endangered as is the Djibouti francolin due to its prime habitat of juniper tree forests being in decline.

Similar to other topics, the availability of data indicating the current status of endangered species is lacking for Djibouti. There appears to be no formal legislation protecting any of the endangered species.

C3. Status and Protection of Forest Resources

According to BirdLife International, information pertaining to the current status of the Day Forest has proved impossible to trace (BirdLife International 2012). According to their observations in 1998, the upper elevation area of the forest contained mostly juniper. However this forest was in an extremely poor state of health. Fifty-three percent of the junipers were dead with an additional 38% being in a poor state of health. Possible causes could include overgrazing, climate change, firewood collection, and a fungal disease (BirdLife International 2012).

Similarly, the current status of the Mabila Forest has been difficult to find. However, in 1990 Stuart and Adams indicated that the forest had been damaged severely, chiefly through forest fires, the grazing of cattle, the felling of trees, as well as military requirements (Stuart and Adams 1990).

C4. Conservation Outside of Protected Areas

Once again, little information was found regarding conservation outside of protected areas. However, as there is limited oversight and management of the seven (7) Djiboutian protected areas, one would be doubtful that there would be much oversight of other important conservation areas within the country. A report completed for the PERSGA indicated that over-exploitation of marine resources was reported in non-protected areas near the Gulf of Tadjoura near the capital city. Reef destruction was particularly severe and was found to have been caused by fishing nets and boat anchors. There is also a large amount of illegal shark fishing that occurs for the production of fins for east-Asian market. Furthermore, the illegal capture of marine turtles and collection of their eggs is rampant (PERSGA 2010).

Fortunately, the large numbers of donors, multilateral organizations, and NGOs involved in projects and funding to Djibouti should help minimize destruction of important natural resources while increasing the overall environmental health through programs such as those that improve sanitation, improve irrigation, and reduce poverty.

D. MAJOR THREATS TO BIODIVERSITY AND TROPICAL FOREST CONSERVATION

Quite a number of direct and indirect threats are limiting Djibouti's ability to protect and conserve their biodiversity and tropical forests. However, improvement of an indirect threat or root cause could reduce the impacts of a direct threat. For instance, if there was improved institutional and financial capacity, Djibouti could have better systems for waste disposal which would ultimately prevent the degradation of the mangroves, beaches, and oceans.

Overall, according to CBD (2012) threats to biodiversity include degradation of habitat from natural and anthropogenic activities; pollution, competition for resources with domestic livestock; predation by invasive species; overexploitation of resources due to overgrazing and uncontrolled hunting and fishing. A review of the literature found the following specific threats as being reported in Djibouti.

D1. Direct Threats

Direct threats are those that “are the proximate (human) activities or processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity targets (e.g., trawling or logging)” (IUCN-CMP 2006, 1).

D1a. Habitat degradation

In his Environmental Security Assessment, Eric van de Giessen (2011) indicates that 100% of Djibouti's land is degraded mostly due to overgrazing. Overgrazing by pastoralists degrades the land by making it more prone to erosion and desertification. Additionally, Giotto et al. (2009) found that overgrazing by goats may negatively affect the distribution of a wild, native species, the beira antelope.

Similar to many other poverty-stricken countries, deforestation has occurred as Djiboutians often chop down trees for firewood and charcoal as it often replaces expensive cooking gas in many homes (U.S. Department of State 2012). Mangroves are also often cut down for use in housing construction and firewood (PERSGA 2003). This deforestation is often done unsustainably and without replanting. Partially due to a hotter and drier climate due to climate change and partially due to anthropogenic influences previously mentioned, the amount of vegetation is significantly less now than in the past. (USDA/REDSO 2005).

Next, due to increased use of several coastal areas, especially those closest to Djibouti City, degradation of coral reefs was found to be increasing due to anchors and trampling, littering, and souvenir collection (Geographic Environmental Solutions/Cortec 2008). Regarding reefs and beaches, habitat degradation was found to be due to sewage pollution, litter, sedimentation, fishing, souvenir collection, and development (PERSGA 2003).

D1b. Drought and desertification

Djibouti is experiencing its seventh consecutive year of drought along with several other countries in the Horn of Africa. Additionally, it is considered to be a hot spot of desertification with increasing surface runoff, reduction in species diversity and plant biomass, and reduction in the overall productivity of the dryland ecosystems (van de Giessen 2011). The continued drought is contributing to desertification and food insecurity as well as lack of water among other impacts.

D1c. Climate change

The Intergovernmental Panel on Climate Change has forecasted that, in the Horn of Africa, the following will occur in the future: extreme weather events will be more frequent; sea levels will rise; temperatures will rise; average rainfall will increase in the long term; and marine acidification will increase. While increased rain could cause flooding, due to increased extreme weather events, the area could also see increased drought events. With rising sea levels, 60.1% of Djiboutians, who live in low-lying coastal areas, would be impacted. Additionally, tourism could be negatively impacted by rising temperatures. Djibouti is already one of the hottest places on the planet so increasing temperatures could keep tourists away and ultimately negatively affect the economy (van de Giessen 2011). Furthermore, climate change will make it more difficult to find water for human consumption, agriculture, stock-raising, and industry (Republic of Djibouti, MHUEAT 2001).

D1d. Pollution

Djibouti has experienced high levels of air pollution in its capital primarily from vehicle and industrial emissions. Furthermore, poor waste management has caused pollution of surface, marine and ground water, landscape, soil, biota and air (van de Giessen 2011). The first source of pollution in Djibouti, however, is due to sewage and solid waste. The existing sewage network, which was previously designed for the evacuation of rain waters, is contaminated by sewages of both domestic and industrial origins. A majority of the sewage goes into the sea without being treated. Solid wastes that are not disposed of properly are deposited in the wadis' beds ultimately contaminating the groundwater and/or the sea during the rainy season. Oil pollution is also a concern due to the intense maritime traffic. This is a concern not only because of Djibouti's port but also due to Djibouti being at the entrance of the Red Sea (PERSGA n.d.).

D1e. Invasive species

The main plant invasive species found in Djibouti is the *prosopis chilensis* also known as *mesquite*. Found mainly in the desert and semi-desert, it is a very strong shrub or small tree that was introduced by FAO in efforts to combat desertification in several countries including Djibouti. Additionally, it was to be used for energy purposes and fodder. However, the problem is that the plant extracts a lot of water from the soil, impairs the growth of the original vegetation, and prohibits grazing and farming. Furthermore, the spines are poisonous to livestock and people while the pods form balls in the stomach and kill livestock. In Djibouti it has invaded approximately 200 km² (van de Giessen 2011).

Regarding animals, the African Bird Club (2011) reports that the Indian House Crow (*Corvus splendens*) is causing increasing amounts of damage to biological diversity.

D1f. Threats to Marine Turtles

The Eritrean Coast Desert eco region, which includes Obock in Djibouti, is highly threatened by fishing, and illegal trading of turtle eggs (van de Giessen 2011). Furthermore, PERSGA (2010) reports that the illegal capture of marine turtles and collection of their eggs is rampant (PERSGA 2010). This is especially concerning since 4 species of marine turtles are considered threatened.

D2. Indirect Threats

As indicated by IUCN-CMP, indirect threats are “factors with a negative effect usually social, economic, political, institutional, or cultural in nature that enable or otherwise contribute to the occurrence and/or persistence of direct threats. There is typically a chain of underlying causes behind any given direct threat” (IUCN-CMP 2006, 1).

D2a. Political Instability

While Djibouti has a relatively stable government compared to many other African and Middle East countries, there is a sense of instability due to its authoritarian nature, due to it not being a true democracy, and due to its citizens not feeling as though the government is transparent and therefore not believing that they have a say in governmental decisions regarding natural resource allocation. Consequently, citizens may not feel properly represented in the government and may feel powerless. Additionally, much of the population is below the poverty level and highly uneducated. Ultimately, this may cause the majority of the citizens to be unable or unwilling to act when it comes to conservation. Or, they may just not understand the need for it. Furthermore, governments that are instable and who have high unemployment rates and poverty may not have the resources to undertake conservation projects. Lastly, Djibouti has a very small private sector with the number one employer being GORD and the second largest employer being the U.S. government. Consequently many people rely on the government for their livelihoods resulting in them being reluctant to protest against it (Brass 2008).

D2b. Health Issues and Lack of Healthcare

Djibouti has the third highest Tuberculosis prevalence rate in the world and some of the lowest health indicators in the world along with a high rate of malnutrition. The AIDS prevalence rate in adults 2009 was 2.5% and the infant mortality rate is approximately 53.31 deaths/1,000 live births. Twenty-six percent of children under age 5 are underweight (CIA 2012). Furthermore, the health of Somalis in the region is threatened by polio (USAID/Djibouti 2012, *Program Overview*). These threats are in no way helped by the fact that there is just one hospital in the country and eighteen doctors per 100,000 people (Brass 2008).

D2c. Population Growth and Urban Development

The Horn of Africa, including Djibouti, has seen exponential population growth in the past 50 years. While not the highest in the region, Djibouti's population grew from 85,000 in 1960 to 889,000 in 2010 with a current 1.9 annual rate of population change (UN, Department of Economic and Social Affairs, Population Division 2010).

Due to the recent years of drought and the corresponding rural-urban migration, 70.6% of the population of Djibouti now resides in urban areas with the capital now accounting for 58% of the population. This has led to an increase of settlements around the cities putting additional pressure for basic human needs on these areas (UN 2011). Despite production of urban plans, as cities in Djibouti grow, environmental disturbances often occur as the plans are rarely followed. Consequently the following disturbances often occur: coastal erosion; lack of proper services such as sewage and drainage; pollution; and settlements in inundated areas (PERSGA n.d.).

D2d. Poverty, Unemployment, and Lack of Skilled Workforce

In 2007 the percent of the population below the poverty line was 42% while unemployment in urban areas was approximately 60%. In addition, the literacy rate is approximately 67.9% (CIA 2012). Consequently when new workers are needed, such as for different port projects, companies often find that they need to hire skilled and educated labor from outside of the country. According to Brass (2008), Djibouti does not have an established university. Therefore, only a small portion of its citizens receive post-secondary education which must occur abroad. Often this education is funded by government scholarships. Furthermore, since foreign training raises the cost of education, only a small elite population can attain it. Consequently a large amount of the government's education budget goes to financing higher level education for a very small percentage of the population. Moreover, payments of teachers' salaries are often late or delayed ultimately forcing teachers to pursue other careers. In the end, the prospects for higher education for the average Djiboutian remains slim.

D2e. Refugees

Djibouti has long been a haven for refugees from many of its neighbors, particularly Somalia. The years 2010 and 2011 brought a significant influx of refugees from Somalia and Ethiopia which led to further increases of humanitarian needs throughout the country. In September 2011 the total refugee population was up to 20,611. While the existing Ali-Adde camp is essentially at its limit, a new camp in Holl-Holl is under construction, further taxing the resources of this country. There is the expectation that due to continued insecurity and increased conflict in Somalia, another 10,000 refugees could be coming to Djibouti (UN 2011).

D2f. Lack of Human and Financial capacity

As indicated previously, Djibouti has a relatively unskilled and uneducated workforce. Furthermore, there are little financial resources available or dedicated to conservation and protection of natural resources. This results in difficulty in data collection and monitoring of the country's natural resources in addition to limited funding for conservation programs.

D2g. Limited Governmental, Institutional, and Legal Capacity

The limited governmental, institutional, and legal capacity unfortunately results in weak management, oversight, and enforcement of Djibouti's limited number of protected areas. Furthermore, these threats limit the enforcement capacity of Djibouti's environmental laws.

D2h. Limited Number of Protected Areas

While Djibouti does have seven protected areas additional biodiversity and forestation benefits could be gained if more areas were afforded protection. Specifically, since mangrove forests have been found to be particularly threatened yet support a great amount of biodiversity, the protection of additional mangrove forested lands would benefit Djibouti. Some areas to consider would be Ras Siyyan, Îles des Sept Frères, and Godoriya (Geographic Environmental Solutions/Cortec, 2008).

D2i. Food and Water Insecurity

Climate change and the associated consequences of possible frequent flooding and/or prolonged drought will have a destructive effect on livestock and pasture. Additionally, the rising temperatures will only add to the difficulty of raising crops (van de Giessen 2011). Food insecurity, particularly in urban areas, has recently been rising due to high levels of unemployment and a sharp increase in food prices to approximately 80% above the five-year average (UN 2011).

Due to a lack of arable land and difficulty growing crops, the majority of Djibouti's food must come from imports (CIA 2012).

Access to potable water has long been a problem in Djibouti, especially in the rural areas. Just 48% of those living in rural areas in Djibouti had access to treated water in 2012 (CIA 2012). The ongoing drought has made finding potable water even more difficult. For example, in 2011 50 traditional surface and subsurface water sources dried up. At the same time, the water tables in 20 boreholes went down drastically. This lack of water not only is proving difficult for people but it is also severely weakening the livestock that so many rural dwellers depend on for the livelihoods (UN 2011).

E. ACTIONS NECESSARY TO CONSERVE BIODIVERSITY AND TROPICAL FORESTS

Fortunately, much can be done by Djibouti to start making progress to conserve biodiversity and tropical forests. While some suggestions are more costly, others may not be as expensive.

E1. Political Stability

Becoming more democratic and transparent will enable Djibouti's government to gain strength since its citizens will become more empowered. It can also help to motivate stakeholders. Moreover, the media is mostly state-owned and subject to censorship. Releasing this tight grip on the media somewhat will instill further trust into the citizens of Djibouti. While a country that is more empowered could lead to more protests, it would let Djiboutians know that they have a say in their government and hopefully will result in more buy-in by the public on natural resource conservation initiatives in the future. Furthermore, it could help to draw more NGOs and others from the donor community to the country to help with these measures.

E2. Sustainable Land-Use Practices and Habitat Improvement Projects

Several projects could be undertaken to improve the land and habitat in Djibouti. First, major reforestation and afforestation projects should be undertaken in areas previously forested as well as in open or previously cleared areas that could be suitable to growing trees. It would be important to choose native species that are tolerant of heat and drought. This would not only provide trees for carbon sequestration, shade, habitat for wildlife, and perhaps firewood, but it would also help with reducing soil erosion and improving water conservation. Furthermore, by selling carbon credits under the Clean Development Mechanism of the Kyoto Protocol, large-scale tree planting projects that sequester CO₂ could be eligible for financial compensation (van de Giessen 2011).

Another project to consider would be agroforestry. According to the Encyclopedia of the Earth, agroforestry is defined as “the deliberate incorporation of trees and other woody species of plants into other types of agricultural activities.” A benefit of agroforestry is that the use of trees in agriculture makes the areas more like natural ecosystems thus providing more and better habitat for wildlife which can enhance biodiversity (Encyclopedia of the Earth 2011, *Agroforestry*).

These projects could benefit not only the land, but also provide jobs for the unemployed immediately and into the future as these new forests would need to be managed. It would also help in food production thereby improving food security. Due to increased jobs and increased crops, this could become an economic benefit to the country.

Along with reforestation efforts, mangrove restoration would be an important activity as well due to the declining condition of mangroves in Djibouti and the importance that they play in climate change adaptation. Currently the Environment Department is implementing a mangrove conservation project in Khor Angar (northern Djibouti) and Damerjog (southeast Djibouti). This project is aimed at replanting trees in the degraded portion of both mangrove stands and at

teaching pastoralists how to more sustainably use this resource. The project was launched in October 2011 and local communities have been sensitized and invited to participate actively for its success (MHUEAT 2011).

Eliminating overgrazing and employing more sustainable pastoralist techniques that incorporate a trans-boundary or cross-border ecosystem approach will also increase vegetation, reduce erosion, and reduce desertification. This could entail employing a Holistic Management approach where pastoralists are trained on how to maximize the amount of grass grown in wet seasons and how to make it last through dry seasons. It involves having the right animals in the right place at the right time of year (Laikipia Wildlife Forum 2011). According to van de Giessen (2011) the entire Horn of Africa region could benefit by the creation of corridors to facilitate the movement of stock by pastoralists and securing access to water and grazing lands. Land use planning techniques would need to be employed and could become an important peace-building tool by getting several different countries working on a regional problem. Additionally, van de Giessen believes that involving the donor community would benefit the region by helping to develop long-term regional outlooks and opportunities. Ultimately, the region could be managed on a more ecosystem-wide scale.

E3. Increase Size and Number of Protected Areas

Djibouti has a small number and area of protected areas with the total area encompassing approximately 0.5% of the country's total land. In comparison, on average, worldwide other countries have protected approximately 10% of their land. One way to address this would be for Djibouti to designate more land for conservation and have it legally protected. Djibouti has reinstated Forêt du Day as a terrestrial protected area in 2004 (République de Djibouti, 2004) which reassured its citizens and the world of their commitment to conserve biodiversity.

Another idea would be the creation of wildlife refuges, especially those that work to protecting endangered species such as the beira antelope. Not only would this help to protect this species but it may also create an ecotourism opportunity (Giotto 2009). In addition, the CBD (2012) recommends that some protected areas ban all human activities to enable them to become wildlife refuges for many different species. They also indicate that in 2000 they identified several new areas or zones that should become protected since they are home to rare plants and animal species. Furthermore, BirdLife International has identified several Important Bird Areas (IBAs) whose protection should be considered (BirdLife International 2009).

However, in order for expanded protection of important conservation areas to be successful, improvement in the management of these areas and increased enforcement along with effective statutory powers will be necessary. While it would be useful in some areas to have total protection and perhaps a lack of human activities, it would also be useful to designate other conservation areas that allow multi-use. In such a situation, Djibouti could borrow some of the principles from the U.S. Forest Service to find a balanced approach for more sustainable use of these important areas.

E4. Climate Change Adaptation and Mitigation Measures

As early as 2001, in its document entitled “First national communication of the Republic of Djibouti to the United Nations Framework Convention on Climate Change” the Republic of Djibouti’s MHUEAT acknowledged that their country was going to be affected by climate change and should put together an adaptation strategy. The document also indicated that while the level of greenhouse gas emissions for Djibouti was relatively low, they would develop a policy geared toward greenhouse gas reduction, especially in the areas of energy production, transport, and housing. Some of these measures included completion of hydrogeological studies of Djibouti’s aquifers so that the additional information would enable them to better protect and manage them. The Republic indicated that they would further study finding facilities to collect surface water, ways to artificially replenish the groundwater table, underground dams, and water recycling systems. Some additional adaptation measures that the study suggested are as follows: coastal protection; strengthening of rock rubble breakwaters on the marine coastline; development of the Ambouli wadi; reforestation of dunes; banking up the walls of landfills; installing a drainage system for rainwater; and implementing regulatory and institutional measures. Furthermore, the study concluded that the state of coastal, marine and land ecosystems in particular mangroves, coral, fauna, and forested areas were at that time determined to be in a fragile and vulnerable state. Consequently, the study proposed the following measures: creation of a national network of protected areas; putting in place a follow-up program for ecosystems; examination of the vulnerability of ecosystems; establishment of an integrated development program for the Day Forest; and conduct of institutional measures (MHUEAT 2001). Unfortunately, research did not indicate with certainty that any these measures were implemented.

According to the 3rd African Drought Adaptation Forum Report (2008), drought risk management will be necessary for drought prone countries as climate change increases so that these countries can be better prepared. Their recommended adaptation measures include the following:

- Expanding efforts to promote rainwater harvesting and improved soil management techniques that decrease soil erosion and increase soil water holding capacity
- Improved weed management
- Adoption of cultivars or crops that are more drought or heat tolerant
- Integration of multi-purpose agroforestry and legume green manure species into croplands
- Tailoring of fertilization recommendations to high-risk environments

(UN International Strategy for Disaster Reduction, UNDP Drylands Development Centre, and UN Economic Commission for Africa 2008).

E5. Infrastructure Development and Improvement

As previously mentioned, the first source of pollution in Djibouti is sewage and solid waste. The existing sewage network is not able to handle the waste. Unfortunately, the majority of the sewage goes into the sea without being treated (PERSGA n.d.). Therefore, improved sanitation and sewage treatment is one of the most important steps the Government of Djibouti should take

especially since pollution is leaking into the ground further degrading the groundwater and is being dumped into the sea which would negatively impact the vulnerable coral reefs, mangroves, and fisheries. As the urban areas of Djibouti expand and see population growth, urban planning to ensure livable, sustainable communities will be needed (CBD 2012).

E6. Combat Invasive Species

Prosopis chilensis, also known as *mesquite*, poses a serious environmental threat in desert and semi-desert areas in Djibouti. It has affected approximately 200 km² of land thus far. Efforts should be made to eradicate this destructive species as it can severely degrade the soil and ecosystem in which it grows in addition to it being harmful to both humans and animals. While eradication may prove difficult to impossible, mitigation measures to ensure that it can no longer spread must be implemented.

E7. Improvement of Governmental, Institutional, and Legal Capacity

By having a more stable government, enforcement of environmental laws should become more consistent. Strengthening the nation's capacity for disaster response and integrating environmental considerations into emergency aid and recovery programs will be important to biodiversity conservation. This will aid in reducing the negative environmental impacts of disasters. This can also be incorporated into refugee camp situations.

Furthermore, the government needs to take a more active role in surveillance of its protected areas and needs to have more staff available for enforcement in these important conservation areas. As marine pollution is also a threat, the government will need to take a more active role in monitoring this as well (CBD 2012).

E8. Education

There remains a great need for a variety of educational programs in order to conserve biodiversity and tropical forests. First and foremost, the nation as a whole appears to have a need to better understand the importance of environmental conservation. In general, the population is not well educated and a basic understanding of ecosystems, climate change, and the importance of biodiversity would go a long way. Secondly, there is little opportunity for Djiboutians to receive higher education in the country and even less of an opportunity to learn extensively about natural resources. The development of a university level natural resources program would enable Djiboutians to learn how to be environmental managers and consequently increase the capacity of the country to conserve their natural resources. Additionally visitor management guidelines and educational materials could be developed for sensitive but well used areas to help better protect them.

E9. Incorporate and Increase Opportunities for Trans-Boundary and Cross- Border Ecosystem-Wide Approaches

As previously mentioned, Djibouti and the entire Horn of Africa area as well as other African nations could see great benefits from sharing information, coordinating efforts, and employing

more of an ecosystem-wide approach for management of natural resources. There is a great need for this since Africa is a continent fragmented by national boundaries, languages and cultural boundaries. Consequently, there is often a duplication of efforts and missed opportunities. Therefore, networking and employing trans-boundary and cross-border approaches would be invaluable (UN International Strategy for Disaster Reduction, UNDP Drylands Development Centre, and UN Economic Commission for Africa 2008).

Many of the ecosystems in which pastoralists need to move are often located in more than one country and within cross-border ecosystems. When created in colonial times, national borders often divided well-established pastoral economic and social units. Consequently, pastoralists in Djibouti may be part of one ecosystem along with Somali, NE Kenya, and eastern Ethiopia or part of another ecosystem that encompasses parts of north-east and east Ethiopia and south-east Eritrea (Common Market for Eastern and Southern Africa, Comprehensive African Agriculture Development Programme 2009). According to the Humanitarian Policy Group, “Cross-border activities include the joint management and sharing of grazing land and water, the opportunistic use of natural resources through seasonal cross-border mobility, the sharing of information on rainfall, pasture, water availability, and livestock prices, and the trading of livestock and other commodities” (Humanitarian Policy Group 2010). A cross-border approach would work especially well for pastoralists as it enables them to manage and mitigate drought and other risks. This approach could also aid in improving food security during times of disaster.

According to the Common Market for Eastern and Southern Africa, Comprehensive African Agriculture Development Programme (2009) pastoral land tenure policy should focus on:

- Recognition and protection of the rangelands as communal areas under controlled access management systems;
- Protecting pastoral resources from alienation or encroachment, particularly strategic resources (dry season water, dry season grazing, livestock corridors, etc.);
- Ensuring flexible tenure arrangements that focuses on rights of access and control rather than ownership and which accommodate multiple use and overlapping rights of access;
- Secure mobility within and between different ecological zones and cross-border if necessary;
- Conflict management through mediation, negotiation, and consensus.

Beyond incorporating a cross-boundary approach for pastoralism, in order to avoid depletion of resources that are transboundary, cross-boundary regional agreements could be developed so that these resources are more sustainably managed, regulated, and conserved. Such agreements would work toward enhancing or maintaining ecosystem function and biodiversity conservation. Many countries in the IGAD region have formulated National Biodiversity Strategy and Action Plans that can be used to share biodiversity information and programs (InterGovernmental Authority on Development 2007).

E10. Increased NGO Presence and Assistance

While there are several NGOs with somewhat of a presence in Djibouti, their presence is limited. Efforts should be made by the MHUEAT and perhaps by PERSGA to increase NGO interest and

support in Djibouti and engage them to become more active in environmental education and community conservation (USAID/REDSO 2005). More specifically, projects that can improve habitat while creating opportunities for new employment would go a long way in terms of increasing biodiversity, reducing poverty, reducing unemployment, and improving capacity.

E11. Enhance Food and Water Security

Rather than continually providing aid in the way of food donations, some of the countries involved in these projects could also use some of their funding to teach agroforestry and other sustainable farming practices. Learning rain harvesting techniques, obtaining additional cisterns and water storage tanks, and learning more sustainable irrigation techniques could help to increase water security. Furthermore, van de Giessen (2011) believes that countries in the Horn of Africa should prepare ahead of time for recurrent hazards such as droughts and diseases by drafting and implementing strategies to boost resilience to disasters.

F. IDEAS FOR SUSTAINABLE DEVELOPMENT

F1. Ecotourism

Despite the various threats to biodiversity and tropical forestation, Djibouti has some beautiful and ecologically important areas that could be tapped for ecotourism. Some locations would be the Day Forest, the Moucha Regional Park and the Maskali Reserve along with some other coastal areas such as Les îles des Sept Frères Archipelago which is a notable scuba diving site, and Lake Assal (Geographic Environmental Solutions/Cortec 2008). Care would need to be taken to ensure that infrastructure built to support tourism is done in a sustainable manner, using local products and labor. In addition, limits to the number of tourists and types of activities would be helpful to ensure that the areas are not overly impacted.

F2. Renewable Energy Production

Electricity in Djibouti is very costly. In addition, the current grids are inadequate. Fortunately, Djibouti has several different types of renewable energy options available. Just south of Lake Assal is the Assal Geothermal Power Project (Geographic Environmental Solutions/Cortec 2008). The Great Rift Valley in Djibouti as well as in Kenya, Ethiopia, Uganda, and Eritrea offers significant opportunities for geothermal energy production (van de Giessen 2011). As this area straddles several national boundaries, as discussed previously, a cross-boundary agreement would need to be developed to utilize this resource.

Wind energy is another possible energy source that could be developed. There is potential at one location near Lake Assal and another about 500 m. from the lake (Geographic Environmental Solutions/Cortec 2008). However, any wind energy project must ensure that there will not be any negative impacts to the environment in general and more specifically to migrating birds and bats.

Solar energy production is another possible source of energy in Djibouti due to the area's regular solar radiation throughout the year. Schools, homes and drilling rigs have recently received solar photovoltaic panels through the Agence Djiboutienne Social Development (ADDS). The National Investment Promotion Agency (NIPA) states that the potential for solar is immense in Djibouti since solar radiation is as high as 3,500 hours per year, which is one of the highest in the world. Yet there was great ignorance about this technology on the part of potential users and decision makers due to the absence of communication and technology. Ultimately, a plan entitled "Shock 10" was developed to expand the scope and extent of solar energy use in Djibouti (National Investment Promotion Agency 2012).

F3. Expansion of Fishing Sector

Djibouti has a potential to sustainably develop its fishing industry. While it is estimated that Djibouti could sustainably take 48,000 tons/year for the fishing industry, Brass (2008) reports that for the past 40 years only about 350 tons/year of fish has been taken on average. However, increasing this sector would add not only to Djibouti's food security concern but also help to

decrease unemployment and poverty. However, the industry is not well developed and fishermen's salaries are quite low leaving little incentive for people to work in the field. Furthermore, regulations are out-of-date and inspection and certification of fish must first go to Dubai. Despite being given seed money totaling \$11 million from the African Development Bank to modernize the port of Djibouti, the project took so long to complete that by the time it opened in 1999 physical regulations required by the European Union could no longer be met.

F4. Increase Livestock Production

Brass (2008) also suggests the expansion of livestock production since so many within the rural population are already experienced in this area. The challenge would be to do so sustainably in a manner that does not further degrade the resources. The government would need to support and aid these pastoralists financially in order to accomplish this goal. This too would aid in increasing food security.

G. CONCLUSIONS

Despite having 90% of its land classified as desert, Djibouti still has some valuable natural resources that need to be conserved not only for the sake of the species being threatened but also to help the country work toward a more sustainable future. CDB reports that Djibouti's biodiversity includes an impressive amount of various species despite its torrid and dry climate including 826 species of plants and 1,417 species of animals. And while Djibouti faces many threats to its biodiversity and various internal challenges, there remain many opportunities for improvement.

Overall Djibouti's government has put forth a good effort toward conserving biodiversity and tropical forests in terms of it being a party to so many national treaties and conferences. However well-intentioned the GORD may be, due to lack of human, financial, and technical capacities intended conservation projects often do not get fully implemented in the field. The reasons for some projects not being fully implemented at times may not be within the control of the government as they often are facing many obstacles such as consecutive years of drought, food and water insecurity, an influx of refugees, disease, and lack of arable land. However, many foreign countries and multi-lateral organizations have provided aid for many years due to the strategic importance of this country. U.S. foreign assistance has been consistently provided since 1978 and has primarily focused on Peace and Security, Investing in People, and Humanitarian Assistance. In order to ensure that biodiversity does not continue to decline it may be time to consider giving aid toward projects that will protect and enhance the environment. Furthermore, recently there has been encouraging news of Djibouti becoming more involved in conservation projects such as hosting an international conference on wildlife preservation in March 2012, signing an agreement with Japan to install underground water tanks, and an agreement with the European Union to develop a sustainable sanitation program.

Future programs should be those that both provide economic benefits and protect or enhance the environment. In addition, programs that allow for sustainable use of natural resources along with mixed uses in certain conservation areas should be considered. These could include the various suggestions for improving habitat such as reforestation and afforestation projects, agroforestry, and mangrove restoration. Increasing the size and number of protected areas and then developing an ecotourism industry around these areas would also be a way to see an economic benefit while simultaneously working to protect the ecosystem. Expanding Djibouti's renewable energy sector may be one of the more untapped areas especially when it comes to solar energy since they have an impressive amount of solar radiation.

As discussed in the 2005 Djibouti Environmental Analysis, if Djibouti is not afforded biodiversity conservation funding from USAID at the very least it will be critical to ensure that they continue to commit to an integrated approach to their USAID programs that takes into account the environment in general and biodiversity conservation more specifically.

Djibouti has many obstacles and challenges yet many opportunities. They are fortunate that due to their geo-strategic location many international countries have a stake in their success as a country and are willing to donate money to their development.

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