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118/119 BIODIVERSITY AND TROPICAL FOREST ASSESSMENT FOR CHAD



May 2011

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COVER PHOTO: Elephant Drinking at Sunset, Zakouma National Park, Chad.
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ACRONYMS

ACORD	Agency for Co-operation and Research in Development
ACTED	Agency for Technical Cooperation and Development
AEN	L'Association des Eleveurs et des Nomades
AFD	Agence Française de Développement
AFDB	African Development Bank
APROCOFF	Association for the Protection and Conservation of Fauna and Flora
BELACD	Le bureau d'études, de liaison des actions caritatives et de développement
CBD	Convention on Biological Diversity
CBFP	Congo Basin Forest Partnership
CBJ	Congressional Budget Justification
CFC	Chlorofluorocarbon
CMS	Convention on Migratory Species
COMIFAC	Central Africa Forests Commission
CPPAWA	Climate proofing protected areas in West Africa
CRS	Catholic Relief Services
CURESS	Conservation et Utilisation Rationnelle des Ecosystèmes Sahélo-Soudanais
DFPE	la Direction des Forêts et de la Protection de l'Environnement
DPA	la Direction des Pêches et de l'Aquaculture
DPPFN	la Direction de la Protection de la Faune et des Parcs Nationaux
ECCAS	Economic Community of Central African States
ERAIFT	Ecole régionale post-universitaire d'aménagement et de gestion intégrés des forêts et territoires tropicaux
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic product
GEF	Global Environment Facility
GMV	La Grande Muraille Verte (Great Green Wall)

GOC	Government of Chad
GTZ	Gesellschaft für Technische Zusammenarbeit
HCNE	le Haut Comité National pour l'Environnement
IDP	Internally displaced person
ICRC	International Committee of the Red Cross
IUCN	International Union for the Conservation of Nature
LCBC	Lake Chad Basin Commission
LCU	Lion Conservation Unit
MEE	Le Ministère de l'Environnement et de l'Eau (Ministry of Environment and Water)
NGO	Nongovernmental organization
ONDR	l'Office National de Développement Rural (The National Office for Rural Development)
PAPACO	Programme Aires Protégées d'Afrique du Centre et de l'Ouest
RAPAC	Réseau des Aires Protégées d'Afrique Centrale
SDC	Swiss Agency for Development and Cooperation
SECADEV	Secours Catholique et Développement
SODELAC	Société pour le Développement du Lac (Lake Chad Development Company)
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USG	U.S. Government
WCPA	World Commission on Protected Areas
WCS	Wildlife Conservation Society
WVI	World Vision International

EXECUTIVE SUMMARY

The following 118/119 Biodiversity and Tropical Forest Assessment for Chad is the result of short-term desk research based primarily on readily available materials from the Internet and communications with U.S. Government (USG) and nongovernmental organization (NGO) staff working on initiatives for Chad. To date, no previous 118/119 assessment has been conducted for Chad.

Chad is one of the world's poorest countries, and its greatly reduced diversity is the result of increasing aridity, population increase, resource exploitation and the near-constant state of warfare for more than 40 years. The inability to enforce environmental laws, develop effective government institutions, and provide basic services for its population is strongly tied to the need to devote limited resources to fending off foreign and national groups aimed at overthrowing the government. Unless stability is established, it is difficult to envision how the country will be able to conserve its natural resources.

If current trends continue, the environmental future for Chad is bleak. Natural forest area continues to be lost to desertification and an increasing population's need for agricultural production. The loss of forest area reduces Chad's ability to maintain its biodiversity, due to reduced available habitat and habitat connectivity. Chad's biological diversity is also threatened by the killing and commercial trade of wildlife to supply meat and by increasing human-wildlife conflicts, as more land is occupied in and around protected areas.

Uncoordinated management of scarce water resources is a critical concern, particularly in reference to the dramatic receding of Lake Chad over the last 50 years. A major challenge for the Lake Chad Basin Commission is facilitating a multi-state agreement to sustainably manage the vast but dwindling water resources. Currently there are no agreements among members on the amount of agriculture and irrigation activities that can be undertaken around the lake, nor are there mechanisms for sustainable fisheries management.

Chad's population is increasing and exerting considerable influence on natural resource abundance and quality in the pursuit of fundamental food and water needs. In addition, large numbers of refugees and internally displaced persons exacerbate this situation in the east and south of the country. The reduced land base results in increasing conflicts between settled farmers and migratory herders. These conflicts increase during the drought years that frequently occur. Moreover, the development of boreholes has reduced the migratory herding practices and has locally reduced range productivity.

In response to these challenges, Chad's National Biodiversity Strategy and Action Plan identified the following steps to conserve biological diversity:

- Improved knowledge and monitoring of biological diversity
- A current inventory of ecosystems and threatened species, and reduced illegal acts in and around protected areas
- Increased use of substitution resources
- Adoption of techniques that will result in greater sustainability of natural resources
- Promotion of more equitable sharing of natural resources

Over the past two years, the Government of Chad (GOC) has made significant efforts to address the countries' myriad environmental challenges. For instance, the GOC has developed a comprehensive climate change adaptation plan, with assistance from the Global Environment Facility (GEF). The GOC has also

established large tree nurseries that it plans to use to create “green belts” of planted trees around the cities of N’Djamena and Abeche, and the program may later be implemented in other cities. The GOC has banned charcoal production and the cutting of live trees, in an effort to curb the use of household fuel wood use and stem deforestation; the long-term sustainability of this ban will depend on the availability of sufficient quantities of alternative household fuels throughout the country, especially outside of N’Djamena and in Southern Chad. The GOC has made some investments in developing and commercializing the use of more fuel-efficient cookstoves, but thus far, these efforts have not progressed beyond pilot projects affecting at most a few hundred households. Likewise, Ndjamenana has banned the use of plastic bags at stores and markets, and local consumers appear to have quickly adapted to using reusable bags for shopping and transportation of goods.

In addition to these recommendations, the following suggestions are offered as specific USAID programming is considered and planned:

- Promote the development of water management agreement(s) in the Lake Chad Basin.
- Ensure that environmental assessments are conducted as a routine component of any new program and implementing partner activity. Ensure that agricultural projects encourage sustainable management practices.
- Concentrate on empowering civil society organizations that work with local management of natural resources.
- When working with rural communities, focus on those living near or in biologically diverse and protected areas. Promote and encourage better natural resource management practices, as well as increase community involvement.
- Incorporate sustainable development techniques into humanitarian efforts for refugees and internally displaced persons (IDPs).
- Look for projects that have the potential for cross-cutting programming, such as incorporating environmental awareness into health and education activities. Work with other development organizations who are concentrating on issues other than the environment.
- Participate in the planning for expenditures of oil revenue that will benefit tropical forest and biological diversity conservation.
- In USAID activities to promote and protect tropical forests and biodiversity in nearby countries, consider programs at a regional scale and incorporate Chadian agencies and NGOs wherever possible.
- Given the increasing attention of riparian states and development partners on Lake Chad, consider: (1) discrete small-scale engagements focused on promoting scientific and academic exchanges aimed at finding evidence-based solutions to sustainable water resource management in the Lake Chad Basin; and/or (2) small-scale pilot projects focused on wetland restoration or improved agricultural practices in the basin.

I. INTRODUCTION

The Republic of Chad, in north central Africa, is bounded on the north by Libya, on the east by Sudan, on the south by the Central African Republic, and on the west by Cameroon, Nigeria, and Niger. Chad has an area of 1,284,000 km² and lies between latitudes 8° and 24° N and longitudes 14° and 24° E, stretching 1,700 km from north to south. Slightly larger than three times the size of California, Chad is the 21st largest country in the world. A landlocked country, Chad is separated from its nearest port, Doula, Cameroon by 1,500 km.

Chad's terrain is dominated by the low-lying Chad Basin (elevation about 250 m), which rises gradually to mountains and plateaus on the north, east, and south. In the east, heights of more than 900 m are attained in the Ennedi and Ouaddaï plateaus. The greatest elevations are in the Tibesti massif in the north, with a maximum height of 3,415 m at Emi Koussi. The northern half of the republic lies in the Sahara and is rocky, arid desert. A flat stretch of savannah in central Chad separates the vast desert in the north from a small, fertile region in the south. The only large rivers, the Logone and Chari, are in the southwest and flow into Lake Chad.

Chad is 1,500 km from its Nearest Port



Source: www.lib.utexas.edu

I.1 ENVIRONMENTAL AND NATURAL RESOURCE MANAGEMENT CONTEXT

Environmental productivity is limited by rainfall, which ranges from less than 100 mm annually in the northern third of the country to 1,000 mm in the south. Considerable inter-annual differences in precipitation occur in all areas. Even in relatively moist southern areas, low rainfall in one of every three years results in reduced productivity. The West African Sahara, the Sahel, and the Sudanian Forest ecological zones are all represented in Chad. Forests cover 11,921,000 hectares, about nine percent of the country.¹ More than 50 percent of Chad is desert and an additional 30 percent is highly or extremely vulnerable to desertification.

The population reported in Chad's second demographic census from 2009 is 11.2 million, growing at an annual rate of 3.6 percent (3.5 percent without counting refugees). Other recent analyses suggest a population of 10.5 million growing at an annual rate of 2.04 percent.² Population density increases with rainfall, ranging from 0.12 people per square kilometer in the Sahara to 22.4 per square kilometer in the southern Sudanian zone. Population density is rising in the southern half of the country due to the population growth rate and immigration from other regions experiencing desertification and land degradation.

I.1.1 ECONOMIC ENVIRONMENT

Chad ranked near the bottom of France's priorities among its colonies. Economic development was largely limited to southern areas to develop cotton export. A border agreement with Italy regarding the location of

¹ FAO, Global Forest Resources Assessment 2005: <http://www.fao.org/forestry/country/32185/en/tcd/>

² CIA World Fact Book, 2010 estimate: <https://www.cia.gov/library/publications/the-world-factbook/geos/cd.html>

the Chad/Libya border was neither ratified nor implemented, and contributed to military conflict between Chad and Libya after independence.

Since independence, armed conflicts and political instability have prevented the development of institutions necessary for economic development. As a result, Chad relies on foreign assistance and foreign capital for public and private sector investment. Chad continues to be ranked as one of the most corrupt countries in the world.³ Armed rebel groups fighting government forces and refugees from the Darfur conflict continue to hamper economic development.

More than 80 percent of the population relies on subsistence farming and livestock-raising. Until oil production began in 2003, cotton, cattle, and gum arabic provided most of Chad's export earnings. Its economy has long been handicapped by its landlocked position, high energy costs, harsh environmental conditions, and political instability.

Chad's economy is currently dominated by exploitation of its oil resources, which generated an income of \$1.9 billion in 2008.⁴ Agriculture is now of secondary importance to the economy, with cotton and livestock accounting for the two most valuable agricultural exports in 2007.⁵ One mine and one placer deposit are exploited in Chad. Undeveloped minerals include gold, bauxite, uranium, silver, and alluvial diamonds.⁶

Chad's infrastructure is limited, resulting in high costs to market goods. There is no railway system, and only 1,600 km of paved road. Roads are often impassable in the rainy season. The landlocked country's nearest route to the sea is through the Benoue River in Cameroon.

Beginning in 2000, investment in oil exploration increased Chad's gross domestic product (GDP). Chad's GDP of \$16.3 billion in 2009 is double that of 2000.⁷ Chad's economy has experienced strong growth since 2004, due to the oil industry. Oil production began in 2003, which led to growth in the trade, transportation, and public service sectors. The World Bank and the GOC signed a memorandum of understanding in 2006 under which Chad committed 70 percent of its budgetary spending to priority poverty reduction programs. Due to rebel attacks on the capitol of N'Djamena, President Deby issued a "state of emergency," placing oil revenue funds into his direct command. Additional rebel attacks led the World Bank to close its offices in February 2008, and an oil pipeline project was officially suspended in September 2008 following World Bank accusations that oil profits were not going toward poverty reduction efforts, as outlined in the initial agreement. In January 2009, the World Bank partially reopened its office in Chad, noting that it would only be involved in development assistance programs, and not play a role in the oil sector. Although the community of international donor and multilateral organizations universally recommend saving oil-generated revenues until capacity in Chad's infrastructure, human capital, institutions, and governance can be improved, oil revenue may continue to be wasted and cause inflation. Oil supplies are declining – down from 177,000 barrels/day in 2005 to 120,000 barrels/day in 2009 – and Chad's oil reserves are limited, even when considering new fields under development.⁸ As a result, oil revenues are expected to be minimal after 2020 and have an expected life of 25-30 years. A critical challenge for the country and its decision-makers will therefore be to gradually reduce the dependence on oil and reduce the non-oil primary deficit.

I. I. I. SOCIAL CLIMATE

Chad is among the 10 poorest countries of the world, ranking 175 out of 182 countries in the United Nation's 2009 Human Development Index. Approximately 62 percent of Chad's population lives below the poverty

³ Transparency International: http://www.transparency.org/policy_research/surveys_indices/cpi/2009

⁴ USGS, The Mineral Industry of Chad, 2008: <http://minerals.usgs.gov/minerals/pubs/country/2008/myb3-2008-cd.pdf>

⁵ FAO, 2007 data: <http://faostat.fao.org/>

⁶ MBendi Information Services: <http://www.mbendi.com/indy/ming/af/ch/p0005.htm#5>

⁷ CIA World Fact Book, 2010 estimate: <https://www.cia.gov/library/publications/the-world-factbook/geos/cd.html>

⁸ World Bank Country Brief: <http://go.worldbank.org/8U4COBBZG0>

threshold, living on less than \$ 1.25 per day, and only 48 percent of the population has access to improved water supplies. Compared to most sub-Saharan countries, children in Chad spend less time in school, and the literacy discrepancy between sexes is greater. The inadequately educated work force is also in poor health, with a lower life expectancy than most sub-Saharan countries.⁹ Although environmental protection is identified as a priority in Chad's National Poverty Reduction Strategy Paper,¹⁰ most of the population is unable to meet basic needs. As a result, environmental degradation continues, leading to poor management of water resources, declining soil fertility, and loss of habitat due to expansion of the human population.

Although urbanization is increasing, more than three-quarters of the population remains in rural areas. Most of Chad's population lives in the southern half of the Sahelian Acacia savanna and the western half of the eastern Sudanian savanna. Most farming is rain-fed, hand-harvested, and done without improved seed, fertilizers, and other agrochemicals. Flood-recession farming of berbere occurs in river floodplains. Soil water limits agricultural production. Cotton is the most important cash crop, and rice may be a locally important cash crop. About 25 percent of the country is cultivated and 50 percent grazed. Due to intensifying land use, conflicts between pastoralists and agricultural interests have increased. Open access land use policies, land use conflicts, and unplanned development are affecting conservation of natural resources.

Chadian society continues to be affected in the east by the presence of approximately 270,000 refugees from Darfur and in the south, 57,000 refugees from the Central African Republic; there is also a total of 190,000 internally displaced persons.¹¹ The presence of refugees and IDPs contributes to the strain on natural resources, including water, pasture, and arable land.

The oil development project extracts and carries oil from the Doba basin in southern Chad to facilities off the coast of Cameroon. Petroleum production is expected to last about 25 years. The project has occupied almost twice as much land as originally anticipated, resulting in the loss of livelihoods for 600 families. A 2009 assessment of the Chad-Cameroon Pipeline Project by the International Advisory Group reported favorably on the progress of the Land Use Mitigation Action Plan, which is intended to address the pipeline's impact on local residents as well as natural resources.¹²

Fish is a major source of protein in several areas and is important to the food security of urban centers. About 100,000 tons of fish are caught in Chad annually, but the amount varies depending on rainfall and the area inundated by the Chari and Logone rivers. Most fishing is done with gill nets and long lines from canoes. About 300,000 people earn revenue from fishing, but aquaculture is rarely practiced. Official systems of regulating fishing are complicated and haphazardly enforced. In the Lake Chad Basin, there are no mechanisms for sustainable fisheries management, and the estimated amount of annual fish catch from the lake has dramatically declined over the last 45 years.

I.2. CURRENT USG PROGRAMMING EFFORTS IN CHAD

Since the 1995 closure of the USAID mission, significant amounts of foreign assistance resources for community development, environmental protection, and the promotion of democracy have been provided by U.S. Departments of State, Agriculture, Treasury, and Interior. Chad has received funding from the African Elephant Conservation Fund, which was established by the 1988 African Elephant Conservation Act to help protect, conserve, and manage African elephants.

⁹ UNDP 2009 Human Development Report: <http://hdr.undp.org/en/reports/>

¹⁰ World Bank: <http://go.worldbank.org/GRI2GGHBO0>

¹¹ UN High Commissioner for Refugees, 2010 Chad profile: <http://www.unhcr.org/cgi-bin/texis/vtx/page?page=49e45c226>

¹² International Advisory Group: http://siteresources.worldbank.org/INTCHADCAMPIPE/Resources/IG_Mission_Chad-Cameroon_Jan09.pdf

U.S. foreign policy priorities in Chad include addressing the humanitarian emergency in eastern Chad resulting from the Darfur crisis and restoring regional security essential to resolving that crisis; promoting a stronger and more legitimate polity by implementing electoral reform to ensure credible democratic elections in 2010 and 2011; and strengthening Chad's capacity to deal with terrorist threats and the potential for intolerance and extremism.

In 2006, the U.S. Government provided \$87.7 million in assistance to Chad; all but \$13 million was for humanitarian assistance. With the FY 2011 Congressional Budget Justification (CBJ), the USG proposes total continued assistance of \$7.38 million to support several objectives:

- *\$780,000 in peace and security.* Under the Peace and Security Objective, the key changes sought include improvements in the behavior and societal role of Chadian military and security services, an enhanced capacity to combat rising criminality along the eastern border and counter terrorist threats, a reduction in conflict between the Government and opposition groups, an increase in youth opportunities, and improved community governance.
- *\$600,000 in governing justly and democratically.* The United States is working with bilateral and multilateral partners to support Chad's democratic process to reform the manner in which elections are conducted, leading to legislative and municipal elections in 2010 and presidential elections in 2011.
- *\$3 million in investing in people.* Resources will be directed toward alleviating poverty and improving health care, including in areas such as maternal and infant health and nutrition and disease prevention through improved hygiene and access to clean water.
- *\$3 million in economic growth.* Funding will help to address the risk factor associated with rain-fed agriculture in Chad's semi-arid desert region by tapping into water resources through impoundment and diversion of runoff; digging of garden wells for vegetable production during the off-season; and the use of improved agricultural technologies such as animal traction, improved seeds, mixed cropping, organic fertilizer, and post-harvest storage.
- *\$660,000 in budget and planning performance.*

I.3 BACKGROUND ON USAID ACTIVITIES IN CHAD

The American embassy in N'Djamena was established when Chad gained independence from France in 1960, was closed 1980-81 during fighting, and re-opened 1982. USAID resumed activities in Sept 1983. Since 1995, Chad has been a non-presence country, where USAID has minimal involvement. The West Africa Regional Program Mission in Ghana manages USAID activities in Chad.

Before permanently closing its Chad mission in 1995 because of declining funds and security concerns, USAID's development program in Chad concentrated on the agricultural, health, and infrastructure sectors. It also included projects in road repair and maintenance, maternal and child health, famine early warning systems, and agricultural marketing. A number of American voluntary agencies (notably AFRICARE and VITA) continue to operate in Chad. Peace Corps has traditionally had a large presence in Chad, with volunteers arriving during the postwar period in September 1987, and then withdrawing in 1998. Peace Corps operations resumed in September 2003, with a group of 20 new volunteers. The second class of 17 volunteers arrived in September 2004. Both groups focused on teaching English; expansion into other areas was planned for 2005. Currently the Peace Corps presence in Chad is inactive.

I.4 RATIONALE FOR A 118/119 ASSESSMENT IN CHAD

ADS 201.3.9.2 (Environmental Analysis – Biodiversity and Tropical Forests) contains the environmental requirements of USAID country strategic plans. These requirements were derived from the Foreign Assistance Act and 22 CFR 216, which set forth the guidelines for the performance of Section 117 (environmental sustainability), Sections 118 and 119 (tropical forestry and biological diversity, respectively),

and 22 CFR 216 (agency environmental procedures). Sections 118 and 119 assessments are required by law for all USAID country strategic plans, and they are conducted or updated before development of new strategic plans.

Sections 118 and 119 specifically require that USAID country plans include: 1) an analysis of the actions necessary in that country to conserve biological diversity of tropical forests as well as freshwater and marine resources, and 2) the extent to which current or proposed USAID actions meet those needs.

These assessments identify biodiversity and forestry assets in the country, review threats, discuss the impact of planned USAID activities, and identify actions within current and future programs where USAID could promote conservation. More than a legal requirement, a current 118/119 analysis can provide important advice to help guide proposed programs toward a more sustainable use of the country's renewable natural resources. To date, USAID has not conducted or commissioned a 118 or 119 assessment for Chad, and this combined 118/119 assessment was developed to fulfill the requirements.

2. LEGISLATIVE AND INSTITUTIONAL STRUCTURES AFFECTING BIODIVERSITY AND FORESTRY

Violent regime change has been the norm for Chad since its independence from France in 1960. The dedication of resources to prevent violent overthrow has greatly reduced the government's ability to provide public services and guide economic development. President Idriss Deby seized power by force in 1990. Deby has remained in power through elections in 1996, 2001, and 2006, although the fairness of the electoral process has been questioned. The next presidential election is scheduled for May 2011.

Rebel groups based in Darfur continue their attempts to forcefully overthrow the government, most recently in 2009. The Chad-Sudan peace accord was signed in January 2010. Under this accord, both sides have agreed to end the proxy war by breaking with rebel clients, normalizing relations, and securing their border through joint military cooperation. President Deby publicly renounced past support for Sudanese rebels and committed Chad to assist international efforts to resolve the Darfur crisis through peaceful negotiation. In May 2010 the United Nations Security Council voted to end the United Nations peacekeeping mission in Chad and the Central African Republic by the end of 2010, following a request from the Government of Chad.

2.1 ENVIRONMENTAL POLICIES, LEGISLATION, AND TREATIES

2.1.1 LEGISLATION

Chad is one of the few countries in the world to extend explicit value to the environment in its Constitution of March 31, 1996:

- *Article 47*: Everyone has the right to a healthy environment.
- *Article 48*: The government must ensure the protection of the environment.

National legislation relevant to biological diversity and topical forests includes:

- *La loi 014 /PR/98 définissant les principes généraux de la protection de l'environnement* (Guiding Principles of Environmental Protection)
- *Ordonnance 14/63 du 28 mars 1963 interdisant la chasse ou la capture des espèces sauvages* (Prohibition on Hunting or Capturing Wildlife)

- *Décret 673/PR/MTEP/85 du 12 octobre 1985 portant protection de la faune dans les réserves, projet de loi sur le régime des forêts, faunes, et la pêche* (Wildlife Protection in Reserves)
- *Décret 088/PR/99 du 09 mars 1999 relatif à l'interdiction de la chasse sur toute l'étendue du territoire* (Prohibition on Hunting Throughout the Country)
- *Loi 036/PR/94 du 03 décembre 1994 portant commercialisation et transport de bois* (Commercialization and Transport of Wood)
- *Décret 107/MET/DG/97 du 20 août 1997 portant application de la loi 036 portant réglementation de l'approvisionnement en bois et charbon de la ville de N'Djaména* (Regulation of Charcoal)
- *La loi n°016/PR/99, Portant code de l'eau* (Water Code)
- *La loi n°011/PR/95, Portant code minier et réglementant entre autre l'exploitation des carrières* (Mining)
- *La loi n°014/PR/2008, Portant régime des forêts, de la faune et des ressources halieutiques* (Collaborative Community Management of Forest, Wildlife and Fisheries Resources in selected protected areas)

2.1.2 TREATIES

Chad is party to several international treaties on environmental issues. Of primary importance for this report, Chad signed the Convention on Biological Diversity (CBD) in 1992 and ratified it in 1994, committing itself to promoting sustainable development and recognizing that biological diversity is composed not just of flora and fauna, but that human actors also play an active role in conserving the environment in which they live. National reports are also available on the CBD website.¹³

One of these reports is Chad's National Biodiversity Strategy and Action Plan. The five core objectives of the plan are:

- Improved knowledge and monitoring of biological diversity
- Current inventory of ecosystems and threatened species, and reduced illegal acts in and around protected areas
- Increased use of alternative resources
- Adoption of techniques that will result in greater sustainability of natural resources
- Promotion of equitable sharing of natural resources

Priority actions of the National Biodiversity Strategy and Action Plan include:

- Protection and restoration of local gene pool
- Increasing research on ecosystems and species, especially those that are threatened
- Facilitating the use of carbonization techniques to produce energy
- Adapting and implementing legislation related to biological resources
- Accelerating the reform and application of land tenure

¹³ <http://www.cbd.int/countries/?country=td>

National objectives are incorporated into the national strategy and the *Plan d'Intervention pour le Développement Rural* (Intervention Plan for Rural Development). Both natural resource management and environmental conservation are included in the *Plan d'Intervention pour le Développement Rural*.

Chad has ratified several other international treaties related to conservation and natural resource management, including:

- The Convention to Combat Desertification
- United Nations Framework Convention on Climate Change
- Vienna Convention on Protection of the Ozone Layer
- Cartagena Protocol on Biosafety
- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- The Convention on Wetlands of International Importance (Ramsar Convention)
- Convention on World Cultural and Natural Patrimony
- Fort Lamy Convention (management of Lake Chad)
- African Convention on the Conservation of Nature and Natural Resources
- Convention on Migratory Species
- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
- Stockholm Convention on Persistent Organic Pollutants
- Bamako Convention on the Ban on the Import and Transboundary Movement and Management of Hazardous Wastes within Africa

2.2 PRINCIPAL INSTITUTIONS OF CHAD INVOLVED WITH THE ENVIRONMENT

In 1994, the Government created the National High Committee for the Environment (HCNE), which is overseen by the prime minister. HCNE is charged with integrating environmental and developmental needs.

The HCNE secretariat is provided by the Ministry of Environment and Water (MEE). The MEE includes the National Committee for Monitoring, the Directorate General, and six technical departments. Three of the technical departments are directly concerned with the environment and biodiversity:

- the Directorate of Forestry and Environmental Protection (DFPE)
- the Directorate of Fisheries and Aquaculture (DPA)
- the Directorate for the Protection of Wildlife and National Parks (DPFPN)

The DFPE is currently pursuing several broad management objectives: protection and regeneration of ecological resources, including the restoration of forest and grasslands; enhanced plant management and soil

protection; the design of a national land use planning scheme; increasing institutional staff resources and strengthening the legal framework; and, improving plant and animal production systems.

The National Office for Rural Development (ONDR), within the Ministry of Agriculture and Rural Development, works with rural communities to reduce poverty by organizing agricultural co-operatives, marketing agricultural products, and providing advice in credit and business management.

The Lake Chad Development Company (Société pour le Développement du Lac, SODELAC) is a state-owned company that manages Lake Chad agricultural development projects.

Over the past two years, the Government of Chad has made significant efforts to address the countries' myriad environmental challenges. For instance, the GOC has developed a comprehensive climate change adaptation plan, with assistance from the GEF. The GOC has also established large tree nurseries that it plans to use to create "green belts" of planted trees around the cities of N'djamena and Abeche, and the program may later be implemented in other cities. The GOC has banned charcoal production and the cutting of live trees, in an effort to curb the use of household fuelwood use and stem deforestation. However, it is not clear that sufficient quantities of alternative household fuels, such as propane, are available throughout the country, especially outside of N'Djamena and in Southern Chad, and it is thus not clear whether such a ban will ultimately be sustainable. The GOC has made some investments in developing and commercializing the use of more fuel-efficient cookstoves, but thus far, these efforts have not progressed beyond pilot projects affecting at most a few hundred households. Likewise, N'djamena has banned the use of plastic bags at stores and markets, and despite some initial concerns about how this might be implemented or sustainable, local consumers appear to have quickly adapted to using reusable cloth bags and other cases for shopping needs and transportation of groceries

2.3 THE LOCAL AND INTERNATIONAL NGO COMMUNITY

Due to security concerns, international NGO activity is limited, and many organizations are focused on responding to the humanitarian crisis along the border with Sudan.

Association for the Protection and Conservation of Fauna and Flora (APROCOFF) is a wildlife NGO that operates within Chad.

SOS Elephants in Chad is a national organization focused on reducing threats to elephant populations in Chad. SOS Elephants works with the Government of Chad to decrease poaching, and to reduce conflicts with humans.¹⁴

Wildlife Conservation Society (WCS) is an international NGO based in New York that has been working in Zakouma National Park, and the surrounding landscape, assisting the Chadian Government since 2007. WCS has helped with protected area planning, management, and surveillance, and with biological monitoring.

Réseau des Aires Protégées d'Afrique Centrale (RAPAC) is a regional NGO network intended as a unifying platform to coordinate stakeholders in the management of protected areas and the development of natural resources.¹⁵ RAPAC follows the mandate of the Central Africa Forests Commission (COMIFAC) in helping to implement Axis 4 of the Convergence Plan on the conservation of biodiversity.

A variety of local, national, and international development assistance organizations operate in Chad, and many of their projects facilitate efforts to improve the country's environmental conditions, including the conservation of biodiversity and tropical forests.

¹⁴ SOS Elephants: <http://www.facebook.com/group.php?gid=60337531783&ref=ts>

¹⁵ RAPAC: <http://www.rapac.org/>

- *Groupement pour la Procuration de l'Eau Potable* is a Chadian NGO that has helped with boreholes and water wells for communities in and around Lake Chad.
- *Inades-formation* is a Pan-African NGO, with a branch in Chad. Inades-Formation works with rural populations, especially farmers, to advance sustainable socio-economic development.¹⁶
- *L'Association des Eleveurs et des Nomades (AEN)* is a non-political organization created in 1996 whose primary goal is to promote the socio-economic interests of those most forgotten or on the edge of development in Chad, including herders and nomads. The AEN has constructed schools throughout most of the country, trained midwives and agricultural assistants, planted trees around the schools it constructed, and has been working for the development of grazing laws.
- *Catholic Relief Services (CRS)* is an international organization that has worked for many years on projects of reforestation, development of water resources, and agricultural production. CRS focuses on helping communities address injustices and the precarious food security situation in Chad. CRS' Justice work includes empowering farmers to advocate for fair prices, mediating land disputes between farmers and herders, and increasing communities' capacity to ensure that their rights are respected at all times.¹⁷
- *Le bureau d'études, de liaison des actions caritatives et de développement (BELACD)* is a network of local Catholic dioceses in southern Chad involved with development actions.
- *Secours Catholique et Développement (SECADEV)* is a local NGO consisting of local dioceses in north and eastern Chad involved in development activities. In eastern Chad, SECADEV is promoting sustainable regional development for indigenous, displaced Chadians and Sudanese refugees by providing access to arable land; distributing seeds, tools, pesticides, and training; increasing environmental awareness; facilitating reforestation; and, providing improved stoves to increase energy efficiency. In the Bousso region, SECADEV works with 63 agricultural organizations to sustainably increase food yields.¹⁸
- *Oxfam International* has provided humanitarian assistance to Darfur refugees and Chadian IDPs in eastern Chad since 2003.¹⁹ They have assisted in improving public health, sanitation, and water in refugee camps and the surrounding communities. Oxfam's efforts involve providing clean water, establishing latrines and sewage disposal, and distributing information and materials to combat vector-borne diseases, especially malaria. In addition, Oxfam is working to help people find alternatives to relying on external aid through livelihoods projects.
- The *International Committee of the Red Cross (ICRC)* has operated in Chad since 1978, and has focused on assisting IDPs, refugees from Sudan, and treating victims of armed conflict.²⁰
- *World Vision International (WVI)* has been working in Chad since 1985.²¹ Its current focus is on providing humanitarian assistance to refugees and IDPs, but also provides medical, social, and food assistance for children throughout the country. World Vision helps communities to access clean

¹⁶ Inades-Formation: <http://www.inadesfo.net/?lang=en>

¹⁷ CRS: <http://crs.org/chad/index.cfm>

¹⁸ SECADEV: <http://www.secours-catholique.org/>

¹⁹ Oxfam International: <http://www.oxfam.org/en/emergencies/darfur-chad>

²⁰ ICRC: <http://www.icrc.org/Web/Eng/siteeng0.nsf/htmlall/chad?OpenDocument>

²¹ WVI: http://www.wv africa.org/index.php?option=com_content&view=article&id=158&Itemid=152

water, by equipping water sources with pumps, as well as training local committees to manage and maintain their water sources.

- *Care International* has been active in Chad for 30 years. CARE is working to reduce the incidence of HIV/AIDS, improving access to potable water and improving sanitation, providing humanitarian assistance to refugees, and distributing food and other essential items.
- *Africare* has been active in Chad since the early 1970s, working on water resource development projects; resettling refugees; meeting basic needs for food, water, and health care; controlling river blindness; food security in the Ouaddai prefecture; and humanitarian assistance to refugees from Darfur and the Central African Republic. Africare currently works in the Batha and Ouaddai, two regions of Northeastern Chad and in Logone Oriental a region of Southern Chad through four major projects: Batha and Ouaddai Food Security Initiative, Initiative for the Economic Empowerment of Women Entrepreneurs, Care and Assistance to Sudanese Refugees in Eastern Chad, and Central African Republic Assistance and Local Settlement Project.
- *Alliance Sud*, an alliance of Swiss development organizations, helps farmers purchase agricultural tools and provides farmers advice concerning public granaries. They also help villagers dig potable water wells in the Mogum region of Guera. In Bandaro, Alliance Sud purchases donkeys for farmers to help transport goods to market.
- *Menmonite Central Committee* supports agricultural development, conflict resolution between northern and southern Chadians, and public education on HIV/AIDS.²² It also funds medical care and schooling for orphaned and fatherless children.
- The *Agency for Co-operation and Research in Development (ACORD)* has been working with marginalized communities on their rights to access natural resources for sustainable food security.²³ ACORD and its partners continue to urge state and non-state actors to demonstrate effective service delivery and international standards of accountability in natural resource management. ACORD is supporting rural community development plans in the Mongo, Bokoro, and Am Dam districts, and a part of rural N'Djamena. These plans include microfinancing, access to water, and swamp management. ACORD is also active in HIV/AIDS awareness and advocates for the management of oil resources to benefit poor communities through sustainable development, environmental conservation, and investing in programs that benefit the poor.
- The *Agency for Technical Cooperation and Development (ACTED)* first launched its multisectoral intervention in Chad at the end of 2004, and initially focused on the emergency response to the massive influx of Sudanese refugees into the country from the crisis in Greater Darfur.²⁴ ACTED has been active in the refugee camp Ouré Cassoni since May 2005, as a part of the United Nations Environment Program (UNEP) Campaign for a Billion Trees. The project is designed to increase vegetative cover within and around the camp to maintain environmental stability. A nursery produces fruit and fuel wood trees, which are planted by the refugees and local Chadians. An environmental education program is also a project component.
- *Islamic Relief* is an organization that strives to alleviate suffering, hunger, illiteracy, and diseases. Currently, Islamic Relief continues to serve Chad with water and sanitation projects, livelihood support and seasonal Ramadan and Udhiyah/Qurbani food distributions.

²² MCC: <http://africa.mcc.org/>

²³ ACORD: <http://www.acordinternational.org/acord/en/our-work/where/chad/>

²⁴ ACTED: <http://www.acted.org/en/chad>

- *AmeriCares* is a nonprofit disaster relief and humanitarian aid organization which provides immediate response to emergency medical needs, and supports long-term humanitarian assistance programs. AmeriCares supports over-stretched health services for local populations and refugees in northeastern Chad in partnership with the International Rescue Committee.²⁵

2.4 DONOR ORGANIZATIONS

In addition to NGOs, the international donor community has contributed to conserving Chad's natural resources.

WORLD BANK²⁶

The objective of the Community-Based Ecosystem Management Project is to restore some of the country's most fragile ecosystems, by enabling local communities to better fight desertification, rehabilitate degraded lands, and protect biodiversity. It will be integrated into the design and implementation of the first phase of the Local Development Program Support Project, whose objective is to reduce poverty, promote sustainable rural development, and establish a participatory, decentralized financing mechanism for community-driven development initiatives. Eligible activities for funding include the reforestation and rehabilitation of gallery forests, the development of grazing corridors, community co-management of protected areas, the introduction of agro-forestry techniques, the development of local drought management plans, bushfire awareness and control programs, and, pilots to demonstrate or disseminate more sustainable, alternative energy technologies and practices.

The Agricultural Services and Producer Organizations Project, which ended in 2008, was intended to increase agricultural productivity and rural incomes, while preserving the natural resource base. The project supported this objective by financing productivity-raising interventions and strengthening the institutional and technical capacities of producer organizations, government institutions, and private support services.

The World Bank is also an implementation partner for the GEF Reversal of Land and Water Degradation Trends in the Lake Chad Basin project.

GESELLSCHAFT FÜR TECHNISCHE ZUSAMMENARBEIT (GTZ)

GTZ has been working with the Government of Chad since 1986.²⁷ GTZ's activities currently focus on rural development in the Mayo-Kebbi and Ouaddaï/Biltine regions. The project aims to improve living conditions for local populations and alleviate poverty. Aspects of the project include improved use and sustainability of the region's natural resources, and incorporating active local participation in improvement of the economic and social infrastructure. Ecological benefits of the project are expected to include increased woody vegetation, reduced harvest of immature fish, and increased crop yields. GTZ is also encouraging improved trans-national management of Lake Chad by supporting the creation of a knowledge management system for the Lake Chad Basin Commission to facilitate effective regional management of the lake.

AGENCE FRANÇAISE DE DEVELOPPEMENT (AFD) FRANCE²⁸

The government of France's pastoral water projects improves access to drinking water and establishes corridors for nomadic herders to reduce conflicts with crop farmers. This project also creates wells for livestock.

²⁵ AmeriCares: <http://www.americares.org/wherewework/africa/chad.html>

²⁶ World Bank: <http://go.worldbank.org/BL9U21VGN0>

²⁷ GTZ: <http://www.gtz.de/en/weltweit/afrika/600.htm>

²⁸ AFD: <http://www.afd.fr/jahia/jahia/lang/en/home/Qui-Sommes-Nous/Filiales-et-reseau/>

SWISS AGENCY FOR DEVELOPMENT AND COOPERATION (SDC)

SDC began working in Chad in 1964, and the Chad remains a priority country for Swiss public support.²⁹ SDC is currently supporting seven regional development programs in Logone, Moyen Chari, Mandoul, Wadi Fira, Ennedi, Batha, Kanem. Since 1995, SDC efforts have focused on strengthening the capacities of rural families and communities to improve agro-pastoral production while conserving the environment, enable access to basic education, and ensure better health coverage. Since 2004, SDC has also provided support to refugees from Darfur and people displaced within Chad.

2.5 MULTILATERAL ORGANIZATIONS

THE LAKE CHAD BASIN COMMISSION (LCBC)

The LCBC is an intergovernmental organization that was established in 1964 by Niger, Nigeria, Chad, and Cameroon to coordinate management of Lake Chad, and more recently, the waters upstream of the Chari-Logone and Komadougou-Yobe.³⁰ LCBC membership expanded in 1994 to include the Central African Republic, and in 2008 to include Libya. LCBC's mandate is the sustainable and equitable management of Lake Chad, the associated wetlands, and other natural resources within the Lake Chad Basin to conserve biodiversity, meet subsistence needs, reduce poverty, and promote peace and security. In June 2008, LCBC member states agreed on a strategic action plan for the Lake Chad Basin, which presents principles of environmental management and cooperation, establishes a long-term vision for the sustainable development of the Lake Chad Basin, notes the challenges to the sustainable integrated management of the Lake Chad Basin, sets the regionally agreed Ecosystem Quality and Water Resource Objectives and indicators for the priority areas of environmental concern in a transboundary context, and defines a set of targets and interventions to meet these objectives. "Saving Lake Chad" was the focus of the 8th World Forum for Sustainable Development and 13th Summit of the Lake Chad Basin Commission held in N'Djamena in October 2010.

CENTRAL AFRICA FORESTS COMMISSION

Within Central Africa, Chad is one of 10 member countries of the Central Africa Forests Commission, which was established in 1999 with the signing of the Yaoundé Declaration.³¹ COMIFAC is a political forum that provides technical guidance and coordination to facilitate decision-making in conservation and management of sustainable forest and savannah ecosystems in Central Africa. The major themes of COMIFAC's Plan de Convergence (2003-2010) include: harmonization of forest policy and taxation, inventory of flora and fauna, ecosystem management, conservation of biodiversity, sustainable use of natural resources, capacity building and community participation, research, and innovative financing mechanisms.

THE CONGO BASIN FOREST PARTNERSHIP (CBFP)

The CBFP was launched at the 2002 World Summit on Sustainable Development in Johannesburg as a non-binding partnership registered with the United Nations Commission on Sustainable Development.³² CBFP is a voluntary multi-stakeholder initiative contributing to the implementation of an intergovernmental commitment, and brings together the 10 member states of the COMIFAC, donor agencies, international organizations, NGOs, scientific institutions and representatives from the private sector. CBFP works in close relationship with COMIFAC to promote the conservation and sustainable management of the Congo Basin's forest ecosystems.

²⁹ SDC: <http://www.swiss-cooperation.admin.ch/tchad/>

³⁰ LCBC: <http://www.cbft.org/>

³¹ COMIFAC: <http://www.comifac.org/>

³² CBFP: <http://cbfp.org/home.html>

UNITED NATIONS

The UN is present in Chad through the United Nations Development Program (UNDP), United Nations Environment Program, United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Food and Agriculture Organization of the United Nations (FAO).

UNITED NATIONS DEVELOPMENT PROGRAM

UNDP and the Government of the Republic of Chad have been working together since 1977.³³ Current collaborations are part of the United Nations Assistance for Development in Chad, covering the period 2006-2010, and focusing on the promotion of good governance, including the management of natural resources and poverty reduction. Ongoing projects related to this biodiversity and tropical forestry include: support for the development of integrated, basin-wide institutional mechanisms to protect the integrity of Lake Chad (see GEF description below); support for the development and ratification of the second national report on climate change, including an evaluation of the vulnerability of priority sectors (water resources, agriculture, forestry); support for the establishment of mechanisms of participatory management and monitoring in Manda National Park; and support for the implementation of the Montreal Protocol to eliminate the use of chlorofluorocarbons (CFCs).

UNITED NATIONS ENVIRONMENT PROGRAM

UNEP Regional Office of Africa provides support to activities aimed at safeguarding biodiversity, sustaining ecosystem processes, and contributing to livelihoods and sustainable development. One current UNEP project is the Promotion of the Use of Renewable Energy Resources and Conservation of Flora Species in the Drylands of Mega-Chad of the West African Sub-Region. This project is also known as the Mega-Chad Project, and includes the transboundary areas between northeast Nigeria, north Cameroon, southwest Chad, and east Niger. The project's objective is to establish self-sustaining communities in a desert-threatened environment through education and inputs of material, financial, and intellectual resources. Project components include alternative cooking technologies; the promotion of environmental social clubs; establishing nurseries for threatened plant species; community training on rainwater harvesting, composting, soil conservation measures, and other sustainable agricultural practices; the production of environmental education materials; and, the establishment and promotion of community-based regulatory and management frameworks, including revolving funds for the purchase and maintenance of renewable energy technologies.

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

The ERAIFT School (*Ecole régionale post-universitaire d'aménagement et de gestion intégrés des forêts et territoires tropicaux*), located at the University of Kinshasa in the Democratic Republic of the Congo, was created in 1999 by UNESCO. Each year, ERAIFT trains some 30 African specialists from more than 20 countries, including Chad, on sustainable resource management of tropical forests. The aim is to "Africanize" forest management by training local specialists to take over from their expatriate counterparts.³⁴ The course addresses the specific challenge of how to curb local communities' unsustainable dependence upon firewood as energy.

In 2003, UNESCO sponsored a five-day workshop in N'Djamena, Chad on establishing a virtual laboratory for researchers studying large drying lakes. More than 20 participants from Niger, Nigeria, Cameroon, Chad, Central African Republic, and Kazakhstan participated in the workshop that was hosted by Lake Chad Basin Commission.

FOOD AND AGRICULTURE ORGANIZATION

FAO is currently supporting planning efforts for the implementation of the Great Green Wall for the Sahara and Sahel. Other projects include a workshop on biofuels, and the development of a strategic plan to better

³³ UNDP: <http://www.td.undp.org/>

³⁴ ERAIFT: <http://www.eraift.org>

manage peri-urban forests, including improved wood energy supplies to the city of N'Djamena. FAO is also supporting planning and personnel training to improve the sustainability of agriculture and rural development.

GLOBAL ENVIRONMENT FACILITY

GEF has been involved with several projects in Chad related to protected area management and climate change.³⁵ GEF is partnering with UNEP on the Climate Proofing Protected Areas in West Africa (CPPAWA) Project, which is developing science-based national- and regional-scale tools to support improved management of protected area systems in response to climate and other change impacts. Specifically, GEF has helped to strengthen the protected area network by supporting capacity building and involvement of key stakeholders. GEF has also assisted the Ministry of Environment in assessing climate change risks and developing a comprehensive Action Program of Adaptation to Climate Change (PANA-Tchad). GEF has also been involved in projects that promote low carbon economic development, including renewable energy technologies for rural electrification that avoid greenhouse gas emissions, as well as knowledge sharing and capacity building.

Another GEF project is the Reversal of Land and Water Degradation Trends in the Lake Chad Basin, which is being implemented by UNDP and the World Bank.³⁶ The project is designed to build capacity within the Lake Chad Basin Commission to better meet its mandate of managing land and water resources; enhance policy initiatives and transboundary institutional mechanisms to ensure that member countries jointly develop and manage the Lake Chad Basin resources; and, conduct a transboundary diagnosis analysis, implement pilot demonstration projects, design a strategic action program for sustainable management of the basin, and mobilize increased donor interest/support. This project also includes Cameroon, the Central African Republic, Niger, and Nigeria. The final output of this project is a Strategic Action Programme that was completed in June 2008.³⁷

INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE (IUCN)

Programme Aires Protégées d'Afrique du Centre et de l'Ouest (PAPACO) is the IUCN Central and West Africa Protected Areas Program, in collaboration with a number of partners including the World Commission on Protected Areas (WCPA), the African Fund for World Heritage, the UNEP World Conservation Monitoring Center, and the French Fund for Global Environment. PAPACO consists of several program elements: evaluating site management, funding small local initiatives, providing training for protected area managers, supporting World Heritage sites, assessing the vulnerability of protected areas to climate change, and facilitating sustainable funding for protected areas.³⁸

AFRICAN DEVELOPMENT BANK (AFDB)³⁹

Currently, AFDB is supporting a project to sustainably increase the productivity of natural resources in the Sudan zone. Program components include: capacity building of public and private institutions and organizations to improve natural resource management through the establishment of frameworks and mechanisms for conflict resolution, training and equipment; increasing agricultural security, diversification, and productivity through alternative irrigation schemes and seed choices, and improved agricultural practices; restoring, improving, and conserving soil fertility and water quality; and, support for the development and implementation of monitoring and evaluation of programs.

³⁵ GEF: <http://www.gefonline.org/>

³⁶ Lake Chad Basin Project: <http://lakechad.iwlearn.org/>

³⁷ LCBC Strategic Action Programme: <http://lakechad.iwlearn.org/publications/reports/the-lake-chad-basin-sap-english>

³⁸ PAPACO: <http://www.papaco.org/index.php>

³⁹ AFDB: <http://www.afdb.org/>

ECONOMIC COMMUNITY OF CENTRAL AFRICAN STATES (ECCAS)

ECCAS is an economic community comprised of 10 member states, including Chad.⁴⁰ ECCAS aims to achieve collective autonomy, raise the standard of living of its populations, and maintain economic stability through harmonious cooperation. Areas of emphasis that are relevant to this assessment include the environment, agriculture, water, and rural development.

EUROPEAN UNION (EU)

Conservation et Utilisation Rationnelle des Ecosystèmes Sahélo-Soudanais (CURESS) was launched in 2001 and is funded through 2011. The project, focused on Zakouma National Park, has five components: protection/patrols, conservation and ecological studies, sustainable natural resource use, tourism, and technical assistance. An important aspect is promotion of sustainable natural resources along the periphery of the park. This component seeks to improve relations between the local population and the park, and reduce pressures exerted on the park by the communities surrounding the park, while improving their living conditions. CURESS has been largely responsible for the increased populations of elephants and other large mammals in the park.

⁴⁰ ECCAS: <http://www.ceeac-eccas.org/>

3. STATUS AND MANAGEMENT OF NATURAL RESOURCES

Although Chad continues to face numerous challenges to conserving forests and biological diversity, there are opportunities to contribute to the conservation of biological diversity of national, regional, and global importance. Conserving forests will be critical to realizing some of these opportunities.

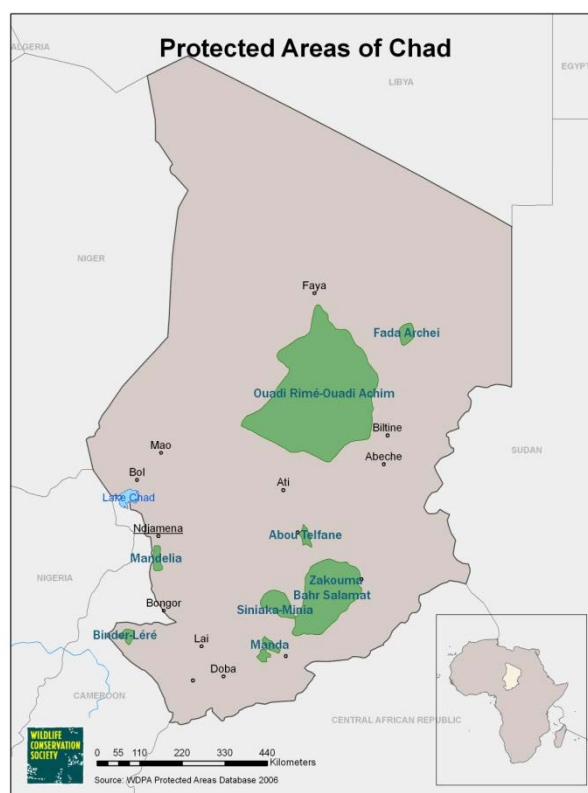
3.1 PROTECTED AREAS

3.1.1 STATUS AND MANAGEMENT OF PROTECTED AREAS

Chad is a signatory of the African Convention on the Conservation of Nature and Natural Resources and has established a number of protected areas in line with Convention guidance. Chad is home to a variety of nationally designated protected areas that comprise 10 percent of the total surface area of the country and that broadly represent Chad's ecosystem diversity. The protected area network includes national parks, ranked forests, and game reserves. Chad has nominated several sites – Zakouma National Park, Fada Archei Wildlife Reserve, Lake Chad, and Ounianga Lakes – for consideration as UNESCO World Heritage Sites.

Zakouma National Park was established in 1963 as Chad's first national park and serves as one of the last significant representations of biodiversity in Sahelian Africa. Zakouma's 300,000 ha is mainly comprised of savannas, grasslands, and swamps. More than 700 plant species have been identified inside the park, as well as 65 mammals, 370 birds, 80 reptiles, 50 amphibians, and 40 fish. Zakouma is entirely surrounded by Bahr Salamat Faunal Reserve, which helps to lessen pressures on the park and provides additional area to conserve species, including migratory wildlife. Zakouma National Park is regarded as the best managed protected area within Chad, and has been consistently funded by foreign donors. Zakouma's elephant herds have been the subject of heavy poaching in recent years. Zakouma National Park is currently in the process of being privatized.

Manda National Park was established in 1965 to protect giant elands. All ostriches, bustards, and large mammals, including giant elands, were eliminated during the years of armed conflict. Although the park's vegetation is still mostly intact, some of its fauna could be restored. However, the park is a forested island of 114,000 ha with limited capacity for long-term conservation of biological diversity for many species that



require large amounts of habitat, and protection of the resources within Manda continues to be weakly enforced.

Sena Oura National Park: On May 31, 2010, the Chadian National Assembly approved a bill to create Sena Oura national park, Chad's third national park. The park will encompass 73,520 hectares (approx 182,000 acres) in southwest Chad along the Cameroon border. The park will adjoin the Bouba Ndjida National Park in Cameroon, creating a transboundary protected area of more than 300,000 hectares. The proposed park is home to a multitude of endemic and endangered species, including approximately 800 elephants. The impetus for creating the park originated in the surrounding communities, whose populations have worked to create an agreement for the local management of the area's wildlife and natural resources. The Minister of the Environment has specified that the Chadian Government plans to address the issue of poaching by using traditional authorities and local people to raise alerts regarding suspicious activity. Given that poachers have decimated elephant populations in recent years in Zakouma National Park, while Manda National Park has been largely neglected, significant questions remain about Chad's capacity to manage, protect, and devote sufficient budgetary resources to a third national park.

One additional transboundary national park has been proposed in Chad, although it's unclear how this park will be protected or funded, and thus sustainably managed – Chad and the Central African Republic may create a transboundary protected area that would include Zakouma National Park and Manovo-Gounda-St. Floirs National Park in the Central African Republic.

The *Ouadi Rimé-Ouadi Achim Faunal Reserve* is Chad's largest reserve, at 8,000,000 ha. It is important to the conservation of Sahelo-Saharan antelopes nationally as well as globally. The reserve contains a large population of dorcas gazelles and some dama gazelles. Other species of Sahelo-Saharan antelope probably have been extirpated, mainly because of poaching. Addax and oryx could be reintroduced to this reserve, but not until it has an effective means of protection.

All other faunal reserves in Chad are relatively small and were established to conserve individual species. For example, the Binder-Léré Fauna Reserve, which is also a Ramsar site, is the only refuge in the country for a small, threatened population of landlocked manatees.

3.1.2 THREATS TO PROTECTED AREAS

Chad hosts biodiversity resources of national and global significance. As in other countries, a main pillar of conserving biodiversity is the protected area network. However, this network in Chad is presently failing to adequately conserve biodiversity for a number of reasons. A review of twelve of Chad's protected areas was completed by IUCN in 2008⁴¹ and found the following: (1) policies and regulations for tapping into economic opportunities (such as tourism, biodiversity offsets) for furthering conservation objectives are lacking, (2) weak enforcement of conservation regulations resulted in the uncontrolled use of forest resources until the 2010 ban on the production of charcoal and the cutting of trees for fuel wood, (3) DPFNP lacks technical and operational capacity, (4) other stakeholders (e.g., communities, NGOs, private sector) are not being mobilized to manage protected areas, and (5) the Government of Chad is the main financier of protected areas, and does not have sufficient funding, or adequate human resources, to effectively manage protected areas. For example, few protected areas have management plans. As a result, the forests and biodiversity found within Chad's protected areas continue to be threatened by livestock grazing, agricultural expansion, poaching, overfishing, and unsustainable resource extraction.

⁴¹ <http://www.papaco.org/publication/Tchad%20pdf%20web%202.PDF>

3.2 ENDANGERED SPECIES

3.2.1. STATUS AND PROTECTION OF ENDANGERED SPECIES

Chad has an estimated 1,600 vascular plants, 134 mammal species, 141 breeding bird species, 52 reptiles, and three amphibian species.⁴² (Because Chad's biological diversity has not been comprehensively studied, these statistics are estimates.) Chad has a relatively high diversity of fish and good fish abundance, with reported fish diversity ranging from 140 (UNEP, 2004) to 159 species (FAO 1994).

The IUCN Red List of Threatened Species identifies 24 species in Chad that are extinct, critically endangered, endangered, or vulnerable.

IUCN Red List of Threatened Species in Chad

(EW = extinct in the wild, CR = critically endangered, EN = endangered, VU = vulnerable)

Genus	Species	Common Name	Classification
Mammals			
<i>Oryx</i>	<i>dammah</i>	SCIMITAR-HORNED ORYX	EW
<i>Addax</i>	<i>nasomaculatus</i>	ADDAX	CR
<i>Diceros</i>	<i>bicornis</i>	BLACK RHINOCEROS	CR
<i>Gazella</i>	<i>dama</i>	DAMA GAZELLE	CR
<i>Gazella</i>	<i>leptoceros</i>	RHIM	EN
<i>Lycan</i>	<i>pictus</i>	AFRICAN WILD DOG	EN
<i>Acinonyx</i>	<i>jubatus</i>	CHEETAH	VU
<i>Ammotragus</i>	<i>lervia</i>	BARBARY SHEEP	VU
<i>Eudorcas</i>	<i>ruffrons</i>	RED-FRONTED GAZELLE	VU
<i>Gazella</i>	<i>dorcass</i>	DORCAS GAZELLE	VU
<i>Hippopotamus</i>	<i>amphibius</i>	COMMON HIPPOPOTAMUS	VU
<i>Loxodonta</i>	<i>africana</i>	AFRICAN ELEPHANT	VU
<i>Panthera</i>	<i>leo</i>	AFRICAN LION	VU
<i>Trichechus</i>	<i>senegalensis</i>	WEST AFRICAN MANATEE	VU
Birds			
<i>Neophron</i>	<i>percnopterus</i>	EGYPTIAN VULTURE	EN
<i>Aquila</i>	<i>clanga</i>	GREATER SPOTTED EAGLE	VU
<i>Circaetus</i>	<i>beaudouini</i>	BEAUDOUIN'S SNAKE-EAGLE	VU
<i>Falco</i>	<i>naumanni</i>	LESSER KESTREL	VU
<i>Marmaronetta</i>	<i>angustirostris</i>	MARbled TEAL	VU
<i>Torgos</i>	<i>tracheliotos</i>	LAPPET-FACED VULTURE	VU
<i>Trigonoceps</i>	<i>occipitalis</i>	WHITE-HEADED VULTURE	VU
Plants			
<i>Azelia</i>	<i>africana</i>	AFZELIA	VU
<i>Khaya</i>	<i>senegalensis</i>	AFRICAN MAHOGANY	VU

⁴² World Resources Institute: <http://earthtrends.wri.org/>

Five Sahelo-Saharan antelopes are of conservation concern due to reduced population size and range contraction: oryx, addax, dama gazelle, dorcas gazelle, and slender-horned gazelle (rhim). The oryx is thought to be extinct in the wild. Due to the presence of remnant populations of several species, Chad and Niger are identified as priority areas for in situ conservation of the other four Sahelo-Saharan antelopes. Only a few remnant populations of addax are known to exist in the wild, including one population in Chad discovered in 2005 at Egey-Bodele, near the border with Niger. This population and a larger population in Niger are the last two known wild populations of addax. Dama gazelles probably still exist in the Ouadi Rime-Ouadi Achim Faunal Reserve. Surveys in 2001 detected a Dama gazelle population inhabiting the Manga area; this population may range across the border into Niger, where a suitable habitat is known to exist. Dorcas gazelles are probably still common in Chad. In 2001, the density of this species in the Ouadi Rime-Ouadi Achim Faunal Reserve was the highest reported for the entire Sahel region. There is no current information on the status of rhim gazelles, but two areas adjacent to the Tebesti Mountains are suspected to support populations of this species.

The elephant population of Chad is under severe poaching pressure. Approximately 21 percent of Chad serves as a known or suspected habitat for elephants, but only 16 percent of this habitat range is currently within the protected area network. Most elephant habitat is concentrated in the southern third of the country, and the largest populations are found within Zakouma National Park. Transboundary populations disperse between Chad and the Central African Republic and Cameroon. Chad's elephant population is currently estimated at 3,000 animals, though accurate estimates are difficult because habitats remain unsurveyed and poaching has dramatically reduced elephant numbers in Chad over the last several decades. In Zakouma National Park, regular aerial surveys of live and dead elephants conducted by WCS have documented an unsustainable level of poaching. Zakouma's elephant herds experienced heavy poaching in 2007 and 2008 during periods of regional and civil conflict and political instability in which seven park rangers were also killed. In February of 2011, at least 20 elephants were poached in southern Chad outside of protected areas.⁴³

Estimates of the lion population in Chad from surveys conducted in 2002 and 2004 using different methods were 520 and 150 animals, respectively. The lion range is restricted to the southeast corner of the country, but is contiguous with the occupied range in the Central African Republic. Zakouma National Park is important for a population of lions during the dry season. A Class I Lion Conservation Unit (LCU) capable of sustaining a viable population has been proposed in Chad that includes Zakouma National Park and extends into the Central African Republic. The current estimated transboundary population for the Chad-Central African Republic LCU is 1,500 animals, with a steady population trend. The black rhinoceros may be extirpated in Chad.

The Egyptian vulture occupies a large global range in Africa, Europe, and Asia. This long-lived species has experienced an extremely rapid decline in India, combined with severe long-term declines in Europe and West Africa, plus ongoing declines through much of the rest of its African range. Declines in Africa are likely to have been driven by loss of wild ungulate populations and overgrazing in some areas by livestock.⁴⁴

Manatees were once abundant in the Chad basin but had become rare by 1924. In a survey in 1995, they were found in Lake Léré and Lake de Tréné along the Mayo-Kebbi, Bahr Keeta, and Baniangi rivers; manatees are also reported from the Baniangi, Logone, and Chari Rivers tributaries of Lake Chad. Hunting continues on the rivers and lakes, despite enforcement efforts. The animals are sought mainly for their oil, which is shipped with dried meat to Cameroon.

⁴³ [http://www.politics.co.uk/opinion-formers/press-releases/animal-welfare/ifaw-rampant-elephant-poaching-leaves-a-bloody-stain-in-the-congo-basin-\\$21387380\\$364355.htm](http://www.politics.co.uk/opinion-formers/press-releases/animal-welfare/ifaw-rampant-elephant-poaching-leaves-a-bloody-stain-in-the-congo-basin-$21387380$364355.htm)

⁴⁴ IUCN: <http://www.iucnredlist.org/apps/redlist/details/144347/0>

3.2.2 THREATS TO ENDANGERED SPECIES

Threats to declining wildlife species include direct factors such as poaching for subsistence and trafficking in animal parts. Poaching is common throughout Chad, due to insufficient personnel, border instability, and arms trafficking. Wildlife species are more vulnerable to poaching outside of protected areas. Wildlife are also killed by livestock owners in response to predation or conflicts over grazing. Indirect factors have also contributed to population declines by fragmenting, degrading, and destroying habitat through desertification, deforestation, overgrazing, and conversion to agriculture. Habitat fragmentation and loss also isolates remaining populations, thereby reducing gene flow and population connectivity.

3.3 FOREST RESOURCES

3.3.1 STATUS AND PROTECTION OF FOREST RESOURCES

In 2005, forests and other wooded land were estimated to cover 16 percent of the total land area of Chad. Chad's forests include 109 native tree species, including two species listed as vulnerable by IUCN. Of the forested lands, 90.3 percent is officially designated for production, 0.1 percent for protection, and 9.6 percent for conservation. Forested cover includes 190,000 ha of primary forest, 12,108,000 ha of modified forest, and 14,000 ha of plantation forest. Plantations supply lumber, and consist primarily of *Eucalyptus* and *Acacia* spp. and other broadleaved trees.

Gum Arabic (*Acacia senegal*) is an important export product and Chad is the second largest global producer. In 2005, gum Arabic production was 18,000 metric tons and accounted for 7 percent of GDP (IMF 2007). Production of gum Arabic has increased steadily since the late 1980s when production averaged 1,500 tons.

Shea butter derived from nuts of the karité tree *Vitellaria paradoxa* is another non-wood forest export product. Karité is widespread in the southern Sudanian zone. The densest concentrations of karité are found in the prefectures of Tandjilé, Logone Oriental, Logone Occidental and Moyen-Chari. Only 5 percent of the existing karité trees are exploited for nuts.

3.3.2 THREATS TO FOREST RESOURCES

From 1990 to 2000, the annual rate of deforestation was 6 percent, and increased to 7 percent from 2000-2005. From 1990-2005, primary forests were lost at a rate of 1,200-1,300 ha per year. Expansion of agriculture and increased use of forest products are the primary causes of deforestation. Fuel wood is estimated to account for 90 percent of forest products use. As mentioned previously, however, the 2010 ban on the production of charcoal and the cutting of trees for fuel wood has had a significant positive effect on forested areas. Forest regeneration in Chad is relatively slow, due to arid and semiarid conditions that result in low forest productivity.

Wildland fires greatly affect the forest resources of Chad. The 2005 Global Forest Resources Assessment shows that Chad's incidence of forest fires is among the highest in the world. For the 2000 reporting period, Chad reported that more than 6 million hectares of forests were affected by fires annually. An estimated 50 percent of the Sudanian zone and 20 percent of the Sahelian zone are affected each year in Chad.

3.4 CONSERVATION OUTSIDE OF PROTECTED AREAS

Conservation outside of protected areas in Chad is inconsistent. Chad's ability to apply its environmental regulations effectively is restricted by lack of overall coordination, limited institutional capacity, and few financial resources.

Chad's wetlands are of international importance, as identified using criteria under the Ramsar Convention on Wetlands. There are six Ramsar sites in Chad, totaling 12,405,068 ha: Lake Fitri, Partie tchadienne du lac Tchad, Plaine de Massenya, Plaines d'inondation des Bahr Aouk et Salamat, Plaines d'inondation du Logone

et les dépressions Toupouri, and Réserve de faune de Binder-Léré.⁴⁵ Established in 2006, Plaines d'inondation des Bahr Aouk et Salamat is the world's third-largest Ramsar site located in a natural depression at the border with the Central Africa Republic. The site plays a very important role for wildlife, providing breeding grounds for migratory birds, as well as supporting hippos, leopards, elephants, and ungulates.

The floodplains and gallery forests along Chad's rivers provide breeding and migratory habitat for waterfowl and are among the most important wetlands of the Sahel. Lake Fitri, an important Ramsar wetlands site, supports extensive grazing and a productive fishery, and provides habitat for migratory waterfowl.

Lake Chad is the fourth largest lake in Africa, and the only freshwater expanse of such magnitude on the outskirts of the Sahara Desert. As the second largest wetland in Africa, Lake Chad is of global biodiversity significance. Lake Chad provides essential habitat for migratory waterfowl and shorebirds, and during some seasons it provides habitat for half the waterfowl in west Africa. More than seven waterfowl species and 49 water bird species occur on the lake and surrounding wetlands. The lake also hosts high fish biodiversity, with 140 species in 21 genera. Some fish species migrate up to 150 km to spawn in river systems tributary to the lake. Lake Chad is a major source of fresh water in the Sahel, providing water for not only human and animal consumption, but also for irrigation, agriculture and fishing activities. There are extensive wetlands and floodplains along the Chari-Logone River, which provides more than 95 percent of the inflow to Lake Chad.

The Tibesti Mountain area hosts considerable endemism. There are six endemic plant species, and fishes that evolved in scattered springs of the Borkou Basin in the northern Tibesti and Ennedi mountains. Because endemism is not high in Chad, these species are of special value. In addition, the Tibesti Mountains are home to an important population of Barbary sheep *Ammotragus lervia*, a vulnerable species under IUCN criteria.

The Great Green Wall (i.e., *La Grande Muraille Verte* or GMV) is a transboundary proposal to plant a 15-km-wide forested corridor stretching 7,000 km across the Sahel from Senegal to Djibouti, through Chad, to combat the southern advance of the Sahara desert.⁴⁶ Within Chad, the GMV would be 1,000 km long and 15 km wide, stretching in a snaking pattern from Lake Chad east to Hadjer Lamis, and on to Bar El Gazel in Sudan. Specific objectives include biodiversity conservation; combating desertification; soil restoration and conservation; provision of forest resources, water, and income-generating activities; and carbon sequestration in vegetative cover and soils. Some observers have questioned the cost, sustainability, and feasibility of the GMV proposal. The FAO and the African Union have made some efforts and promoted some workshops in the Sahel that have been aimed at establishing broad guidelines for sustainable dryland landscape management, rather than focusing exclusively on the creation of the GMV. Likewise, some experts have argued that efforts to create the GMV will only be possible through grassroots, farmer-led natural resource management, rather than government-led centralized planning, and only if the appropriate regulatory enabling environments are established in Chad and other Sahel countries, including laws permitting farmers to own trees. In March 2011, the 11 member countries of the Great Green Wall initiative met in Ndjamena to establish a coordinating agency for the project. A Senegalese professor instrumental in developing the idea now heads the new agency and is charged with realizing the GMV vision. Separately, during meetings in Bonn in late February, the Global Environment Facility confirmed its commitment to allocate up to \$115 million to support the Great Green Wall Initiative.⁴⁷

⁴⁵ Ramsar sites: <http://www.ramsar.org>

⁴⁶ GMV: <http://www.grandemurailleverte.org/gmven/index.php>

⁴⁷ <http://www.guardian.co.uk/global-development/2011/feb/25/great-green-wall-sahel-desertification?INTCMP=SRCH>

4. MAJOR ISSUES IN BIODIVERSITY AND TROPICAL FOREST CONSERVATION

The environmental threats in Chad present a tremendous challenge to biodiversity and tropical forest conservation. The causes and effects of these threats are interwoven, presenting multiple obstacles for a country already challenged by difficult development issues. The main threats to sustainable natural resource use and biodiversity conservation are political instability; drought and desertification; ineffective management of natural resources, including both water and protected area management; and anthropogenic pressures. All of these threats are exacerbated by Chad's population density and poverty.

4.1 POLITICAL INSTABILITY

Chad has experienced continuous unrest and war since independence in 1960, and armed conflicts have occurred throughout Central Africa over the past two decades. The proliferation of light arms over the last four decades, primarily the AK-47, has been a principal cause of wildlife loss. This political instability threatens biodiversity conservation in many ways. The GOC is largely unable to enforce environmental laws, develop effective government institutions, and provide basic services for its population. The presence of significant numbers of refugees and IDPs results in localized overuse of natural resources, including fuel wood, water, pasture, and arable land, especially in eastern Chad. Political instability in Chad inhibits development assistance by NGOs. Until the country can become stable, effective governance will not develop and there will be extremely limited capacity for conservation of forests and biodiversity.

4.2 DROUGHT AND DESERTIFICATION

Most of Chad lies in the Saharan and sub-Saharan Sahel, both of which lack water resources. As the driest country in central Africa, Chad is highly vulnerable to desertification, with 58 per cent of the area already classified as desert, and 30 per cent classified as extremely vulnerable. The Sahara is moving southward at an estimated 5-7 km per year. Unpredictable rainfall and drought contribute to land degradation and desertification, and ultimately, reduced agricultural productivity, and soil quality. The combination of a rapidly rising human population and the reduction in land productivity due to rising aridity are resulting in increased use of natural resources. Additional desertification will result in higher concentrations of people competing for fewer resources. Lower rainfall also results in reduced fish production from Lake Chad.

4.3 INEFFECTIVE MANAGEMENT OF NATURAL RESOURCES

Most of Chad's natural resources are not formally protected or suffer from ineffective protection, which can be attributed to a variety of policy, capacity, and governance barriers. Legal and regulatory provisions intended to protect forests and biodiversity are mostly obsolete and are seldom respected. Policies and regulations for tapping into economic opportunities such as tourism and biodiversity offsets for furthering conservation objectives are lacking. Knowledge of the high-value biodiversity of Chad and how this can be leveraged to promote both conservation and strengthen livelihoods is not being used in policy-making.

Historically, weak enforcement of conservation regulations has resulted in uncontrolled use of forest resources, due to a lack of technical and operational capacity. Recent bans on charcoal production and the harvesting of fuel wood, however, are helping to protect forested areas. Protected areas are easily accessible for illegal activities and the market value of their resources is important. In general, other stakeholders (e.g., NGOs, private sector) are not being mobilized for managing resources, and conflicts over land tenure and access to resources persist. Greater community involvement in natural resource governance may result from the 2008 law concerning forestry, fish, and wildlife resources, which allows for the management of protected areas by local communities in partnership with state departments and private industry, although implementation has not yet occurred. The GOC remains the main financier of protected areas at this time, and these resources are inadequate. In addition, the human resources base and knowledge base are not adequate for effective protected areas management and overall biodiversity conservation.

Uncoordinated management of scarce water resources is a critical concern, particularly in reference to the receding of Lake Chad. “Saving Lake Chad” was the focus of the 8th World Forum for Sustainable Development and 13th Summit of the Lake Chad Basin Commission held in N’Djamena in October 2010. Since 1960, Lake Chad’s surface area has declined by more than 80 percent, separating into two lakes, with the northern lake rarely containing water. Factors contributing to Lake Chad’s shrinkage are complex, but include surface-groundwater interactions; variable rainfall and drought in the Sahel over the last 45 years; climate change and desertification; increases in surface temperatures and accelerating evaporation; and, large increases in population and in agricultural and irrigation activity around the lake. The Lake Chad basin currently supports an estimated 30 million inhabitants in four bordering countries: Chad, Niger, Cameroon, and Nigeria.

The Lake Chad Basin Commission has begun to look at long-term solutions to the lake shrinkage, most notably through a feasibility study of channeling water from the Oubangi River to the Chari River, the main feeder of the lake. The proposed water transfer would dramatically increase the flooded extent of Lake Chad and restore livelihoods of shoreline residents, most of who subsist on products from livestock and on blue-green algae and fish harvested from Lake Chad. The proposed canal also raises questions about potential adverse environmental and social impacts on communities in the Central African Republic, the Republic of Congo (Brazzaville), and the Democratic Republic of Congo that depend on the Oubangui, as well as impacts on inhabitants of recently-exposed areas of Lake Chad that could be vulnerable to flooding. “Saving Lake Chad” forum participants did not adopt a definitive position on the water transfer proposal, and Lake Chad Basin Commission members decided to await the outcome of the feasibility study before pursuing next steps.

A major challenge for the Lake Chad Basin Commission is facilitating an agreement among the lake basin states to sustainably manage the vast but dwindling water resources. Currently there are no agreements among members on the amount of agriculture and irrigation activities that can be undertaken around the lake. Likewise, there is also no agreement on fish quotas, or other mechanisms for sustainable fisheries management, and the estimated amount of annual fish catch from the lake has dramatically declined over the last 45 years. The potential for conflict and regional instability, including international border and land disputes, competition over diminishing resources, and large population migration that might accompany further receding of the lake, are significant concerns.

4.4 ANTHROPOGENIC PRESSURES

The pressure of Chad’s growing population on forests and biodiversity is extensive, and most of the population is unable to meet their basic needs. Significant numbers of refugees and IDPs have resulted in localized overuse of natural resources, including fuel wood, water, pasture, and arable land, especially in eastern Chad. The inflated population leads to increased pressures on a limited resource base, which in turn leads to increased poaching, overgrazing, and deforestation. In an increasingly arid environment, land productivity declines. Coupled with an increasing population, the demand for natural resources increases and leads to further land degradation in an area where land productivity has already fallen. This has led to high rates of deforestation to provide agricultural and pasture lands. Brush fires, ignited accidentally or for

purposes such as agricultural clearing or hunting, burn large areas each dry season. These fires reduce forest land, and degrade habitat for a host of species. A critical problem is the rapid disappearance of the forest cover, threatened by the expansion of farming and livestock herding and formerly high use of wood fuels as the main source of energy for Chadian households. Approximately one-third of natural forest stands have disappeared since the 1990s from vegetation removal through commercial logging and tree cutting to provide domestic fuel, as well as clearance of forests for commercial or subsistence cultivation. Recent bans on charcoal production and the harvesting of fuel wood, however, are helping to protect forested areas.

5. PROGRAM RECOMMENDATIONS AND PROPOSED ACTIONS FOR USAID PROGRAMS

The U.S. Government continues its commitment to assist Chad in: addressing the humanitarian emergency in eastern Chad resulting from the Darfur crisis and restoring regional security essential to resolving that crisis, promoting a stronger and more legitimate polity by implementing electoral reform to ensure credible democratic elections in 2010 and 2011, and strengthening Chad's capacity to deal with terrorist threats and the potential for intolerance and extremism. Four programmatic areas factor into this assistance: Peace and Security; Governing Justly and Democratically. Investing in People. and Economic Growth.

5.1 PEACE AND SECURITY

FY 2011 investments of \$780,000 target key changes to promote peace and security: improvements in the behavior and societal role of Chadian military and security services, enhanced capacity to combat rising criminality along the eastern border and counter terrorist threats, reduction in conflict between the Government and opposition groups, increase in youth opportunities, and improved community governance.

Although peace and security activities are not directly tied with conservation efforts, they have important connections with the potential to affect environmental activities. Promoting a peaceful resolution to the Darfur crisis will presumably lessen pressures on natural resources from the refugee population. In the meantime, refugee camps provide opportunities for exposing people to new technologies of fuel-efficient stoves, training in sustainable agriculture and agroforestry, transferring natural resource management responsibilities to rural communities, and other education in natural resource management, especially the role of tree cover in water quality and quantity.

Given the importance of protected areas and the need for increased involvement of local communities in sustainable management of biodiversity and natural resources, there is potential for USAID to have an impact on biodiversity conservation. Improved regional peace and security would benefit the natural resources within protected areas, including transboundary sites. USAID should work with organizations implementing the peace and security activities and conservation organizations in Chad to identify and target those areas that most need security and natural resource protection. The added security will help to protect conservation areas from illegal uses such as poaching, while at the same time helping to maintain wildlife productivity and populations. In addition, depending on the specifics of programming, USAID could leverage peace and security efforts aimed at reaching children and communities to promote local engagement in natural resource management, in line with the 2008 law on collaborative community management of protected areas. Wherever possible, USAID should facilitate negotiations for integrated water management agreements in the Lake Chad basin, as the potential for transboundary conflicts and regional instability over diminishing water resources are significant concerns.

5.2 GOVERNING JUSTLY AND DEMOCRATICALLY

FY 2011 investments of \$600,000 support Chad's democratic process to reform the manner in which elections are conducted, leading to legislative and municipal elections in 2010 and presidential elections in 2011. This funding complements the efforts of other donors to improve governance.

Through its support to effective and transparent democracy and governance in Chad, the USG has the opportunity to strengthen civil society organizations that participate in the management of natural resources management. Weak enforcement or misapplication of existing law is a major threat to biodiversity and tropical forests in Chad. Encouraging fair, democratic systems and practices will strengthen public trust and will encourage participation in the legal process. This will help build the base needed for improved participatory management of natural resources and protected areas, in line with the 2008 law on collaborative community management of protected areas. USAID could assist with ensuring that the people of Chad experience the benefits of their natural resources by continuing to encourage decentralization of the country's natural resource management. Such assistance would not only afford incentives for local actors to invest in improved approaches to sustainable natural resources management, but also lend itself to ameliorating conflicts over the resources themselves. Where appropriate, the GOC could be encouraged to reinvest oil revenues in critical infrastructure and services that could help alleviate natural resource pressures. Finally, as mentioned earlier, USAID should support the development of transparent, transboundary governance of scarce water resources in the Lake Chad Basin amongst the member states.

5.3 INVESTING IN PEOPLE

FY 2011 investments of \$3 million are directed toward alleviating poverty and improving health care, including in areas such as maternal and infant health and nutrition and disease prevention through improved hygiene and access to clean water.

Environmental degradation and poverty go hand in hand, and clean water is critical to both environmental and public health. In Chad, where a significant percentage of the population relies on agricultural and livestock activities, food security is heavily dependent upon a healthy natural environment. Chad's population lives under the constant threat of food insecurity caused by variable and insufficient rainfall, declining soil quality and crop yields, and poor infrastructure. USAID could provide local communities with the tools and techniques to increase the productivity of agricultural activities, while at the same time protecting the natural environment. In areas of critical importance to biodiversity, civil society organizations should be engaged by USAID to prevent encroachment of agricultural activities into ecologically sensitive areas. Similarly, access to potable water is predicated upon functional watersheds and effective pollution protections. Shortage of water is a chronic problem in Chad. In partnership with many of the organizations working on this issue, USAID could engage in initiatives that focus on increasing the accessibility of potable water and to protect the watersheds that are ultimately responsible for supporting the resource. USAID should also actively support the development of water use agreements in the Lake Chad Basin. Where appropriate, the GOC could be encouraged to reinvest oil revenues to reduce poverty, improve health care infrastructure, and to address sustainable natural resource management. Finally, wherever possible, USAID should encourage building local capacity to foster a sense of ownership on the part of local communities over the natural resources upon which they depend for survival.

5.4 ECONOMIC GROWTH

FY 2011 investments of \$3 million will address the risk factors associated with rain-fed agriculture in Chad's semi-arid desert region by tapping into water resources through impoundment and diversion of runoff; digging of garden wells for vegetable production during the off-season; and the use of improved agricultural technologies such as animal traction, improved seeds, mixed cropping, organic fertilizer, and post-harvest storage.

Broadening the range of viable economic opportunities for the growing population can alleviate the pressure placed on the environment by agricultural and livestock activities. Therefore, initiatives aimed at expanding

livelihood strategies to local populations should concentrate on best practices in soil conservation and improved agricultural and livestock techniques. Efforts are needed to increase productivity of agricultural practices and to reduce the demand for fuel wood, especially from natural forests (e.g., integrating trees into agriculture). In addition to reducing the need for additional agricultural land, improvements in agricultural productivity will reduce the level of food insecurity in Chad. Individual and community plantations of fuel wood, coupled with the use of fuel-efficient stoves, would reduce reliance on natural forests. In addition, USAID should promote the diversification of growth-oriented agricultural sectors (e.g., gum Arabic, cotton, shea butter, fruits, tubers), which could provide employment, and for some crops, food. As mentioned previously, USAID should help to prevent encroachment of agricultural activities into ecologically sensitive areas.

Water management is critically important in Chad. USAID should facilitate negotiations for integrated water management agreements, including agricultural withdrawals, in the Lake Chad Basin. In addition, improved water management throughout the country is essential for meeting basic human needs.

A key issue related to biodiversity conservation and natural resources management is the lack of knowledge in local communities regarding the state of the natural environment, the potential threats and opportunities which lie therein, and the skills necessary to participate fully in the discourse about the fate of their natural environment. USAID should support education and technology transfer, and the development of economic alternatives such as sustainable livelihoods in agriculture and eco-tourism (to the extent practicable) near protected areas.

Where appropriate, the USG should assist the GOC in fully leveraging oil revenues to support sustainable development. The opportunity to assist in decision-making and strategic planning could benefit Chad's tropical forest and biological diversity. Involvement in decisions on funding of oil revenues has two potential benefits. First, proposed projects that have potential adverse effects to tropical forests and biological diversity could be identified and modified where possible to remove adverse impacts. Second, promoting projects that are most beneficial to the conservation of Chad's tropical forests and biological diversity could be supported and integrated into the use of oil revenue use.

6. CONCLUSION

Chad's tropical forests and biological diversity are at great risk of further depletion. This report has attempted to identify the key threats to biodiversity and forestry conservation and to provide a basis to more effectively address these threats.

Currently, Chad is a non-presence country for USAID, although the agency has taken significant strides to offer humanitarian assistance and encourage a credible democratic process that are important to development. The proposed program presents some interesting and important potential synergies with natural resources management and conservation objectives. While this is an indirect avenue to environmental protection, USAID can find related activities to aid conservation and mitigate possible negative environmental impacts.

The proposed USG assistance to Chad did not present any major threats in terms of the proposed program's potential impact on Chad's biodiversity and forestry resources. The following general recommendations are offered as specific USAID programming is considered and planned:

- Promote the development of water management agreement(s) in the Lake Chad Basin.
- Ensure that environmental assessments are conducted as a routine component of any new program and implementing partner activity. Ensure that agricultural projects encourage sustainable management practices.
- Concentrate on empowering civil society organizations that work with local management of natural resources.
- When working with rural communities, focus on those living near or in biologically diverse and protected areas. Promote and encourage better natural resource management practices, as well as increase community involvement.
- Incorporate sustainable development techniques into humanitarian efforts for refugees and IDPs.
- Take into account the environmental impacts of refugee and IDP camps, and seek to ensure as much as possible that they are managed in a sustainable and environmentally-friendly manner.
- Look for projects that have the potential for cross-cutting programming, such as incorporating environmental awareness into health and education activities. Work with other development organizations who are concentrating on issues other than the environment.
- Participate in the planning for expenditures of oil revenue that will benefit tropical forest and biological diversity conservation.
- USAID activities to promote and protect tropical forests and biodiversity in nearby countries should consider programs at a regional scale and incorporate Chadian agencies and NGOs wherever possible.
- Given the increasing attention of riparian states and development partners on Lake Chad, consider: (1) discrete small-scale engagements focused on promoting scientific and academic exchanges aimed at finding evidence-based solutions to sustainable water resource management in the Lake Chad Basin; and/or (2) small-scale pilot projects focused on wetland restoration or improved agricultural practices in the basin.

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