

## 4.0 Chad

AfDB	African Development Bank
ARC	ARGHYMET Regional Centre
BMU	Bundesministeriums für Umwelt, Naturschutz und Reaktorischerheit (Germany)
CAR	Central African Republic
CMEWF	Chad Ministry of the Environment, Water and Fisheries
CIDA	Canadian International Development Agency
CILSS	Permanent Interstate Committee for Drought Control in the Sahel
COMIFAC	Central African Forests Commission
DRC	Democratic Republic of the Congo
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (Germany)
FAO	Food and Agriculture Organization of the United Nations
FNC	First National Communication
LDCF	Least Developed Countries Fund
NAPA	National Adaptation Programme of Action
PNSA	Programme National pour la Sécurité Alimentaire
SCCF	Special Climate Change Fund
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNITAR	United Nations Institute for Training and Research

The Republic of Chad is dominated by the Saharan desert in its north (covering half of its 1,284,634 km<sup>2</sup>). The Sahelian ecological zone runs through the center of the country, and is characterized by poor soils and scrubland. In the south, the wetter Sudanian savanna zone is dominated by forest and wooded savannah. The country's unique position within the Middle Africa region aligns it with both the Congo Basin and the Sahel (as a member of both the Central African Forests Commission [COMIFAC] and the Permanent Interstate

Committee for Drought Control in the Sahel [CILSS]). Landlocked, the country is home to about 11.5 million people (2010 estimate), only 28 per cent of whom live in urban areas (UNFPA, 2010).<sup>76</sup>

The main economic sectors in the country are: industry (responsible for 48.8 per cent of GDP, mostly from petroleum products); services (37.6 per cent of GDP); agriculture (13.6 per cent of GDP, principally cotton and livestock). Although agriculture is not the main economic sector of Chad, more than 80 per cent of the country's workforce is engaged in this sector (USDS, 2010). Chad is among the poorest countries in the world—ranked 163 out of 169 countries on the UNDP Human Development Index (UNDP 2010). GDP per capita in 2008 was US\$770 per year (UNDP, 2010), and only 3 per cent of the population has access to electricity. This low level of electrification places huge pressure on forest resources as wood and charcoal remain the principle sources of energy. Exploitation of these resources is contributing to desertification (OneWorld, 2010).

The main non-climate environmental pressures facing Chad include population growth, deforestation, overgrazing, poaching, erosion, waste pollution (litter), soil pollution, brushfires and ground and surface water pollution. Unsustainable levels of water extraction and population pressures have contributed to Lake Chad's loss of approximately 90 per cent of its surface area in the past 40 years. The second largest lake in Africa, Lake Chad is currently very shallow, thereby very vulnerable to the impacts of climate change (OneWorld, 2010).

### **A. Adaptation Needs and Priorities**

The climate of the northern, Saharan desert region of Chad today is very dry throughout the year. Its central plain is hot and dry, with an intense rainy season mid-June to mid-September. In the southern Sudanian savanna lowlands, the climate is warm and more humid, with an intense rainy season from late May to early October. Temperatures in the country range in the winter from 11 to 20°C, and in the summer from 39 to 45°C. Mean annual temperatures in Chad have increased by 0.7°C since 1960 (McSweeney et al., 2008).

Chad is projected to experience a moderate increase in temperature of between 0.6 and 1.3°C (under a medium warming scenario) by 2023 and 1 to 2.5°C of warming expected by 2050. It is expected that the number of “hot” days and nights will increase, while there will be a decrease in the number of “cold” days and nights (McSweeney et al., 2008; World Bank, n.d.). With respect to precipitation changes, model simulations for the Sahel remain widely divergent; some models estimate that mean annual precipitation could decrease by up to 28 per cent, while others suggest that it could increase by up to 29 per cent by the 2090s. A significant increase in extreme rainfall events

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<sup>76</sup> Estimated population for Chad in 2050 is 27.8 million people (UNFPA, 2010).

(greater than 50 mm in the maximum five-day precipitation) has also been projected—a change that could increase runoff and flooding conditions (McSweeney et al., 2008; World Bank, n.d.).

Reflecting these projected changes, the following key vulnerabilities were identified in Chad’s National Adaptation Programme of Action (NAPA) released in 2010 (CMEWF, 2010):

- *Agriculture*: with 80 per cent of its workforce dependent on agriculture and husbandry, the country is highly vulnerable to climate shifts. It therefore not a surprise that the potential for climate change to bring about a loss of biomass, disappearance of certain crop species, lower yields and increased food deficits is of concern to Chad. Potential outcomes of climate change include reduced agricultural productivity in the south, failed harvests in the Sahelian belt, livestock deaths due to insufficient water resources and reduced fish populations. The length of the growing period could be reduced by more than 20 per cent by 2050, and a near-elimination of rainfed mixed crop/livestock systems could occur within this same timeframe. Of particular concern is the potential for the area suitable for cotton cultivation to be reduced due to economic and climatic reasons. So too is the possible impact of climate change on livestock and pastoralism; Chad projects that climate change could led to abandonment of traditional pastoral zones, modified migration patterns, livestock deaths, loss of genetic diversity, fodder deficits, pressure on protected areas and lower livestock yields.
- *Fisheries*: concerns include an increase in the number of subsistence fishers who have abandoned agriculture and livestock for fishing, migration towards Lake Chad and lower fish stocks.
- *Forest resources*: climate change could result in lower vegetation cover, degraded soils, deterioration in the ecosystem services provided by the forests, stronger winds and less rainfall.
- *Freshwater resources*: stronger flooding, increased demands on water resources, excessive exploitation, increased evaporation rates and significantly increased extraction (with population growth) are cited as sources of vulnerability.
- *Population*: increased pressures for the best land, internal and external migration, rural exodus, and greater pressure on urban structures and services.
- *Transport*: degraded road networks and increased transportation costs.
- *Industry*: increased difficulty in supplying products and inputs.
- *Human health and nutrition*: Chad currently has weak access to basic health services among most of the population, leading in part to low life expectancy<sup>77</sup> and high mortality rates (infant, children, maternal), and low capacity to address the threat of disease

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<sup>77</sup> Life expectancy at birth in Chad in 2010 was 49.2 years (UNDP, 2010).

(including respiratory, malaria, diarrhea, cardio-vascular disease, cholera, meningitis, skin and eye diseases). Climate change will place an additional burden on an already vulnerable system.

## B. National Level Policies and Strategic Documents

Chad has submitted both its First National Communication (in 2001) and, in 2010, its National Adaptation Programme of Action (NAPA). Both of these documents were prepared by the National High Commission for the Environment. The government has stated that its NAPA is to be implemented in complete coherence with national and sectoral policies on the development of the country. To support integration of climate change adaptation into government policies, the state has also proposed the creation of a new government agency tasked with the integration of the NAPA agenda into the Chad’s human development policies. Summary descriptions of Chad’s National Communication and NAPA can be found in Table 1.

**Table 1: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions**

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	First National Communication to the UNFCCC <sup>78</sup>	Ministry of the Environment and Water	August 2001	Energy, industry, transportation, agriculture, livestock, forests, land and waste	Chad’s First National Communication (FNC) outlines its national context, and then provides an inventory of national greenhouse gas emissions. It then lists existing and potential mitigation measures, as well as existing climate change vulnerabilities and adaptation challenges. The FNC provides an inventory of domestic research and observation institutes, and efforts at public awareness-raising. It concludes with a set of proposals for projects designed to address these adaptation and mitigation challenges.
2.	National Adaptation Programme of Action <sup>79</sup>	Ministry of the Environment, Water and Freshwater fisheries	Submitted February 2010	Key sectors identified: agriculture, livestock, freshwater fisheries, food security, water, settlements, transportation, industry and health	The Chad NAPA begins with a description of the country’s socio-economic and biophysical contexts. It then lists the observed and projected negative impacts of climate change through summaries of the findings of policy key documents. It next describes how climate change will impact national development objectives,

<sup>78</sup> UNFCCC, [http://unfccc.int/essential\\_background/library/items/3599.php?rec=j&preref=3198#beg](http://unfccc.int/essential_background/library/items/3599.php?rec=j&preref=3198#beg)

<sup>79</sup> UNFCCC, [http://unfccc.int/essential\\_background/library/items/3599.php?such=j&symbol=TCD/NAPA/1%20E#beg](http://unfccc.int/essential_background/library/items/3599.php?such=j&symbol=TCD/NAPA/1%20E#beg)

Name of Policy Action	Government Division Responsible	Status	Sector(s) of Focus	Summary description
				and lists priority projects designed to minimize these negative impacts.

### C. Current Adaptation Action

Chad is currently involved in a high number of adaptation projects relative to its Middle African counterparts, the majority of which are multi-country adaptation projects (see Table 2 below). Most of the adaptation activities underway are research-based projects aimed at generating stronger climate information upon which policies and adaptation strategies can be based. There is a strong focus on water and agriculture (food security or pastoralism). Existing projects reflect a number of diverse funding sources, including multilateral (African Development Bank, FAO), bilateral (CIDA, BMU) and non-governmental organizations (AfricaAdapt).

Ongoing adaptation in Chad consists of:

- Given its central position in the Lake Chad watershed, the Government of Chad is leading (and partially financing) the six-year “Lake Chad Sustainable Development Support Program,” a five-country, US\$95 million effort to promote sustainable development in the Lake Chad Basin and reverse the watershed’s decline. One of the project’s specific objectives is to improve the adaptive capacity of the lake’s productive systems to climate change, though it is unclear what proportion of activities under this project will relate directly to adaptation. The project will also include a significant infrastructure component, focused on cleaning out the Vrick Canal to increase the flow of water into the lake (AfDB, 2009).
- Chad was one of eight countries that received funding in the AfricaAdapt Knowledge Sharing Innovation Fund in 2009. With support from the fund, the Association of Pular Women of Chad implemented a small project to create a knowledge sharing film on experiences of adapting to climate change in the country (AfricaAdapt, 2009).
- As a member of COMIFAC, Chad will also benefit from its current project on climate change scenarios for the Congo Basin. The extent of activities being carried out in Chad under the project is unknown, but it is hoped that these scenarios will enable decision makers in the country and throughout the COMIFAC region to adapt and prepare their natural resource management strategies to meet the regional challenges of climate change (BMU, 2010).
- The Food and Agriculture Organization of the United Nations (FAO) has included a commitment to support adaptation in Chad in its Action Pledges to the Nairobi Work Programme. Under this initiative, FAO will undertake a number of research and pilot projects on agriculture-based adaptation strategies. Specific activities to be carried out in Chad are unknown (FAO, 2010a).

- The Government of Chad, in conjunction with FAO, has produced a National Programme for Food Security (Programme National pour la Sécurité Alimentaire).<sup>80</sup> Currently under implementation, the goal of the program is to increase production and productivity of the agricultural sector to ensure national food security (FAO, 2009).
- With funding from the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre is implementing a regional project focused on climate proofing protected areas in West Africa. One of five pilot projects implemented as part of this regional initiative will be completed in Chad (UNEP-WCMC, 2009).

**Table 2: Current Adaptation Projects and Programs active in Chad**

Name	Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
<b>National Actions</b>							
1.	Knowledge Sharing Film on Experiences of Adapting to Climate Change in Chad <sup>81</sup>	The project aims to broadcast information on climate change within the Mbororo community and to facilitate the sharing of existing local knowledge on adaptation.	AfricaAdapt through its Knowledge Sharing Innovation Fund <sup>82</sup>	The Association of Pulaar Women of Chad	Knowledge communication	2009 – 2010	Civil society Mbororo community
<b>Participation in Regional and Global Actions</b>							
2.	Pilot Projects on Uses of Plant Genetic Resources for Food and Agriculture to put Strategic Plans into Action to Promote Sustainable Use and Management of Land for Adaptation to Climate Variability <sup>83</sup>	Objectives of the project include: <ul style="list-style-type: none"> <li>• Monitoring and production of strategic plans for plant genetic resources for food and agriculture based on poor farmers' agricultural practices to climate variability.</li> <li>• Pilot projects on used of plant genetic resources for food and agriculture to put strategic plans into action to promote sustainable use and management of land for adaptation to climate variability.</li> </ul>	FAO	FAO	Research; Field implementation	2007 – 2010?	Agriculture African: Burkina Faso, Chad, Niger, Sudan
			In Chad: More information required				

<sup>80</sup> FAO, <http://www.fao.org/spfs/national-programmes-spfs/participating-countries-npfs/en/>

<sup>81</sup> AfricaAdapt, <http://www.africa-adapt.net/aa/ProjectOverview.aspx?PID=%2f77R4X4hgww%3d>

<sup>82</sup> AfricaAdapt, <http://www.africa-adapt.net/aa/ProjectOverview.aspx?PID=wOrGUSXnVTs%3d>

<sup>83</sup> FAO, [http://unfccc.int/files/adaptation/sbsta\\_agenda\\_item\\_adaptation/application/pdf/fao\\_pledge\\_2.pdf](http://unfccc.int/files/adaptation/sbsta_agenda_item_adaptation/application/pdf/fao_pledge_2.pdf) and <http://www.fao.org/climatechange/unfccc-process/63662/en/>

Name	Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	<ul style="list-style-type: none"> <li>Use of tools and plant genetic resources for food and agriculture to secure implementation and management methods to enhance capacities of poor farmers to face climate change.</li> </ul>						
3.	Interdisciplinary and Participative Research on Interactions between Ecosystems, Climate And Societies in West Africa <sup>84</sup>	France's Foreign Affairs Ministry	Agence inter établissements de la recherche pour le développement (Inter-institutional Research Agency for Development)	Research	2007 – 2011	Ecosystem conservation	<i>Regional:</i> Benin, Burkina Faso, Cameroon, Cape Verde, CAR, Chad, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Nigeria, Senegal, Togo
<i>In Chad: More information required</i>							
4.	Climate Change Scenarios for the Congo Basin <sup>85</sup>	BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety,	GIZ and COMIFAC	Research	2009 – 2011	Climate information services	<i>African:</i> COMIFAC (Burundi, Cameroon, CAR, Chad, Congo, DRC, Equatorial

<sup>84</sup> <http://www.aird.fr/ripecsa/index.htm>.

<sup>85</sup> BMU, <http://www.bmu-klimaschutzinitiative.de/en/projects?p=1&d=550>

Name	Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Germany)					Guinea, Gabon, Rwanda, Sao Tome and Principe)
<i>In Chad: More information required</i>							
5.	Lake Chad Sustainable Development Support Program (PRODEBALT) <sup>86</sup>	AfDB, Government of Chad, other co-financing	Lake Chad Basin Commission	Field implementation	2009 – 2015	Watershed management	<i>African:</i> Cameroon, CAR, Chad, Niger and Nigeria
<i>In Chad: More information needed</i>							
6.	Evolution of Protected Area systems with regard to climatic, institutional, social, and	GEF; co-financing <i>Budget: approx.</i>	UNEP World Conservation Monitoring Centre	Capacity building	2009 – 2015	Biodiversity; Ecosystem conservation	<i>Regional:</i> Chad, The Gambia, Mali, Sierra

<sup>86</sup> AfDB, <http://www.afdb.org/en/projects-operations/project-portfolio/project/p-z1-cz0-002/#>

Name	Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
economic conditions in the West Africa Region <sup>87</sup> (also known as Climate Proofing Protected Areas in West Africa)	change impacts. Opportunities for transboundary collaboration will play a large part in the project activities, as these might offer some of the most effective solutions.	US\$14.0 million					Leone, and Togo Plus: Burkina Faso, Côte d'Ivoire and Ghana
<i>In Chad: More information required</i>							
7. Great Green Wall <sup>88</sup>	The project will address desertification and food security through the creation of a biological corridor along participating countries. The goal is to increase investment in appropriate sustainable land and water management and technologies. In addition the project seeks to encourage cooperation within and among participating countries and for countries to incorporate evidence-based policy development. The program's goals are to: "expand investment in sustainable land and water management technologies in order to help communities adapt production systems to climate variability and change; improve land use planning; and improve climate and water monitoring network improvements, institutional cooperation within and across countries, and evidence-based policy development." <sup>89</sup>	LDCF; SCCF; World Bank; AfDB  Budget: US\$3.108 billion		Capacity building; Research; Policy formation and integration	2011 – ?	Agriculture; Ecosystem restoration	African: Benin, Burkina Faso, Chad, Djibouti, Eritrea, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal Sudan and Togo
<i>In Chad: More information required</i>							

<sup>87</sup> [http://www.unep-wcmc.org/protected\\_areas/cppawa.htm](http://www.unep-wcmc.org/protected_areas/cppawa.htm)

<sup>88</sup> GEF, <http://www.thegef.org/gef/node/4503>

<sup>89</sup> IISD, <http://climate-iiisd.org/news/gef-council-approves-programme-that-includes-great-green-wall-initiative/>

### D. Proposed Adaptation Action

The Government of Chad submitted their NAPA to the UNFCCC in early 2010. It proposes ten adaptation project and programs, with a strong focus on addressing the country's vulnerability to climate change in the agriculture and food security sector. This focus is appropriate given the country's reliance on the agriculture sector and the fact that food security, pastoralism and commercial agriculture are identified as Chad's top vulnerability to climate change. Eight of the ten proposed projects deal with agriculture and livestock directly, with the remaining two projects (an awareness raising campaign on climate change adaptation and a project to improve the country's climate monitoring capacity) indirectly aligned with the agricultural sector as well. Most of the proposed projects are research-based, and a number contain a significant awareness-raising component. Most of the proposed projects are national in scope.

**Table 3: Proposed Adaptation Projects and Programs in the National Adaptation Programme of Action for Chad**

Name	Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1. Improved use of surface water for agriculture and livestock	To better use surface water resources to reduce climate vulnerabilities and improve food security among rural populations. This will be done through the development of irrigation infrastructure, reforestation programs, and other means.	Field implementation	Agriculture; Freshwater supply	Sudanian, Sahelian and Saharan zones.
2. Diversification and intensification of crops to adapt to the risks of climate change	To reduce the negative effects of climate change and climate variability on the agricultural sector through the intensification and diversification of crops.	Research; Capacity building	Agriculture	Sudanian and Sahelian zones
3. Improving and disseminating climate-sensitive planting schedules	Contribute to better agricultural decision-making and improved yields through the dissemination of climate-sensitized planting calendars and support for better planning capacity among farmers.	Capacity building; Knowledge communication; Field implementation	Agriculture	Chari Baguirmi, Salamat, Guera, Mayo-Kebbi, Ouaddai
4. Improving information, education and communication on climate change adaptation	To improve the level of information, education and communication relating to climate change adaptation, in the hopes of improving decision-making processes among target audiences	Knowledge communication	Government	National
5. Soil rehabilitation for the development of agricultural activities	To improve soil fertility and agricultural yields and to prevent further soil degradation linked with anthropogenic and climatic factors.	Research; Field implementation	Agriculture	National

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
6.	Improving inter-community pasture zones	To improve the availability of pasture and fodder for livestock in order to reduce migratory pressures among pastoralists, promote new livelihoods and to improve their capacity to adapt to climate change.	Research; Knowledge communication	Pastoralism	National
7.	Improving rainfall forecasting capacity	To improve the quality of seasonal rainfall forecasting and models, and to integrate this knowledge into vulnerability reduction strategies.	Research; Capacity building; Policy formation and integration	Climate information services	National
8.	National Center for Climate Change Observation	To establish a national center for climate change observation	Capacity building; Field implementation	Climate information services	National
9.	The Livestock Food Bank	To establish and stock eleven national food banks for livestock to ensure animal health and improve livestock productivity.	Field implementation; Knowledge communication	Agriculture	National
10.	Reducing climate change vulnerability/managing climate change risks	To contribute to the national strategy for climate risk management, through climate observation and modeling, analysis, policy integration and awareness-raising.	Research; Knowledge communication; Policy formation and integration	Climate information services	National

### E. Assessment

With 80 per cent of the country's workforce engaged in agriculture, and agriculture identified as a sector with high vulnerability to current and future climate change,<sup>90</sup> the Government of Chad has focused on the farming and livestock sectors in its NAPA. That said, agriculture is not a focus of current adaptation activities (with the exception of the FAO project), indicating that there is considerable room for increasing the number such farming and livestock initiatives in the country. Additional areas in which greater adaptation action may be warranted include:

- The projected increase in flooding and extreme rainfall events indicates that there is also considerable scope for climate-related disaster risk management activities in Chad. Conflict and instability in the east of Chad also could increase vulnerability to climate change and complicate the delivery of adaptation programming.

<sup>90</sup> The vulnerability of Chad to climate variability and change was demonstrated in 2010, when poor rains led UN agencies to estimate that two million people would require food assistance during that year (IRIN, 2010).



- The health impacts of climate change are identified as a key national vulnerability in the country's NAPA, but are not addressed by current or proposed adaptation activities; this could be an area for future adaptation investments.
- Gender is not a prominent component of any current adaptation project or proposed strategy; it could be given greater attention in future proposals as appropriate.
- The uncertainties associated with climate change projections for the Sahel indicate that more research is required to understand current and future climate trends. Support for Chad's proposed National Center for Climate Change Observation might contribute to addressing this gap.

Existing projects reflect a number of diverse funding sources, including multilateral (African Development Bank), bilateral (CIDA, BMU) and non-governmental (AfricaAdapt) organizations.

More broadly, there is significant scope for expanded national activities on climate change adaptation. With the submission of the Chad's NAPA in 2010, funding for such work through multilateral channels like the Least Developed Countries Fund should become more accessible. Moreover, current implementing agencies are largely limited to regional and international actors; the capacity of domestic actors to design and implement adaptation projects could be strengthened.

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