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The Lake Chad Basin: a system under threat

Water for agriculture and energy in Africa: The challenges of climate change

Report of the ministerial conference - 15-17 December 2008 - Sirte, Libyan Arab Jamahiriya

Geographical context

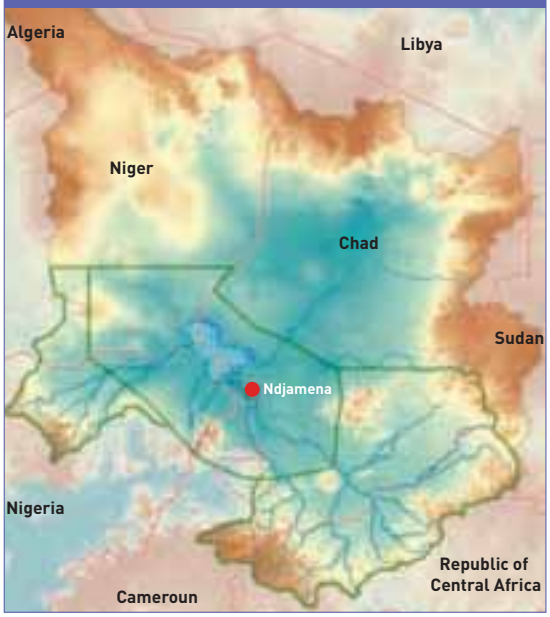
The Lake Chad Basin is a transboundary basin stretching over 2 397 423 km^2. It is distributed, as indicated in Table 1, between Chad, Niger, the Central African Republic (CAR), Nigeria, Algeria, Sudan, Cameroon and Libya.

Table 1: Regional distribution

Country	Basin surface area (km^2)	Portion of basin (%)	Country surface area (km^2)	Portion of basin in the country (km^2)
Chad	1 109 201	46.3	1 284 000	86.4
Niger	671 868	28.0	1 267 000	53.0
Central African Republic	217 340	9.1	622 980	34.9
Nigeria	180 364	7.5	923 770	19.5
Algeria	89 694	3.7	2 381 740	3.8
Sudan	81 360	3.4	2 505 810	3.2
Cameroon	46 049	1.9	475 440	9.7
Libya	1 548	0.1	1 759 540	0.1
Total	2 397 423	100	11 220 280	

The region is bounded to the north by the Ahaggar Mountains in Algeria. From this summit, the border descends southwards towards the Tibesti Highlands that form the border between Libya and Chad, and continues to about 19 N near the Djebel Mara volcanic mountains in Sudan. The southern border is defined by the Mongos Hills in the Cenral African Republic and the Adamawa Mountains at about 6 N and further west by the Mandara hills in northern Cameroon at approximately 10 N. The Jos Plateau marks the western boundary in the Nigerian sector of the Basin and further north the A r Plateau in Niger.

Figure 1: Relief Map of the Topographic Lake Chad Basin (Conventional basin is in green outline)



The Lake Chad Basin is an endorheic (closed) basin. That is, it does not flow into the ocean, but the hydrographic system flows out towards a low point. Lake Chad is located at about 280 m above sea level. (Figure 1)

Lake Chad is the epicenter of human, animal and plant life for the region, it is the fourth largest lake in Africa after lakes Victoria, Tanganyika and Nyassa. In 1964, when the Lake Chad Basin Commission (LCBC) was established, Lake Chad covered 25 000 km^2. However, the Lake has been shrinking since the droughts of the 1970s, and now covers less than 1 000 km^2 when the water is annually at its lowest level.

Lake Chad Basin s ecological regions

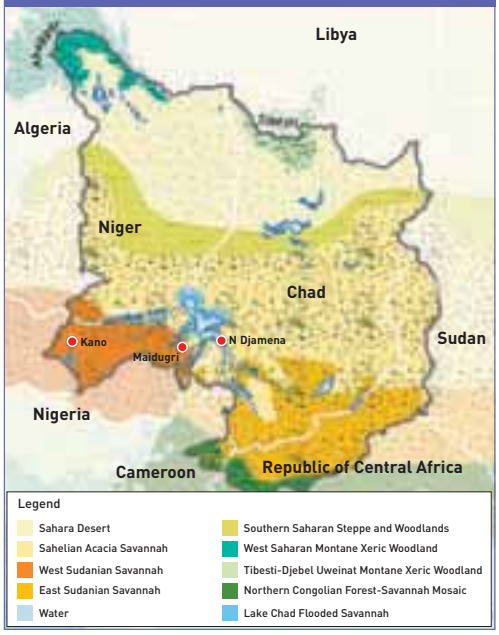
Figure 2: Giraffes in the Waza National Park

The Lake Chad Basin contains a variety of habitats, including deserts, shrub steppes, savannahs, forests, lakes, wetlands and mountains. These terrestrial and aquatic habitats form a unique sanctuary for the diverse fauna of the region: ostriches, cheetahs, hyenas, crocodiles, hippopotamus and elephants. These habitats are also well stocked with water birds, migratory birds and waders that thrive in the river valleys. They depend primarily on the waters of the numerous small lakes that are formed during periods of receding floods. The humid zones of the basin and the lake itself constitute a unique ecosystem in this area of the Sahel, and is a preserve of biodiversity of global importance. For example, 140 species of fish and 372 species of birds, of which one-third are migratory species have been listed. The integrity of the ecosystem is an essential shield against desertification.

The Lake Chad Basin is made up of the following subhydrographic basins:

Lake Chad is composed of the north and the south pools, which are separated by a distinct morphological feature called the Great Barrier visible at an altitude of about 279 m.

Figure 3 Ecological Zones of the Lake Chad Basin (after WWF)



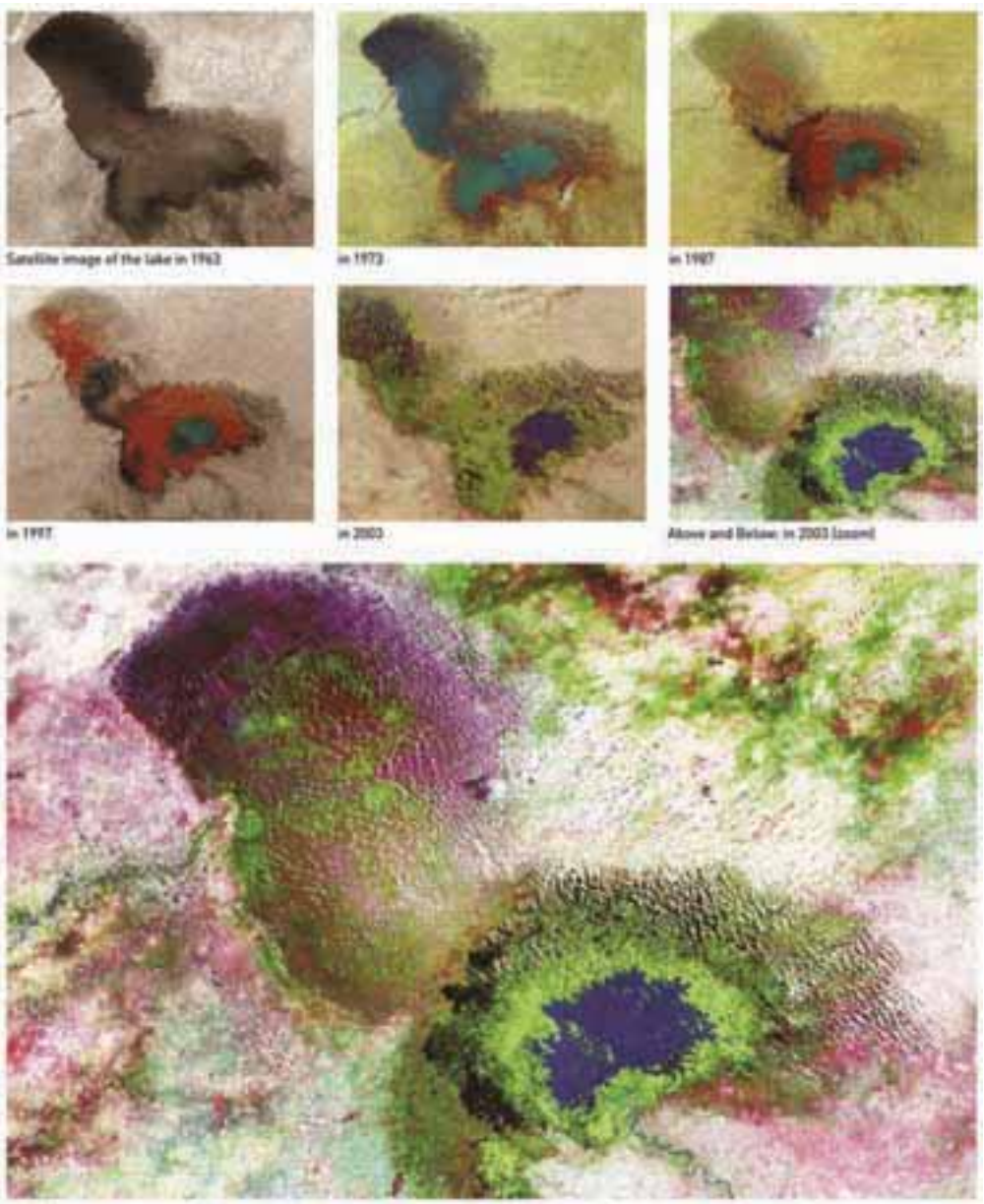
The lake occupies less than 1 percent of the drainage basin and is extremely shallow, with a mean depth of 4 m. The dry season and wet season variation in water level is about 0.5 m while it can vary by up to 5 m from year-to-year. The annual average temperature of Lake Chad water varies between 25.5 and 27.5 C (1956-1975) and is closely related to the annual, seasonal and diurnal variation in air temperature. Rainfall on the lake contributes 17 percent of annual inflow. The surface of the lake is covered with a mixture of island archipelagoes, reed beds and open water. Areas of open water persist in the southern pool, mostly near the Chari River inflow. Swamps are found to the west of this open water. Vegetation in the southern pool consists of *Cyperus papyrus, Phragmites mauritianus, Vossia cuspidata,* and other wetland plants. *Phragmites australis* and *Typha australis* grow in the more saline north pool. Occasionally, the floating plant Nile lettuce (*Pistia stratiotes*) covers large areas of open water. Over 1 000 species of algae have been described, Spirulina, a blue-green algae reputed to have nutritional and medicinal value is found natively in the pools around Lake Chad.

A cattle breed called Kuri, unique to the Lake Chad Basin is found on the shores and islands. This is one reason that Lake Chad is a critical and strategic zone for world biodiversity.

The Chari-Logone system is the biggest supplier of water flowing into the lake. It comprises of two major courses: the River Chari and the Logone River. The Chari-Logone River basin area is approximately 650 000 km^2 and the Chari River extends 1 400 km. The Chari and Logone rivers have a tropical regime with a single flood occurring at the end of the rainy season, which lasts from August to November and feeds the extensive Waza-Logone floodplains and Yar s . The rivers contribute 80 percent of all riverine inputs into the lake, an average of 37.8 km^3/year. The floodwaters take between one and two months to reach the southwest shore of Lake Chad. The flow is at its minimum in May/June at the beginning of the following year s rainy season. However, in the last 40 years the mean Chari discharge has decreased significantly because of the persistent change in rainfall patterns over the contributing catchment.

The Logone flood plains occupy about 25 000 km^2, the largest area of the Waza-Logone floodplain and the most important being the Grand Yar s with a surface area of 8 000 km^2. The Logone floodplains are used for pasture, fishing, flooded rice production and flood recession cropping.

Figure 4: Evolution of the Lake through four decades



The Komadougou-Yobe basin is a water drainage system of 148 000 km^2, which is a typical example of a water course that loses a large part of its annual flow as a result of infiltration and evapotranspiration. The Komadougou-Yobe River is the border between Nigeria and Niger, over the last 160 km, and is the only perennial river system flowing into the northern pool of Lake Chad. The Komadougou-Yobe is formed by various tributaries, in particular the Jama are River which flows from the Jos Plateau (Nigeria), and the Hadejia River, which flows from the area around Kano (Nigeria). The two rivers join to the southwest of Gashua (northeastern Nigeria). Upstream of the confluence of the Hadejia and Jama are rivers the Hadejia-Nguru wetlands (fadamas) in Nigeria start. Peak inflow to the wetlands occurs in late August, resulting in extensive shallow

flooding. These wetlands cover 6 000 km^2, with a water surface area of 2 000 km^2. Much of the Hadejia-Nguru floodplain is dry for part or all of the year. It provides a wide range of resources including fertile agricultural soils, grazing, non-timber forest products, fuelwood and fisheries. In addition, the wetlands are a unique migratory habitat for many wildfowl and wader species.

Lake Fitri is Lake Chad in miniature and is located in Chad, it has a surface area of 300 km^2. During the dry season it is part of a large biosphere reserve covering 1 950 km^2. It is normally a freshwater Sahelian lake, fed by seasonal rainfall and runoff from the seasonal Batha River. Unlike Lake Chad, it is one of the few Sahelian water bodies that have not experienced large-scale hydrological change, although it dried during the severe drought of 1984-1985. It provides pasture in an area where drought abounds. There is intensified competition for the resources of this sub-basin amongst the indigenous populations, resulting in increased risk of conflict over resource use.

Mayo Kebbi is a unique watershed divide filled with a string of lakes that flow either to the Logone or Niger Rivers. The Mayo Kebbi is a unique landscape feature not only within the larger Lake Chad basin but is unique and remarkable in the global context. The Binder Lere wildlife reserve is found within the Mayo Kebbi and Lake Lere, the only known habitat of the Manatee in the basin, is also found here.

The Yedseram and Ngadda rivers and their tributaries rise in the Mandara Hills (northern Cameroon) and they lose most of their waters while flowing northwards through a 7 km wide flood plain. Further downstream of the Ngadda River (Nigeria) a 80 km^2 swamp is formed where the river no longer maintains a definable water course to the lake. The Sambisa Game Reserve (important for elephant conservation), the Chingurimi Duguma and the Lake Chad Game Sanctuary Sectors of the Chad Basin National Park are situated in this sub-basin. It is also home to the largest, failed irrigation scheme, which became moribund as lake levels fell.

The Northern Diagnostic Basin is noted for its Oasis, this is the largest diagnostic basin (807 360 km^2). It supplies no inflow to the lake, as it is also the most arid sub basin. Major resources use concerns include the devastation of dunes by trampling livestock and the over harvesting of increasingly scarce trees.

Demographic context

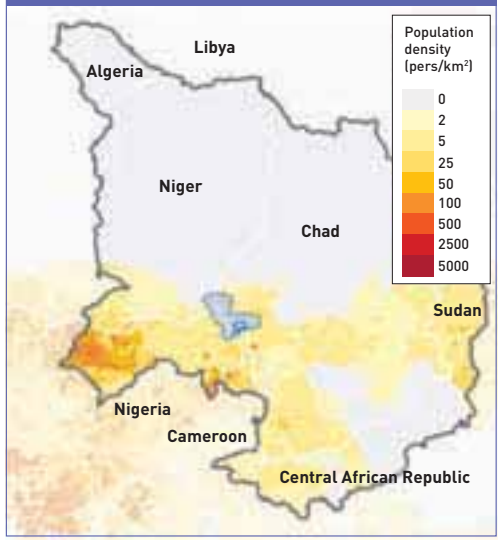
Presently more than 30 million inhabitants, who are nationals of Cameroon, Central African Republic, Chad, Niger and Nigeria, including migrants from various African countries, live in the Lake Chad Basin where their livelihoods are fishing, agriculture and animal husbandry.

In 1991, the population of the conventional basin was 24 104 000 inhabitants, including the Central African Republic portion. However, in 2001, with an annual growth rate of 2.72 percent, this population was estimated at 30 691 260 inhabitants distributed as in Table 2:

Table 2: Population of the Lake Chad Basin					
Member State	Population.1991 (1000 inhabitants)	Density in 1991 (inhabitants/km^2)	Growth rate (%)	Pop. In 2001 (1000 inhabitants/ha.)	Density in 1991 (inhabitants/ha/km^2)
Cameroon	2 100	37	2.72	2 671.2	47
Nigeria	13 856	67.4	2.72	17 648.8	85.77
Niger	2 400	67.6	2.72	3 052.8	53.1
Chad	5 048	14	2.72	6 428.06	17.76
Central African Republic	700	3.5	2.72	890.4	4.5
Total	**24 104**			**30 691.26**	

Population density is greatest in Nigeria and surrounding Lake Chad and decreases in the more arid north provinces. For example, in the Tibesti Highlands people are primarily nomadic pastoralists, and population density is as low as 0-1 people/km^2. Figure 5 shows the population density distribution in the region.

Figure 5: Population density in the Lake Chad basin



Economy

In the Lake Chad Basin production activities are dominated by the primary sector and tertiary sectors, with a predominance of informal, low productivity activities. The primary sector employs more than 80 percent of the population and comprises primarily agriculture and livestock rearing.

Economic activities in the Lake Chad Basin include:

- mining: for example, gold mining in Central African Republic;
- oil: exploration and exploitation;
- agriculture: cotton, groundnuts, cassava, millet, sorghum, rice, onions. Mixed cropping is widely practiced;
- fisheries: in dams, rivers, floodplains and the Lake Chad; and
- manufacturing: cotton ginning, brewing, leather industry, machinery, milling and food industry.

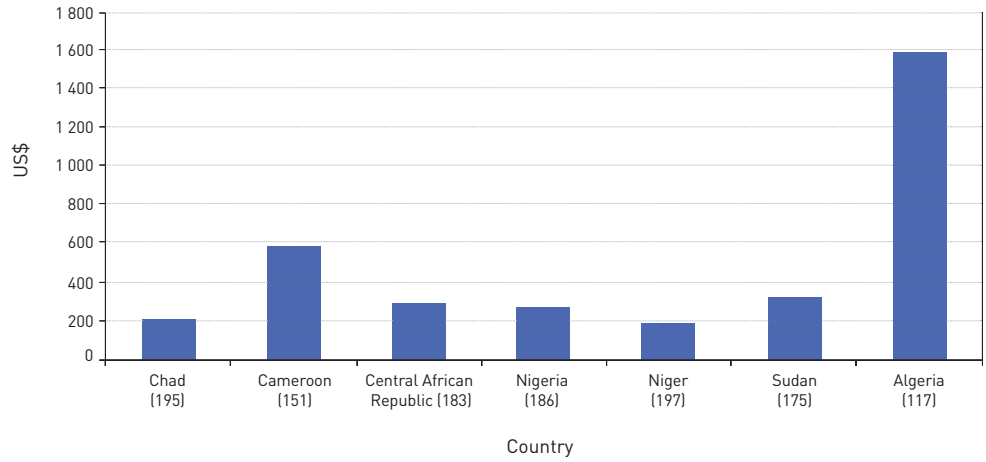
Table 3 shows the region s typical sources of income.

The countries within the region are among the poorest in the world. Economic growth is very slow and variable. Figure 6 shows the disparities in GNI between the riparian countries.

Table 3: Sources of household income in the Lake Chad Basin

Activity	Million US$ (billion CFA*)
Fishing	45.1 (26.3)
Rain-fed and flood recessional cropping	26.6 (15.5)
Animal husbandry	14.7 (8.6)
Small irrigated areas	10.8 (6.3)
Large irrigated areas	9.4 (5.5)

Figure 6: Distribution of Gross National Income among the Lake Chad Basin Countries



The economies of the Basin s countries generally suffer from very low productivity, insufficient infrastructure, poor governance, a lack of a dynamic private sector, an oversized informal sector and a vulnerability to domestic and external shocks (see Figure 6).

The Lake Chad Basin Commission (LCBC)

The Lake Chad Basin Commission was established by the Fort Lamy Convention on 22 May 1964, by the four riparian countries (Cameroon, Niger, Nigeria and Chad) that share the lake. This conventional basin did not include the Central African Republic and, in particular, excluded the upstream part of the active basins of the Chari-Logone and Komadougou-Yobe. In March 1994, the Central African Republic was admitted as the fifth member state during the Eighth Summit of Heads of State (held in Abuja, Nigeria) leading to the New Conventional Basin thus increasing the conventional area to approximately 987 000 km^2. This has enlarged the conventional basin to include the upper basins of the Chari-Logone and Komadougou-Yobe systems. Sudan was admitted into LCBC in June 2000, but is yet to ratify the Convention establishing the Commission. The admission of Sudan has now increased the conventional area from 427 000 km^2 in 1964 to

1 035 000 km^2 in 2000. This new definition of the conventional Lake Chad Basin thus takes into account almost all the water resources that supply the lake, the floodplains and the aquifers in the lake area. The Great Libyan Arab Jamahiriya joined the LCBC family as the sixth member state in 2008.

The of LCBC mandate can be summarized as sustainable and equitable management, conservation of the natural resources of the Basin and promotion of economic integration, cooperation, peace and security. Its mission stated in Article IX of the Statutes of the Commission is to:

a) Prepare general regulations which shall permit the full application of the principles set forth in the present convention and its annexed Statute, and to ensure their effective application.
b) Collect, evaluate and disseminate information on projects prepared by Member States and to recommend plans for common projects and joint research programmes in the Lake Chad Basin.
c) Keep close contact between the High Contracting Parties with a view to ensuring the most efficient utilization of the waters of the Basin.
d) Follow the progress of the execution of surveys and works in the Lake Chad Basin as envisaged in the present Convention, and to keep the Member States informed at least once a year thereon, through systematic and periodic reports which each State shall submit to it.
e) Draw up common rules regarding navigation and transport.
f) Draw up staff regulations and to ensure their application.
g) Examine complaints and to promote the settlement of disputes and the resolution of differences.
h) Supervize the implementation of the provisions of the present Statute and the Convention to which it is annexed.

Finance

The main source of funding for LCBC is the contribution from its member states that contribute the annual budget of LCBC in accordance with the following formula.

The annual budget of LCBC approved every year by Council of Ministers (COM) at its session is a two-line budget. One line is recurrent expenditure while the second line is for development projects. LCBC pays counterpart funding from its development budget for assistance received from donors and development partners for implementation of specific projects (Table 4).

Table 4: Funding of the Lake Chad Basin Commission

Country	Contribution %
Cameroon	26
Niger	7
Nigeria	52
Chad	11
CAR	4

This percentage of the LCBC budget paid by its Member States will soon change due to admission of Libya as its sixth member.

LCBC administration

- The Summit of Heads of State and Government is the supreme organ for the Organization s decision making. It meets once every two years in an ordinary session.
- The Council of Ministers, members of this council, are called Commissioners. Each Member State is represented by two Commissioners. It meets every year in an ordinary session to regulate the operation of the Commission.
- The Executive Secretariat, headed by the Executive Secretary, is the organ for the implementation of statutory provisions, management and execution of the resolution and decisions of the higher authorities on LCBC projects and programmes. Its headquarters is in N Djamena, Republic of Chad. In order to achieve global environmental benefits and re nder it more adaptive and efficient, in view of current challenges and stakes, the Commission has adopted a new structure for the Executive Secretariat following an institutional reform conducted with the assistance of the World Bank and UNDP, within the framework of the LCBC/GEF project. This new structure has been operational from 2009.

Chronology of important events in the life of the Lake Chad Basin Commission

December 1977: The LCBC signed a protocol to allow the harmonization of regulations related to flora and fauna in the four original Member States. It adopted plans seeking multiple donors to support major developments in the Conventional Basin. In 1994, the Member States approved a Master Plan that refocused LCBC support to the development and ecologically sound management of the natural resources of the Lake Chad Conventional Basin.

June 1992: The LCBC, with assistance from the UNEP and United Nations Department of Economic and Social Affairs, produced a Master Plan that established a strategy for the development and environmentally sound management of the basin s natural resources in order to ensure sustainable development of the LCBC region. The principal objectives of the LCBC Master Plan included plans to:

1. increase the availability of water resources and promote their rational utilization, including environmental and socio-economic assessment of water projects,
2. prevent soil erosion and improve soil fertility; maintain and improve vegetative cover and nutritive value of pasture land through sound management of livestock,
3. restore denuded landscapes, balance regeneration of wood biomass with offtake, and
4. establish sustained yield management for hardwoods, and work towards food security preparedness scheme, combining irrigated agriculture, food processing, preservation and storage.

1994: The Campaign to Save Lake Chad Basin aimed to enhance public awareness of the ecological problems faced by Lake Chad to promote indigenous skills/knowledge, to devise and incorporate new policy on the adoption of appropriate technologies, including alternative energy sources other than firewood, and to enhance stakeholder participation in environmental management practices. However, since the project expired, LCBC has not consciously or systematically embarked on increasing its visibility in the region.

1998: The LCBC approached the Global Environment Facility for support to address the environmental degradation problems faced by Lake Chad. The UNDP and World Bank have both assisted.

Key project components include a Transboundary Diagnostic Analysis (TDA) and preparation of a Strategic Action Programme (SAP). The full implementation of the SAP is expected to be conducted during a subsequent Second Phase of the project. The TDA leading to the formulation of SAP commenced in April of 2005. Priority country specific issues have been identified and harmonized and a 25-year SAP developed.

2000: The LCBC developed Vision 2025, a framework for action that suggests that the mobilization of political will, and ensuring good governance, is fundamental to the realization of the objectives of the LCBC and, by extension, the Member States. It complements activities supported by the GEF such as development of a TDA and longer term 20-year SAP framework for Integrated Resources Management, to be implemented across the region.

2000: The LCBC Technical Committee (TC) was established. The TC was created to contribute to harmonization of water resources management in the basin. The committee includes specialists from each of the Member States. The primary responsibilities of the Technical Committee include:

- reinforcement of the dialogue between the Member States on the issues of Lake Chad Basin;
- promotion of a mutual approach towards water management;
- harmonization of environmental and water policies and regulations in the Member States
- preparation of technical inputs to the meetings of the Council of Commissioners or Summit of Head of States ; and
- facilitation of the implementation of LCBC recommendations within the institutions of Member States.

The Directorate of Water Resources and Environment is in charge of organizing an annual Technical Committee (TC) Meeting. Due to a lack of funding, however, the Technical Committee has met only twice. During its last meeting, a draft agreement concerning the use, development, management, and conservation of water in the Lake Chad Basin was formulated. The role, agenda, constitution and working conditions of the Technical Committee is found to be a useful mechanism for the LCBC decision making process, especially as it can include other natural resources issues such as land and soil in the discussions.

2000: A Technical Inter-ministerial Committee (IMC) consisting of Senior Member State Personnel was established to disseminate information regarding LCBC activities at the various administrative levels, from local to national. The IMC provides a forum by which Member States offer feedback to the LCBC. The IMC is to provide logistical support, including provision of resource management personnel for the implementation of projects and as Members in various standing committees.

2002: A Memorandum of Cooperation (MOC) was signed by the Ramsar Convention and LCBC, covering three principal areas of Lake Chad management related activity:

- wise use of all Basin wetlands; the partners seek to involve all stakeholders in organizational cooperation and strengthen the role of wetland management and ecosystem science in sustainable development planning;
- mobilization of funding: the partners will work to ensure that projects focus on the combined importance of wetlands for biodiversity conservation and poverty reduction; and
- designation and management of Ramsar Sites: the partners will explore possibilities for a coherent national and regional network of Ramsar Sites at the Basin level as the basis for the sustainable management of wetlands.

Currently, LCBC participates in the Conference of the Parties (COP) of the Ramsar Convention. It also receives a small grant of 30 000 CHF for a project its objective was the identification of more wetlands within the Basin. Resolution No. 10 of the Fifty-second Session of the Council of Ministers of the LCBC held in June 2005 reaffirms the commitment of LCBC to the objectives of it partnership by the joining Ramsar Convention through supporting CHADWET a new regional initiative for the conservation and sustainable management of wetlands.

2003: The Global International Waters Assessment (GIWA) undertook a project to identify 1) decisions on appropriate management of interventions prepared while incorporating more sustainable approaches to the utilization of water and related resources; 2) protocol for the execution of additional costs and trans-boundary diagnostic analyses; and 3) augment co-financing. The project completed an evaluation of the Lake Chad River Basin, identified major threats, and recommended policy options for managing the Basin and its subsystems. The main concerns for the Lake Chad Basin were ranked in descending order:

- freshwater shortage;
- global climate change;
- habitat and community modification; and
- unsustainable exploitation of fish and other living resources.

2003: The Forty-ninth Council of Ministers Session of the LCBC in January 2002 conducted a feasibility study of the Lake Chad Restoration Project. The Lake Chad Restoration Project seeks to divert water from the Congo Basin to replenish Lake Chad. The LCBC submitted funding requests to potential donor countries directly and through the New Partnership on African Development (NEPAD). The planning for the feasibility study continues and the TOR for the feasibility study were approved during the Fifty Second Session of the Council of Ministers in N Djamena with the participation of the Republic of Congo (Congo-Brazzaville) and the Democratic Republic of Congo (Congo-Kinshasa). During this session, Nigeria committed US$5 million.

2003: The European Union/International Scientific Cooperation (EU-INCO) conducted a 22-month study to develop a better understanding of the role of fish marketing in the livelihoods of the fisheries communities in each of the countries of the Lake Chad Basin. The report was developed to enable decision makers in each country to use information generated by the study to guide policy and identify possible development interventions to improve the livelihoods of the various stakeholders in the fisheries sector. A premise of the study was fish marketing networks in each country, and how different groups of actors relate, their economic and social interests, must be understood to draft policies that take various stakeholder interests into account. Options were identified for drafting new development policy documents for government to promote fish marketing and the livelihoods reliant on it.

2004: The Regional Parliamentary Committee of Lake Chad Basin (RPCLCB) was established with a broad mandate to ensure payment of budgetary contributions to LCBC from Member States, and to assist LCBC in obtaining funds for project implementation. The RPCLB met in Abuja in 2004, Yaounde in 2005, and again in Abuja in 2006. The RPCLB organized a workshop to consider the Oubangui Inter-basin Water Transfer project in 2006, and members of the RPCLB have attended meetings and events hosted by the LCBC. The RPCLCB assists in raising public awareness at local, national, regional and international levels, and in the formulation of policies and legislation necessary for effective IWRM.

2005: The German Technical Assistance (GTZ) began providing assistance to LCBC through an institutional strengthening project, Lake Chad Sustainable Water Management and Institutional Strengthening . The project aims to strengthen information and data management capacity at LCBC. GTZ sponsored two workshops to identify problems associated with information generation and dissemination during the third quarter of 2005. A GTZ mission launched a new institutional strengthening project on 16 August 2005 during a LCBC workshop at its headquarters in N Djamena. Regional stakeholders and technical partners of Member States were all invited to participate.

Several key LCBC operational issues had been discussed during the GTZ workshop including relationships and mechanisms (or lack of) between the LCBC and Member States regarding data exchange; integrated water resources management in the Lake Chad Basin; knowledge management for a sustainable water resources management; and, new technologies regarding information and knowledge exchange to reinforce the relationships between the partners concerning water resources management issues.

A main recommendation arising from the GTZ workshop was for LCBC to establish a monitoring committee including one delegate per Member State. A technical team under the leadership of the Director of the LCBC Planning Department was developed and included the Director of the Water Resources Management Department, a hydrologist, a remote sensing specialist, a computer specialist and consultant experts.

2007: The GTZ issued a fact sheet announcing its intent to sponsor a project, to provide the LCBC with technical and methodological advice on establishing a sound knowledge-management system. The capacity of the Commission s Secretariat is to be developed to strengthen its overall capacities. Digital maps and hydro-meteorological data are to be made available, along with an improved data exchange between the riparian countries through implementation of an Internet map server.

2008: The LCBC GEF project produced a 25-year SAP and supports the development of a National Action Plan in the Lake Chad portion of each LCBC Member State. Management plans were developed for the Lake Fitri, Lake Chad shoreline and the Northern Diagnostic Basin and for Komadougou-Yobe and Waza-Logone basins.

Stakes and challenges of the Lake Chad Basin

Environmental problems

The Transboundary Diagnostic Analysis (TDA), carried out between 2005-2006 under the LCBC GEF Project led to the identification of seven regional environmental problems. They are listed by order of priority:

1. **Variability of the hydrological regime and availability of freshwater** refers to the dramatic decrease in fresh water availability in the Lake Chad Basin, illustrated by the decrease in the lake s volume by 95 percent from 1963 to date. It also pertains to a marked variability in the hydrological regimes of the rivers that feed it, as well as rainfall regimes in the region. This has led to continuing decline in local access to water, crop failures, livestock deaths, collapsed fisheries and wetlands services, etc. The socio-economic consequences of the impacts include food insecurity and declining health status of the populace. It is rated as the most significant problem not only because of the above impacts and consequences, but also because it drives or contributes towards all the other six problems.
2. **Water pollution** is rated relatively high and this problem is based on foreseeable trends, rooted in the absence of working regulations and standards for environmental protection. Commercial cotton and rice production, known to use large quantities of agro-chemicals are on the increase, and will lead to inorganic chemical pollution and eutrophication. There is also the issue of increasing oil exploitation in Chad, which will give rise to increased urbanization, and the pollution of water bodies from oil spills. Increased water pollution will contribute to fisheries depletion and the prevalence of invasive species.
3. **Low viability of biological resources** pertains to the inability of the regenerative rates of plant and animal resources to keep apace with exploitation and disturbances, Disappearance of tree seedlings, collapse of fisheries, sterilization of soils, etc. This phenomenon has a spiralling effect, as shortages cause unsustainable harvesting of resources and further degradation. The net socio-economic consequence is deepening poverty from lack of resources. It also contributes to biodiversity loss and increasing variability of hydrological regime and freshwater availability.
4. **Loss of biodiversity** this refers to the loss of plant and animal species, as well as damage to ecosystem health. This reduces ecosystem productivity and availability of resources, resulting in deepening poverty. It also contributes to the decreasing viability of biological resources.
5. **Destruction and modification of ecosystems e**xtensive habitat and community modification has been experienced in the lake and the river environment. The lake, for example, has changed from open water to a marshy environment, and about 50 percent of wetlands have been destroyed. This has been caused by reduced flows linked to lack of sustainable development on the political agenda of member countries, as well as a low level of environmental awareness. The impact of this phenomenon is most felt in the collapse of some fisheries and recessional rice cultivation, as well as biodiversity loss and the decreased viability of biological resources.

6. **Sedimentation of rivers and water courses** has led to changes in channel flow patterns as well as a reduction in the inflows to the lake through channel diversion, and the colonization of the silted sites by invasive species. It is driven mainly by unsustainable farming practices on marginal lands.
7. **Invading species** such as typha grass and water hyacinth; typha is a major problem in the Komadougou Yobe Basin, and quelea birds are a major invasive pest prevalent throughout the basin. The invasive species are, to a large extent, related to poor water resources management, poor enforcement of environmental regulations and standards, and the absence of resources use planning. The typha grass blocks the river channels and diverts flows, while the quelea destroys crops, hence both contribute to poverty through the loss of livelihoods.

These transboundary problems are social risks and a threat to the riparian populations of the Lake Chad Conventional basin. They are the product of the combined effects of accelerated global climate change and unsustainable practices in the use of resources by the ever-increasing population.

Identified remote causes

Three remote causes of the degradation deserve special attention and are discussed and presented below.

- Lack of a sustainable development concept for rational use of natural resources in political programmes. Governments of all the member countries devote a meagre part of their budgets to the management of biological resources and environmental protection. This is a paradox given that the economy of the region is based on the exploitation of natural resources, be it through agricultural production or direct harvesting of resources. The most plausible explanation is that officials are more concerned with short-term subjects because of the instinct for survival within a context of economic and political instability.
- Low level of education and sensitization on environmental issues. The impression is that decision-makers and people in the region have not understood the link between environmental stability and economic well-being. Proof is that each Member State spends large sums of money to fight the effects of environmental disasters rather than proactively protecting environmental degradation. With respect to the aspirations of the people, especially as expressed by their representatives, it appears that there is little desire for change and this is yet another indication of the lack of environmental awareness. It is noted that various users of resources continue to tap them in an irresponsible manner.
- Population pressure cannot be considered a major concern. However, the low level of technical knowledge for sustainable exploitation of natural resources in the region and problems of short-term survival (low standard of living), irreversibly lead to careless exploitation of natural resources by the ever-increasing population.

Some achievements

Within the limits of its mandate as spelt out by the statutes, LCBC has achieved remarkable success in its operation since its creation in 1964. It has delivered dividends in small-scale agriculture such as the promotion of good fishing practices, production of livestock, rural water supply, communication, transport, regional economic integration and cooperation as well as coordination of regional security.

Some of the outstanding achievements include:

1. The successful demarcation exercise of international boundaries between Chad, Niger, Nigeria and Cameroon between 1988 and 1992, which has now formed the basis of the dispute settlement between Cameroon and Nigeria by International Court of Justice.
2. The successful preparation of a Master Plan for the Basin in collaboration with experts from Member States and supported by FAO, UNDP and United Nations Sudano-Sahelian Office. The Master Plan basically amends the environmentally sound management of the natural resources of the conventional basin . It was adopted in 1994 by the Summit of LCBC Heads of State and Government, which at the same time launched an international campaign to save the Lake Chad.
3. The Strategic Action Plan (SAP), which is based on the Master Plan identified 36 projects as priority and projects to ensure the continued existence of the people and natural resources in the subregion. The project for water transfer Inter Basin Water Transfer (IBWT) from Oubangui to Lake Chad was second in the list of the project contained in the SAP.
4. The preparation of LCBC Vision 2025, based on an analysis of the current situation, challenges to integrated management of the basin natural resources. It defines the means to get to the envisaged situation in 2025 vis-ˆ-vis the short, medium and long-term action required to implement the reversal of degradation trends, restoration and conservation of the ecosystem for environmentally sound and sustainable development of the subregion. The document Vision 2025 identified the cause of the current environmental degradation as global climate change, unsustainable decisions, lack of good policy and the reigons political will on the part of member states, poor coordination mechanisms, poverty and fragile economic situation. Five challenges to integrated management of the Lake Chad Basin Resources are:
    a) conservation to preserve water resources, restore vegetations and protect aquatic ecosystems;
    b) restoration of the level of the lake, including wetlands;
    c) fight against desert encroachment;
    d) data collection; and
    e) regional cooperation.

Today the LCBC is making all efforts to achieve the goals of its 2025 Vision. That is, by 2025 the LCBC, its Member States and development partners envision the Lake Chad Region as:

- a common heritage, with other wetlands maintained at sustainable levels to ensure the economic security of freshwater ecosystem resources, sustained biodiversity and aquatic resources in the basin, use of this region should equitably serve the needs of the population and reduce the poverty level;

- a secure area where the national and regional authorities accept responsibility for freshwater, ecosystem and biodiversity conservation and judicious integrated river basin management to achieve sustainable development; and
- a place where every Member State has equitable access to safe and adequate water resources to meet its needs and rights and maintain its freshwater, ecosystem and biodiversity resources.

The LCBC 2025 Vision provides a way forward through:

- strengthening sub-regional cooperation;
- developing practical and donor-friendly strategies, approved by all LCBC member states;
- disseminate the vision and make it acceptable to all; and
- creating the institutional framework for implementation of the vision at both regional (LCBC) and national (member states) level and ensuring financial and political support for strengthened efficiency.

Saving Lake Chad and its Basin: An absolute necessity

The problems of the Lake Chad Basin are numerous, severe and of global importance. They call for concrete and urgent solutions not only by the LCBC (as a subregional institutional framework) and its members but the active and sustained support of the international community. The drastic shrinkage of Lake Chad is an imminent world disaster if no action is taken. The Lake Chad Basin ecosystems can be restored with combined action to reverse degradation, re-establish the former levels of Lake Chad and other wetlands through sustainable and integrated management of all water resources in the basin.

Adoption of campaign to save Lake Chad

The Eighth Summit of Heads of Government of LCBC held in Abuja (Nigeria) adopted an international campaign to save Lake Chad and approved:

a) launching of the campaign to save Lake Chad;
b) launching the campaign at the Summit;
c) directing the Executive Secretary to seek the assistance of UNDP, UNEP, UNESDCO, FAO, and ADB to organize a donors conference; and
d) signing a joint letter calling for assistance from all external support agencies, countries, institutions and organizations.

Efforts of the LCBC

Faced with these challenges, the LCBC and its member states, with assistance from its development partners carried out extensive work especially in the area of studies, which served as the basis for actions to save Lake Chad. The Strategic Action Plan (SAP), developed within the framework of GEF project was adopted in June 2008 by the LCBC Council of Ministers and was transformed into an Investment Programme available by the end of 2008, to reverse general ecosystem degradation trends in the Lake Chad Conventional Basin, if funding is obtained.

Similarly, on the basis of an internal inter-sectoral diagnostic analysis, the LCBC member states have developed national action plans to meet the priorities of the national portion of the Lake Chad Conventional Basin in their respective territories. The total investment budget for all National Plans amounts to US$788 million over a period of 15 years.

Inter-Basin Water Transfer Project (IBWT)

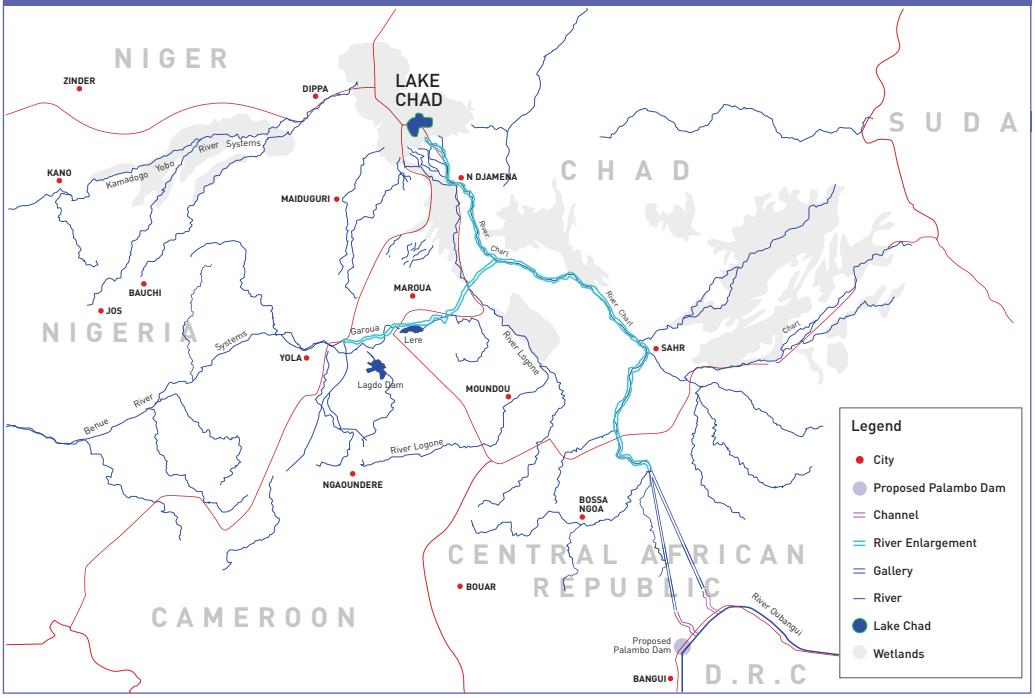
Part of the inflow from the Congo/Oubangui into Lake Chad is transferred to stop the drying and to gradually restore of its normal level (Figure 7). Lake Chad has shrunk considerably in recent years and is still shrinking. This situation may worsen to the complete drying of the lake. The affect on the local economy, especially on the survival of a population of more than 30 000 000 inhabitants who depend on the resources of the lake will be of catastrophic dimensions. To these emerging problems can be added: food insecurity, migrations to neighbouring countries, crime, conflicts and poverty. In consideration of the above, the project was launched in Abuja in 1994 at the Eighth Summit of Heads of State and Government and was given top priority. The first stage of the project, the feasibility studies, in early 2000 was estimated at US$6.07 million, and contributed by member states of LCBC.

The feasibility study aims to define: a) the mean discharge of the transfer and its modulations in compliance with socio-economic constraints; b) method of crossing the divide (ridge) between the two basins of Oubangui and Chari for passage of maximum discharge; c) necessary hydro works to ensure navigation and free flow of Lake Chad water. The feasibility study will evaluate the navigable canal linking the Logone and Benue through Mayo-Kebbi; d) Conduct an environmental impact assessment (EIA) and carry out mitigation measures; and (e) study associated projects to increase IBWT effectiveness.

The Oubangui Chari IBWT addresses the problem of under development, food insecurity and poverty in the West and Central African subregion by providing unique opportunities for:

- Basin-wide joint infrastructure investments that will benefit both the donor basin and recipient basin;
- Basin-wide joint sustainable and investment at the regional level in agriculture, livestock, fisheries, water supply, navigation and power for industrial development;
- bring socio-economic development and benefit-sharing to the member states of LCBC and the member states of CICOS; and
- extend African integration by economically linking the Economic Community of West African States (ECOWAS) and Economic Community of the Central African States (ECCAS).

Figure 7: Map of the proposed water transfer



Call for water actors cooperation and networking

Activities of all stakeholders in water: river basin organizations, other African basin organizations, NGOs and civil societies need to be properly coordinated. AMCOW could promote a forum for exchange of ideas between all water actors in the subregion, and throughout Africa to eliminate duplication. AMCOW can spearhead and organize such a forum locally, independent of the international fora for water, such as the World Water Forum.

Lake Chad and its Basin is drying, the challenges facing member states are immense. This imminent world disaster requires international cooperation and solidarity. The LCBC appealed to the international community to save Lake Chad, the environment and its ecosystems and save the lives of close to 30 million inhabitants living in the Lake Chad Conventional Basin. The Lake Chad Basin Commission therefore requests that:

- Lake Chad be declared a world ecological patrimony;
- the international community support the effective implementation of the international campaign to save Lake Chad launched by the Heads of State in 1994;
- the international community provide financial and technical support to the project for water transfer from Oubangui to Lake Chad after the feasibility study; and
- the international community support the implementation of SAP and its investment programme financially and technically.

The Ministerial Conference on "Water for Agriculture and Energy in Africa: the Challenges of Climate Change" was held in Sirte, Libyan Arab Jamahiriya, on the 15-17 December 2008.

The Conference discussed the prospects for food and energy demand by 2015 and the projections for 2030 and 2050, based on the key drivers of population and income growth and under the threat of climate change, concluding that policy decisions and budget allocations should prioritize assistance to farmers to adapt to climate change and budgets should as well be made available for large-scale infrastructure for irrigated agriculture and hydropower generation.

While recognizing the importance of national financing and regional cooperation for implementing strategies to address country needs and boost food production, the Conference Declaration appealed to multilateral agencies for additional funding and called upon developed and developing countries to realize their commitments in terms of budget allocation to agricultural production.

The Sirte Declaration called upon the African Union Commission to design a road map and a mechanism for monitoring and evaluating implementation, in collaboration with FAO, The African Development Bank, The Economic Commission for Africa, NEPAD, and the Libyan Arab Jamahiriya.

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