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Sustainable Water Resources Management in the Lake Chad Basin

Module “Adaptation to Climate Change”

REGIONAL STRATEGY FOR ADAPTATION TO CLIMATE CHANGE

Agriculture Livestock Fisheries



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EXECUTIVE SUMMARY

Past and future climate changes

Since the 20th century, climate change in the Lake Chad Basin has been characterized by a strong interannual variation. It involves two phases:

- A generally humid phase from 1901 to 1960 punctuated by dry years during the 1910, 1920 and 1940 decades;
- A generally dry phase since 1960, interrupted from the 1990s by a recovery in rainfall with heights not comparable to the situation at the beginning of the century.

Temperatures have generally increased since 1940. Projections have shown that the 120-day crop growth line will descend southward due to its dependence on temperature, evapotranspiration and precipitation. According to scenario A1, by the end of the century, 70,960 km² of land will lose their agricultural potential. Under scenario A2, large areas of the territory will be classified as having low agricultural potential. Due to the gradual southward migration of the 120-day line, about 135,150 km² will experience climatic conditions that will not allow the development of agriculture without adaptation.

No significant difference in temperature increase will be observed between the scenarios until the end of the 2030s. But, from that date on, the difference in variation between the scenarios will be noticeable. Thus, scenario B1 forecasts a relatively lower temperature increase. In this scenario, average annual temperatures will have increased by about 2°C, with 0.5°C more or less, depending on the climate zone. According to scenarios A1 b and A2, temperatures will increase more rapidly in the early 2040s, leading to a total increase of 3°C (A1b) and 4°C (A2) in 2099 (Figures 3,4 & 5). The increase predicted by these scenarios would follow the pattern of spatial and temporal variation observed between 1973 and 2013: increase in maximum temperature in autumn and spring and increase in minimum temperature in summer and winter.

The main extreme weather events in the Lake Chad Basin are mainly related to precipitation, temperature and wind (droughts, floods, extreme temperatures, high winds and sandstorms). These factors also lead to risks such as erosion, bush fires, locust attacks. Locust invasions are favored by the succession of years with wetter climatic conditions in the hyper-arid zone of the basin. According to the analysis of observed or projected climate variability and change (climate scenarios), the trend of these phenomena is increasing.

Vulnerability of the agriculture, livestock and fisheries sectors

Vulnerability studies conducted in countries have shown that fluctuations in cereal yields are linked to many factors, including variations in rainfall patterns. In both the Sahel and Sudan areas, the dry years of the 1970s, 1980s and even the decade of the 2000s have seen a decline in yields and the shift of the cotton zone southward. Significant losses of livestock and livestock migration to the south have also been reported.

Whether the dry scenario (generally dry trends with less than normal annual rainfall in the reference period) or the wet scenario (generally wet trend with annual rainfall above normal in the reference period) is selected, the extreme weather conditions (droughts and floods) that will occur will affect agricultural, pastoral and fish production. Sand encroachment and silting of water bodies and rivers, the proliferation of invasive aquatic plants, the reduction of spawning grounds and the decrease in the diversity of fish fauna will affect fishing production.

Low adaptive capacities to climate change

The basin's capacity to adapt to climate change in the agricultural, livestock and fish farming sectors is weak. Agriculture, livestock and fishery sectors contribute to between 20% and 57% of the GDP of the member countries and employ more than 50% of the active population in the basin. The incidence of poverty is high: between 28 and 76%. The low budget allocated to these sectors (5.2%, well below what is recommended by the Maputo Declaration of 12 July 2003, according to which the budget of ministries involved in agriculture in the broad sense should reach 10% of national budgets) will not facilitate a satisfactory supervision of producers by the decentralized services of the ministries in charge. Also, the low use of both organic and mineral manure (10% to 77% depending on the regions or Federated States), the limited access of producers to animal or mechanical traction (10% to 58%) and vaccines (20% to 60% of the cattle population is regularly vaccinated) are factors that increase sensitivity to climate shock and security challenges.

National climate change adaptation strategies

To mitigate the effects of climate change on populations and ecosystems, the countries of the basin have strategic adaptation documents (NAPAs, NAPs). These documents have made efforts to cover the vital sectors of the economies and are in line with the objectives and priorities of the National Poverty Reduction Strategies. Particular attention has been paid to the rural sector; most projects/programs focus directly or indirectly on rural activities (09 projects in Niger and Chad, 08 programs in Cameroon and Nigeria and 04 projects in CAR). However, little attention has been given to cross-border water management issues and sub-regional cooperation regarding observations and forecasts, dissemination of context-specific varieties and conservation management techniques for water and soil.

The United Nations Framework Convention on Climate Change (UNFCCC) adopted and opened for signature in 1992 at the Rio de Janeiro Conference is the international framework for adaptation to climate change. The highest authority of the UNFCCC is the Conference of the Parties (COP), which brings together all signatory countries each year to take decisions on the implementation of the Convention. All LCBC member countries have signed and ratified the UNFCCC and have put in place their National Climate Change Adaptation Frameworks. In Cameroon, Nigeria and Chad, one of the directorates or sub-directorates of the Ministry in charge of the environment is the UNFCCC focal point that develops and coordinates the Climate Change Adaptation (CCA) policy. In CAR, this ministry oversees the issue until the National Committee for Environment and Sustainable Development (CNEDD) is operational. In Niger, the National Environment Commission for a Sustainable Development (CNEDD) manages the CCA issue.

Objectives and strategic priorities of the regional strategy for adaptation to climate change

The Regional Strategy for Adaptation to Climate Change in the Lake Chad Basin aims **to strengthen the resilience of the rural communities in the agriculture, livestock and fisheries sectors**. It is based on five guiding principles: accordance with the institution's regulatory framework, sustainable development, regional consideration, consideration of adaptation and mitigation measures and gender dimension. It includes four strategic priorities:

- Strategic priority 1: Promotion of income-generating activities that are resilient to climate change, focusing on the development of agricultural value chains and the promotion of crafts;
- Strategic priority 2: Identification, improvement and dissemination of appropriate agro-silvo-pastoral and fish farming techniques for adaptation to climate change in the sub-sectors of agriculture, livestock and fisheries.
- Strategic priority 3: Cooperation and knowledge development on climate change and adaptive capacity building of basin populations. The activities selected contribute to the establishment of an early warning system for floods and droughts, the establishment of

a database for crisis prediction, cooperation with research institutes and the strengthening of people's capacity to adapt to climate change.

- Strategic priority 4: Establishment of a consultation platform on adaptation to climate change in the Lake Chad Basin: organization of the platform, training of stakeholders in lobbying and negotiation, preparation of participation in conferences of the parties and accreditation of the LCBC to the UNFCCC dedicated funds.

Implementation plan of the regional strategy for adaptation to climate change

For the first phase of the strategy, between 2019 and 2024, twenty measures have been selected and various sources of proposed funding can be explored for financing these measures. These may include traditional financial partners, self-financing, government contributions and specialized financing. The latter are either included in the framework of bilateral or international cooperation [Adaptation Fund (AF), Global Environment Facility (GEF), Green Climate Fund and Climate Investment Fund (CIF)].

In addition to the decision-making and implementation bodies of the LCBC, decentralized or regional services and development agencies, decentralized local authorities, non-governmental organizations (NGOs), producers, universities, research institutions and agencies, and Technical and Financial Partners (TFPs) are stakeholders and have or may have responsibilities in the implementation of measures. The institutional framework is the Executive Secretariat of the LCBC, and one of the three implementation schemes is possible:

- Directly through its directorates supported by a Steering Committee, as in the case of the Emergency Priority Development Programme for Young People and Vulnerable Population Segments in the Lake Chad Region (PURDEP);
- Indirectly through a Regional Coordination and National Coordination as in the case of PRODEBALT and PRESIBALT or by an implementing agency designated by the donor;
- Through the regional stabilization strategy

Monitoring and evaluation of the strategy implementation

The implementation mechanism consists of three main points: Resources and capacity to monitor and evaluate the implementation of the strategy; Monitoring and evaluation methodology; External evaluation.

The methodology is based on the timeline and the logical framework as well as the annual work plan to be developed at the beginning of each year. It sets the specific objectives, performance indicators and data sources.

The evaluation will be carried out in three steps:

- A midterm evaluation focusing on the effectiveness and efficiency of the strategy
- An evaluation at the end of the implementation to assess the achieved results
- A retrospective evaluation to measure impacts, lessons learned and sustainability of the results. The value of such an assessment is also to provide a useful basis for the development of future policies and strategies.

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LIST OF ACRONYMS

ACDA	Agency for Agricultural Development, Central African Republic
ACMAD	African Centre of Meteorological Applications for Development
ADB	Asian Development Bank
ADF	African Development Fund
AF	Adaptation Fund
AFB	Adaptation Fund Board
AFD	French Development Agency
AGRHYMET	Regional Centre for Training and Applications in Agrometeorology and Operational Hydrology
ANADER	National Agency for Rural Development, Republic of Chad
ANBO	African Network of Basin Organizations
AWF	African Water Facility
BGR	Federal Institute for Geosciences and Natural Resource
BMZ	Federal Ministry for Economic Cooperation and Development
BRIDGE-Africa	Building River Dialogue and Governance in Africa
CAR	Central African Republic
CBDA	Chad Basin Development Authority
CCA	Climate Change Adaptation
CDM	Clean Development Mechanism
CEBEVIRHA	Economic Commission on Cattle, Meat and Fish resources
CEMAC	Economic and Monetary Community of Central Africa
CIF	Climate Investment Funds
CILSS	Permanent Interstate Committee for drought control in the Sahel
COMIFAC	Central African Forest Commission
CRA	AGRHYMET Regional Center
CTF	Clean Technology Fund
DCP	Cooperation and Project Division
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FFEM	Preservation of Lake Chad, Contribution to the Lake Development Strategy
FIP	Forest Investment Program
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH</i> (German Corporation for International Cooperation)
GWP	Global Water Partnership
HJRBDA	Hadejia Jama'are River Basin Development Authority
IAR&T	Institute of Agricultural Research and Training, Republic of Nigeria
ICASEES	Central African Institute of Statistics, Economic and Social Studies
ICF	International Climate Fund
ICIF	International Climate and Forest Initiative
ICRA	Central African Agricultural Research Institute, Central African Republic
IDB	Islamic Development Bank
IITA	International Institute for Tropical Agriculture

IKI	International Climate Initiative
INRAN	National Institute of Agricultural Research of Niger, Republic of Niger
INSEED	National Institute for Statistics, Economic and Demographic Studies
IPCC	Intergovernmental Panel on Climate Change
IRAD	Institute of Agricultural Research for Development
IRD	Research Institute for Development
ITRAD	Chadian Institute of Agronomic Research for Development, Republic of Chad
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
LCBC	Lake Chad Basin Commission
LCBI	Lake Chad Basin Initiative Support Project
LDCF	Least Developed Countries Fund
MIDIMA	Mandara Mounts Integrated Development Mission
MIE	Multilateral Implementing Entity
NAP	National Climate Change Adaptation Plan
NAPA	National Adaptation Programme of Action
NAPRI	National Animal Production Research Institute, Republic of Nigeria
NBA	Niger Basin Authority
NBS	National Bureau of Statistics, Republic of Nigeria
NGO	Non-Governmental Organization
ONAHA	National Office of Hydro-agricultural Developments, Republic of Niger
PPCR	Pilot Program for Climate Resilience
PRESAO	Seasonal Forecasting Program in West Africa
PRESIBALT	Program for the Rehabilitation and Strengthening of the Resilience of Socio-ecologic Systems of the Lake Chad Basin
PRODEBALT	Lake Chad Basin Sustainable Development Program
PULCI	Emergency Flood Control Project
RC-TEC	Project of Capacity Building for Women Artisans in Niger, Republic of Niger
RIE	Regional Implementing Entity
SAP	Strategic Action Plan
SCCF	Special Climate Change Fund
SCF	Strategic Climate Fund
SEMRY	Society for the Expansion and Modernization of Rice Production in Yagoua, Republic of Cameroon
SHMI-EWS	Strengthening Hydro-Meteorological Information and Early Warning Systems
SNERA	Nigerien Animal Resources Exploitation Society, Republic of Niger
SOCOCA	Central African Cotton Society, Central African Republic
SODECOTON	Cotton Development Corporation, Republic of Cameroon
SODEPA	Animal Development Society, Republic of Cameroon
SREP	Scaling Up Renewable Energy Program in Low Income Countries
UEMOA	West African Monetary and Economic Union
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WEAP	Water Evaluation and Planning
WHYCOS	World Hydrological Cycle Observing System
WMO	World Meteorological Organization

1. INTRODUCTION

The last three decades have seen the mobilization of the scientific community and countries on the issue of climate change because of its potential and proven impacts and its effects experienced by societies and ecosystems. This mobilization was materialized with the creation of the Intergovernmental Panel on Climate Change (IPCC) in 1988 and the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) at the Earth Summit in Rio de Janeiro, Brazil, in 1992. Since then, there have been many summits and conferences at which conventions for better environmental management have been signed to minimize the adverse effects of climate change, whose expected scale could seriously—if not irreparably—undermine sustainable development objectives.

Like all developing countries, the countries of the Lake Chad Basin are particularly vulnerable to the impacts of climate change. Despite the catastrophic consequences that people are faced with (droughts in the 1970s and 1980s, 2010 and 2013, floods in the period after 1990, dynamics of the surface of Lake Chad, etc.), the control measures implemented in the countries have had a limited or sometimes diffuse scope as part of other programs with a focus on other development issues. The integration of climate change into development policies is a recent development. In this area, the National Action Programs for Adaptation to Climate Change (NAPA) or the National Climate Change Adaptation Plans (NAPs) were the first strategic documents for most countries.

In addition, NAPA and NAPs, whether developed and implemented or not, are national strategic documents that take little or no account of cross-border issues. As a result, they sometimes place little emphasis on certain aspects (integrated water management) that would have been treated with more attention at the regional level, for adaptation planning and design are closely linked to national sustainable development objectives.

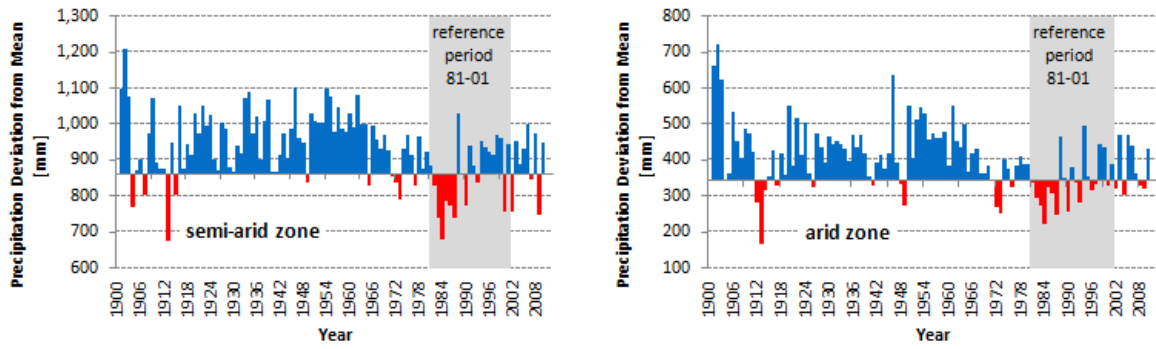
Adaptation to climate change at the regional level should consider building the resilience capacity of cross-border agricultural systems with actions that aim to transform it, to avoid or minimize the damage caused. It is therefore important to put in place a strategy that takes into account the challenges of the basin and that will contribute to the revision of the LCBC Strategic Action Plan (SAP) and the integration of climate change into the planning process.

1.1. Context and Justification

Since the beginning of the 20th century, climate change in the Lake Chad Basin has been characterized by a strong interannual variation. It involves two phases:

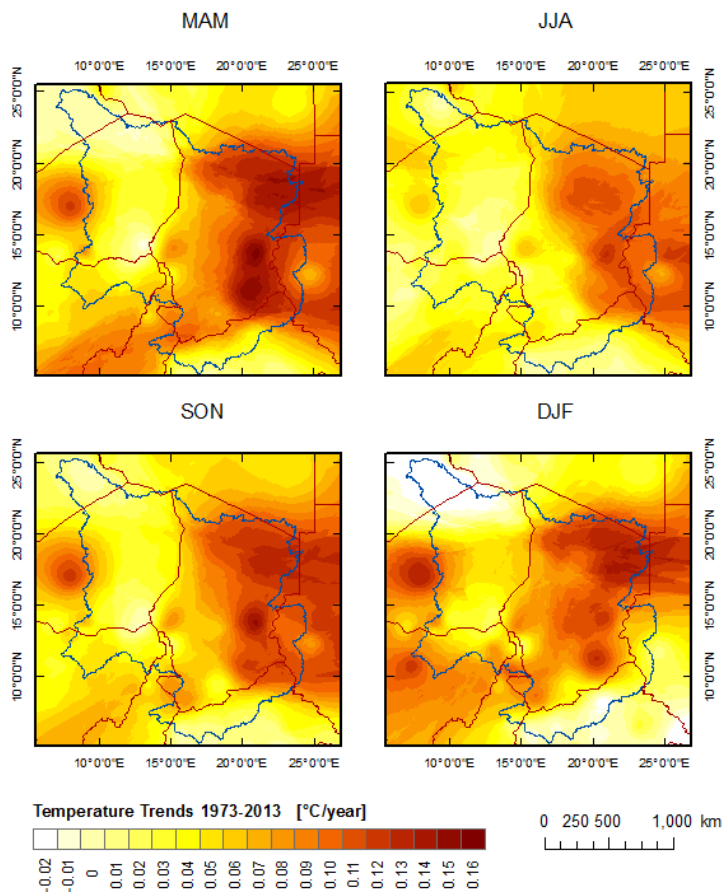
- A generally humid phase from 1901 to 1960 punctuated by dry years during the decades 1910, 1920 and 1940;
- A generally dry phase since 1960, interrupted from the 1990s by a recovery in rainfall with amounts not comparable to the situation at the beginning of the century.

Temperatures have generally increased since 1940. Projections have shown that the 120-day crop growth line will descend southward due to its dependence on temperature, evapotranspiration and precipitation. According to scenario A1, by the end of the century, 70,960 km² of land will lose its agricultural potential. Under scenario A2, large areas of the territory will be classified as having low agricultural potential. Due to the gradual southward migration of the 120-day line, about 135,150 km² of land will experience climatic conditions that will not allow the development of agriculture without adaptation.



Source: GIZ/LCBC, 2015

Figure 1: Annual precipitation anomalies from 1900 to 2010



Source: GIZ/LCBC, 2015

Figure 2: Seasonal temperature trends, 1973-2013

1.2. Future climate change

The study carried out by GIZ and the LCBC (2015) confirms the results of the projections made in the context of the second national communication on climate change: The North-South dynamics of isohyets have been predicted. The 120-day¹ vegetative line will experience a southward shift due to its dependence on temperature, evapotranspiration and precipitation. According to scenario A1, by the end of the century, 70,960 km² of land will lose its agricultural potential. Under scenario A2, large areas of the territory will be classified as having low agricultural potential. Due to the gradual southward migration of the 120-day line, about 135,150 km² will experience climatic conditions that will not allow for the development of agriculture without adaptation (Figure 6).

No significant difference in temperature increase will be observed between the scenarios until the end of the 2030s. But, from that date on, the difference in variation between the scenarios² will be noticeable. Thus, scenario B1 forecasts a relatively lower temperature increase. In this scenario, average annual temperatures will have increased by about 2°C, with 0.5°C depending on the climate zone. According to scenarios A1b and A2, temperatures will increase more rapidly in the early 2040s, leading to a total increase of 3°C (A1b) and 4°C (A2) in 2099 (Figure 3, Figure 4 and Figure 5.). The increase predicted by these scenarios would follow the pattern of spatial and temporal variation observed between 1973 and 2013: increase in maximum temperature in autumn³ and spring⁴ and increase in minimum temperature in summer⁵ and winter⁶ (GIZ/LCBC, 2015).

¹ The 120-day line is the northern limit of the area that has a vegetative period of 120 days or more during which agriculture without adaptation is possible.

² A1b, A2 and B1

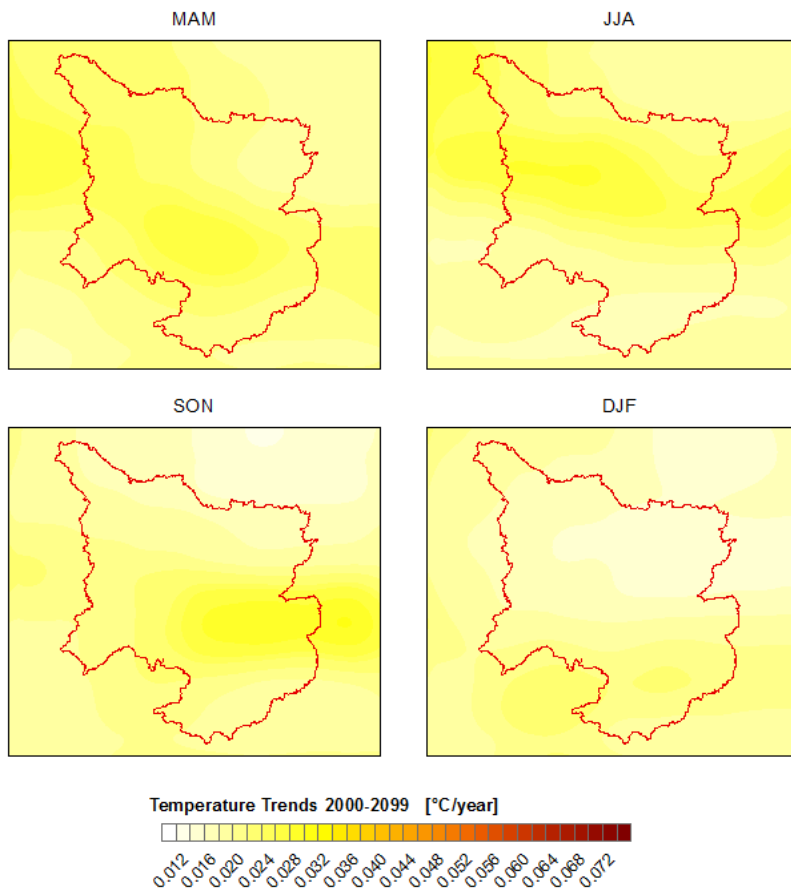
- **The B1 story line/scenario:** Follows the A1 story line (a global population that will peak in mid-century and decline thereafter), but people move quickly toward an economy based on services with a quick introduction to clean and sustainable technologies
- **The A1b (“balanced”) story line/scenario:** Very rapid economic growth, a global population that will peak in mid-century and decline thereafter and a rapid introduction of new and more efficient technologies. No excessive reliance is placed on a particular energy source, assuming that similar rates of improvement apply to all energy supply and end-use technologies.
- **The A2 story line/scenario:** The A2 story line describes a regionally fragmented economic growth, where new technologies are introduced much slower and only locally. Population growth is continuously increasing.

³ Autumn: September, October, November (SON)

⁴ Spring: March, April, May (MAM)

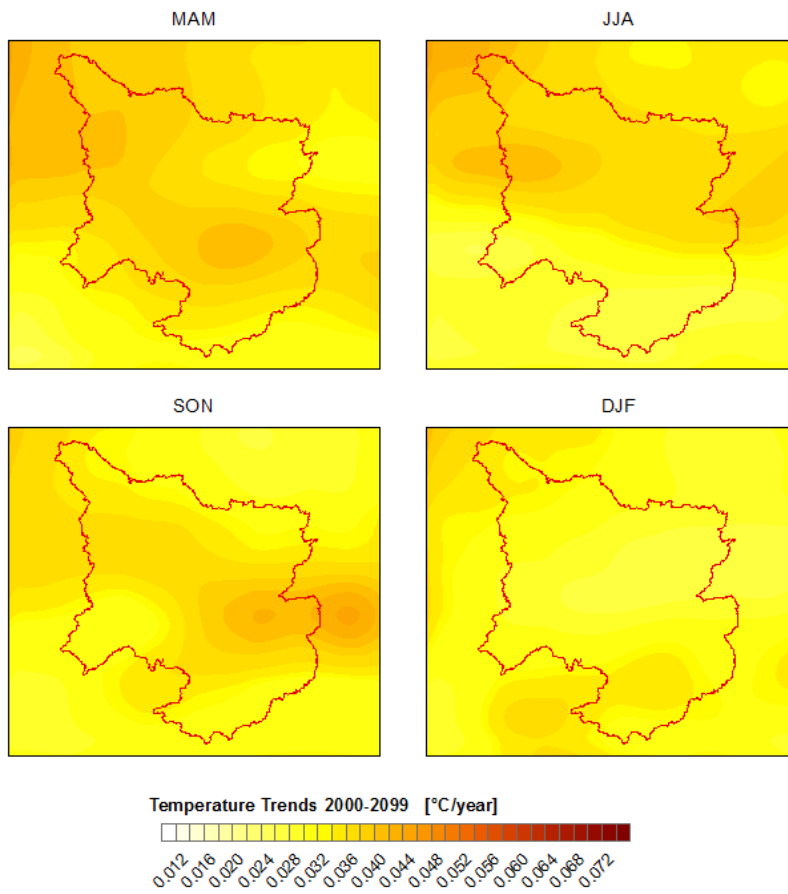
⁵ Summer: June, July, August (JJA)

⁶ Winter: December, January, February (DJF)



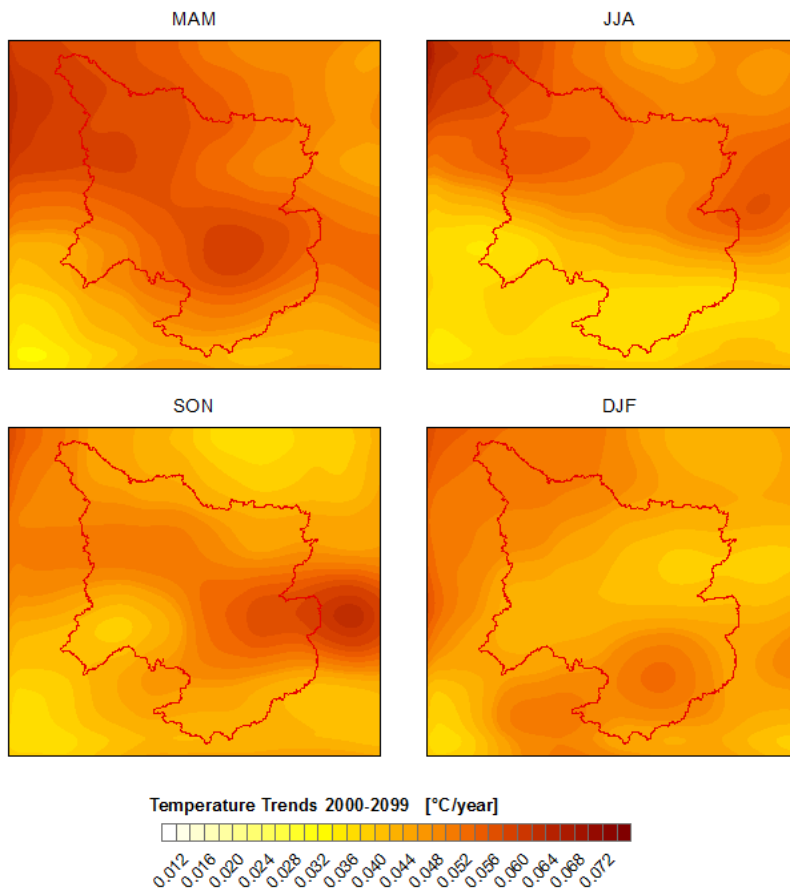
Source: GIZ/LCBC, 2015

Figure 3: Seasonal temperature trends under scenario B1



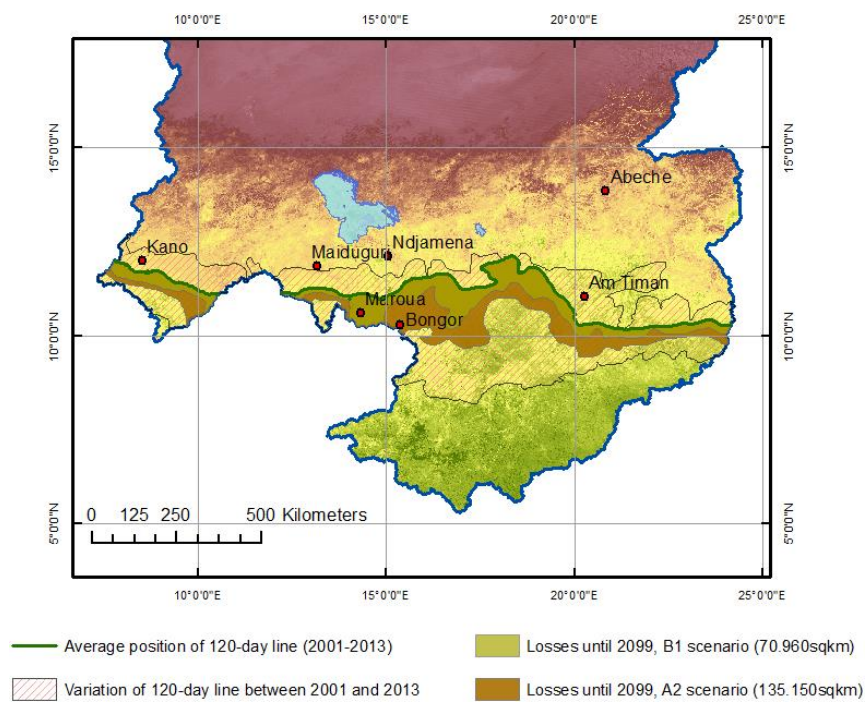
Source: GIZ/LCBC, 2015

Figure 4: Seasonal temperature trends under scenario A1b



Source: GIZ/LCBC, 2015

Figure 5: Seasonal temperature trends under scenario A2



Source: GIZ/LCBC, 2015

Figure 6: 120-day line southward shift in scenarios B1 and A2

1.3. Climatic risks

The main extreme weather events in the Lake Chad Basin are primarily related to precipitation, temperature and wind (Table 1). The main hazards are droughts, floods, extreme temperatures, high winds and sandstorms. These factors also lead to risks such as erosion, bush fires and locust attacks. Locust invasions are favored by the succession of years with wetter climatic conditions in the hyper-arid zone of the basin. According to the analysis of observed or projected climate variability and change (climate scenarios), the trend of these phenomena is increasing.

Table 1: Climate risks recorded by the countries of the Lake Chad Basin

Country	Cameroon	CAR	Chad	Niger	Nigeria
Risks	Heatwaves; dust storms; droughts; floods; quantity and variability of rainfall	Floods; decrease of the rainfall; bush fires; droughts	Droughts; floods; sand/dust storms; extreme temperatures; strong winds; locust invasions; bush fires	Floods; droughts; sand/dust storms; extreme temperatures; strong winds; locust invasions; bush fires	Floods; droughts; storms; extreme temperatures; erosion

1.4. Vulnerability of agriculture, livestock farming and fishery sectors

Vulnerability studies conducted in the basin countries have shown that fluctuations in cereal yields are linked to many factors, including variations in rainfall patterns. In both the Sahel and Sudan areas, the dry years of the 1970s, 1980s and even the decade of the 2000s have seen a decline in yields and the shift of the cotton zone towards the south. Significant losses of livestock and livestock migration to the south have also been reported.

Whether the dry scenario (generally dry trends with less than normal annual rainfall in the reference period) or the wet scenario (generally wet trend with annual rainfall above normal in the reference period) is selected, the extreme weather conditions (droughts and floods) that will occur will affect agricultural, pastoral and fish production. Sand encroachment and silting of water bodies and rivers, the proliferation of invasive aquatic plants, the reduction of spawning grounds and the decrease in the diversity of fish fauna will affect fishing production.

1.5. Low adaptive capacities

The basin's capacity to adapt to climate change in the agricultural, pastoral and fishing sectors is weak. The agriculture, livestock and fishery sectors contribute between 20% and 57% of the GDP of the member countries and employ more than 50% of the active population in the basin. The incidence of poverty is high: between 28 and 76%. The low budget allocated to these sectors (5.2%, well below what is recommended by the Maputo Declaration of 12 July 2003, according to which the budget of ministries involved in agriculture in the broad sense should reach 10% of national budgets) will not facilitate a satisfactory supervision of producers by the decentralized services of the ministries in charge. Also, the low use of both organic and mineral fertilizers (10% to 77% depending on the regions or Federated States), the limited access of producers to animal or mechanical traction (10% to 58%) and vaccines (20% to 60% of the cattle population is regularly vaccinated) are factors that increase sensitivity to climate shock.

1.6. National strategies for climate change adaptation do not consider cross-border issues

To mitigate the effects of climate change on populations, the countries of the basin have strategic adaptation documents (NAPA, NAPs). These documents have made efforts to cover the vital sectors of the economies and are in line with the objectives and priorities of the National Poverty Reduction Strategies. However, little attention has been given to cross-border water management issues and sub-regional cooperation regarding observations and forecasts, dissemination of context-specific varieties and conservation management techniques for water and soil.

2. STRATEGY DEVELOPMENT PROCESS

The development of the regional strategy for adaptation to climate change in agriculture (including livestock, fisheries, forestry) is one of the activities of the *"Sustainable Water Resources Management in the Lake Chad Basin"* program and its *"Adaptation to Climate Change"* module. It is a two-step process:

2.1. First step

The first phase of the baseline studies began in 2013 with the launch of the past and future climate change study validated in early 2015. A survey on agricultural production systems also took place in the project's pilot area. This survey covered agro-silvo-pastoral and fishing production systems, their vulnerability to climate change, traditional adaptation measures implemented by producers and modern ones introduced by external interventions. The local perception of climate change, the adaptation needs of production systems and the evaluation of previous interventions were also analyzed. The relevant measures revealed by the survey were tested in about ten regions in the pilot area of the project (N'Djaména-Maroua-Bongor triangle). These are: the use of improved drought-resistant seeds (of the three crops: maize, sorghum and cowpea); soil and water conservation techniques; capacity building for producers and supervisors (NGOs, extension agents, and CSOs) and flood recession or off-season crops (watermelon, sorghum, melon).

2.2. Second step

The second step consisted of setting up the team for the development of the strategy, data collection, analysis, writing and the validation of the strategy.

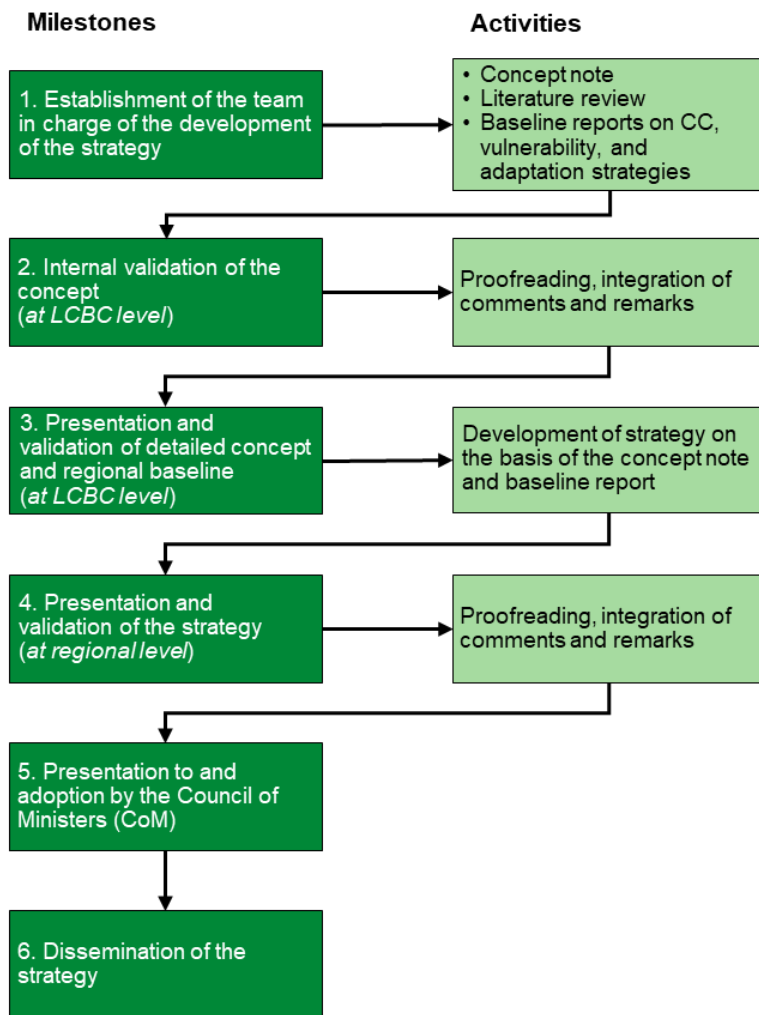


Figure 7: Steps in the development of the strategy

3. STRATEGIC ORIENTATIONS

This section describes the objectives, guiding principles, issues and strategic axes that guide the actions defined in the strategy.

3.1. Objectives

The diagnoses have shown that the Lake Chad Basin is exposed to hazards associated with climate change. The people living the basin, mainly composed farmers, herders and fisherfolk, are particularly vulnerable and have very limited adaptive capacities. There is therefore an urgent need to take action to reduce their vulnerability. Thus, the Regional Strategy for Adaptation to Climate Change in the Lake Chad Basin aims to **strengthen the resilience of rural areas in the agriculture, livestock and fisheries sectors**.

3.2. Challenges

Regional cooperation: In a transboundary basin, adaptation is a particular challenge, as it requires strong cooperation between riparian countries on a cross-cutting issue (climate change). In this context, the adaptation effort demands attention at all levels and in all sectors and institutions as well as the participation of many actors with occasionally conflicting and competing interests, across multiple physical, political and institutional boundaries. Regional cooperation would allow for more effective and efficient adaptation, through the aggregation of available data, models, scenarios and resources, the extension of space for planning and locating adaptation measures and the facilitation of access to financing.

Coordination of the actions through the LCBC: The LCBC has proved its ability to implement this strategy. In addition to its experience in program implementation, the LCBC has already implemented and documented the results of almost all projects, either directly or indirectly through its partners in the framework of the pilot projects. The reform, which is in its final phase of implementation, and the capacity building of experts and division heads initiated since 2013 will further improve the institution's capacity.

Financing: One of the factors limiting the implementation of development strategies in Sub-Saharan Africa is the lack of funding. When such funding is available, access is made difficult by eligibility conditions. Access to funds dedicated to climate change adaptation is certainly facilitated; however, these funds are much more focused on pilot projects.

At the same time, the private sector is emerging as a major source of funding for measures against climate change. However, there are no, or only few, appropriate strategies for mobilizing funds; poorly developed public-private partnerships limit the ability of the States to take advantage of the growing opportunities offered by the private sector for financing.

Aware of this situation, some countries in the basin have developed modalities for integrating climate change into planning, programming, budgeting and monitoring. The challenge of prioritization and the limited budgetary funds complicate the implementation of this strategy.

Cross-border actions for adaptation: it is noted that national climate change adaptation strategies are planning documents with national or local objectives. The policies they support apply almost exclusively at the national and local levels. They deal with little or no cross-border issues that would consolidate the impacts of implemented measures (locust control, animal disease control, seasonal forecasting, disaster prediction). It should also be noted that it is difficult to find an evidence of a consultation framework capable of preventing adaptation actions developed in one country from having negative repercussions in neighboring countries. To respond to the risk of maladaptation represented by the transfer of vulnerability from one country to another, cross-border actions for adaptation appear to be a lever that can improve the adaptation process to climate change.

3.3. Guiding principles

The climate change adaptation strategy of the LCBC is based on five guiding principles that were identified during the exchange meetings.

Compliance with strategic framework: The LCBC has a Vision that guides all its actions, the strategic framework of which is the Strategic Action Program (SAP). This strategy is part of this strategic framework, which includes the Climate Change Development and Adaptation Plan, the Master Plan for the Control of Sand and Water Erosion and other strategic plans and master plans. The regional adaptation strategy adds issues of adaptation to climate change

Sustainable development: The adaptation measures defined are in accordance with the Sustainable Development Goals (SDGs). They contribute to the eradication of poverty, the protection of the planet and prosperity for all.

Regional consideration: National climate change adaptation documents focus on national adaptation aspects. The adaptation measures included in the regional strategy only address cross-border aspects. Thus, any of the selected activities must be implemented in at least two countries.

Taking into account adaptation and mitigation measures: In addition to coherence with the development policies of the Member States, the recommendations (proposed activities) must provide solutions to the problems raised by the adaptation plans (NAPA and NAP).

Gender dimension: The adaptation measures developed in this strategy must take into account the gender dimension. Reducing the inequalities faced particularly by women and marginalized people (including people with disabilities and minorities) enhances the ability of households to adapt to climate change.

3.4. Strategic priorities

3.4.1. Strategic priority 1: Promotion of income-generating activities that are resilient to climate change

Crafts, small urban and rural trades and value chains of certain speculations (rice, tomatoes, onions, etc.) are activities that are not or only slightly influenced by the vagaries of the climate. They can then be developed to strengthen people's resilience to the effects of climate change.

(i) *Crafts and small businesses:* Crafts⁷, informal trade and small businesses (mechanics, carpentry, phone booth operators, hairdressing salons, etc.) are the main secondary activity of the rural population in the basin. These sectors are struggling to provide an alternative to rainfed agriculture because of the multiple expectations that are improving production techniques, product quality and diversification for wider access to markets with higher added value, as reported by RC-TEC (Project of Capacity Building for Women Artisans in Niger).

(ii) *Value chain:* it is well known in the Lake Chad Basin. Traditionally, many agricultural products are processed locally before being marketed, for example groundnuts, sheabutter and sesame, which are processed into oil, paste or other derivatives; tomatoes, cut and dried; cassava processed into flour. But their promotion is subject to technical, economic and organizational constraints.

Market gardening is an activity that contributes not only to reducing sensitivity to climate change but also to mitigating the phenomenon of rural exodus. At the local level, market gardening, like the production of onions, is an important source of income and contributes to food security. However, the aspects relating to the value chain are not well understood by producers. Aspects of commercialization of market gardening products are subject to several

⁷ Mainly jewelry, leather goods, sewing, embroidery, weaving, dyeing, shoemaking, woodcarving, bookbinding and ironwork

distortions that lead to market dysfunction: information asymmetry (small isolated producers with limited access to information on average prices), the absence of market structures (warehouse, cold room), low processing capacity, transport difficulties and poor logistics of the sectors⁸.

Recommendations

At a certain time of the year, a shortage of certain products is observed in the major consumption centers of the basin (N'Djaména, Maiduguri, Maroua, Diffa, Kano, ...). This situation is not only due to climatic hazards that influence production, but also and above all to post-harvest losses due to processing and storage difficulties. The development of the value chain through support for the production, processing, transport and storage of the most traded commodities such as oilseeds (groundnuts, sesame), vegetables (tomatoes, onions) and cereals (rice and maize, if necessary) contributes to strengthening the adaptive capacity of populations.

Crafts can also be an alternative secondary activity for farmers, herders and fishermen of the basin. The supply of raw materials from vegetation, wildlife, quarries or recycling and the production circuit do not depend on rainfall patterns. It is therefore important to better structure this sector, diversify it and increase the supply and strengthen the capacity of the actors.

On the basis of this assessment the following activities are recommended:

Development agricultural value chains:

- (i) Organization of producers, the supply chain of processing units and marketing;
- (ii) Support to the establishment of handicraft or semi-industrial processing units and storage structures;
- (iii) Support to initiatives to process tomatoes and other market gardening products;
- (iv) Capacity building of institutional, technical and financial support structures;
- (v) Organization of the producers in cooperatives.

Promotion of arts and crafts:

- (i) Facilitation of the supply of raw materials;
- (ii) Strengthening the technical, organizational or commercial capacities of craftspeople and their cooperatives in the various craft sectors;
- (iii) Support for the improvement of the quality of their products;
- (iv) Support for the creation of exportable and marketable collections;
- (v) Support for the manufacture of agricultural tools.

⁸ Folefack, D. P., & Djoulde, D. R. (2013). *Les stratégies de commercialisation des produits maraîchers sur le marché de Maroua, au Cameroun*. AGRIPADE, 29(June).

3.4.2. Strategic priority 2: Identification, improvement and dissemination of appropriate agro-silvo-pastoral and fish farming techniques for adaptation to climate change

The inventory of agricultural production systems and local perception of climate change conducted by GIZ and the LCBC (2015) in the N'Djamena-Maroua-Bongor triangle and a literature review (project reports, scientific studies, and other reports) have shown that traditional adaptation techniques as well as some introduced by external interventions, are used throughout the basin. These are mainly techniques related to

- (i) soil and water conservation;
- (ii) agroforestry (vegetation, reforestation and assisted natural regeneration such as the *Faidherbia albida*⁹ parks);
- (iii) agriculture: soil preparation, bovine or donkey traction and crop rotation, crop rotation, crop rotation or fallowing.

These agro-pastoral techniques that allow adaptation to climate change must be popularized.

Recommendations

The survey on production systems in the pilot area carried out by the ACC project should be extended to the main production basins. Interventions in climate change adaptation in rural areas, preceded by an inventory of local perceptions, current adaptation measures and adaptation needs, produce more significant results because they consider the strengths and weaknesses of these systems and improve good practices and discourage bad ones. It is important to:

- (i) Carry out an inventory of adaptation practices and adaptation needs to climate change in the main production basins;
- (ii) Improve and disseminate good adaptation techniques;
- (iii) Raise awareness on the adverse impacts of certain agricultural practices.

Adaptation measures implemented by the interventions of the GIZ and its partners (GIZ, PRODEBALT) and which have yielded good results must be repeated for wide dissemination.

Agriculture:

- (i) *Support for agricultural development:* Capacity building for agricultural extension services; Dissemination of varieties adapted to the socio-cultural context and climatic conditions; Facilitation of access to inputs through support for the establishment of a specialized system; Facilitation of access to credit.
- (ii) *Promotion of peri-urban agriculture:* Support for the development of market gardening in peri-urban areas;
- (iii) *Support for agricultural diversification:* Incentivizing market gardening; Support for recession agriculture crops.
- (iv) *Support for irrigated agriculture:* Extension of irrigation systems with wells to small irrigated perimeters.

⁹ The current expansion areas are the Zinder region of Niger, northern Cameroon and the savannah of northern Nigeria.

Livestock farming:

- (i) Small-scale intensification: Promotion of peri-urban livestock farming through cattle and sheep fattening and poultry farming.
- (ii) Use of agricultural residues as livestock feed;
- (iii) Support to the revision of transboundary transhumance corridors and grazing areas;
- (iv) Extension of fodder production: Introduction or extension of fodder species in pastoral areas; extension of fodder conservation techniques.

Fishery:

- (i) Development of small-scale fishing: Construction of landing stages and support for the production and packaging of smoked fish;
- (ii) Development of aquaculture: Support for the establishment of fishponds and stocking of natural ponds, support for the production of fish feed, support for spirulina producers and construction of fish stocking centers.

3.4.3. Strategic priority 3: Cooperation and knowledge development on climate change and building adaptive capacities of basin populations

To meet the challenges of climate change, it is necessary to set up a regional warning system that will make agro-hydro-meteorological information available to users. This will help prevent natural disasters such as floods, droughts, locust invasions, etc. and their consequences.

At the LCBC, a water resources planning model is utilized that uses the Water Evaluation and Planning System (WEAP) to assesses flows from the Chari, Logone, Kumadugu-Yobe and Elbeid rivers within the framework of the Lake Chad Basin Water Charter. Furthermore, cooperation with the Emergency Flood Control Project (PULCI) and GWP through the project "*Strengthening Hydro-Meteorological Information and Early Warning Systems (SHMI-EWS) in the Lake Chad Basin*" will enable the establishment of an early warning system for floods and droughts in the Yaérés. Similarly, the WMO's World Programme WHYCOS, through the Lake Chad-HYCOS project, and the PRESIBALT will contribute to providing the Lake Chad Basin Commission and its member countries with the means, tools and expertise to efficiently monitor and manage water resources.

In addition, there are agencies in West and Central Africa that specialize in the collection, analysis and seasonal hydro-climatic forecasting, such as the African Centre for the Applications of Meteorology for Development (ACMAD), the AGRHYMET Regional Centre, etc. Cooperation with these agencies will enable the LCBC to set up an early warning system for floods and droughts. There are also other initiatives for the hydrology of the major river basins. These include the "*Building River Dialogue and Governance in Africa*" (BRIDGE-Africa) program set up by IUCN to strengthen the water governance capacity of rivers and lakes at all levels (local, national or transboundary) in water governance, negotiation and benefit sharing, as well as with the *Global Water Partnership*; and UNESCO's FRIEND-Water Programme, which contributes to researching on regional water resources, droughts, global change and the water cycle. These projects complete each other and interact with many national projects and international initiatives. They will facilitate access for the LCBC to seasonal forecasts and capacity building in monitoring and updating.

One of the cornerstones of reducing agriculture vulnerability to climate variability and change is the availability of varieties adapted to climatic contexts. To this end, the LCBC should bring together national agricultural research institutions to contribute to the dissemination of varieties adapted to the socio-cultural and climatic context of different agro-ecological areas in the basin.

The LCBC could also bring together the National Institutes in charge of statistics and the agricultural statistics services to set up a system for collecting agrarian data and to have a database to predict crises.

Recommendations

The following activities are recommended:

- (i) **Setting up an early warning system for floods and droughts:** It is necessary to complete the establishment of an early warning system for floods and droughts (on the main rivers of the Chari, Logone, Elbeid and Kumadugu-Yobe) initiated by previous or ongoing interventions in the basin (PRODEBALT, PRESIBALT, etc.). Given that the PULCI project will only consider a few stations on the Logone and that the PRESIBALT and the cooperation with WMO through the Lake Chad-HYCOS project will take into account the installation of a number of observation stations, it is essential that this strategy allows the Commission to obtain a dense network of stations for data collection that is sufficient to produce credible information. These initiatives must also be supported by a data transmission and processing system and the capacities of the Basin Observatory must be strengthened.
With regard to agro-meteorological information, the Basin Observatory will have to sign agreements with the specialized institutions (ACMAD, AGRHYMET Regional Centre) that will allow the establishment of a cooperation platform to facilitate the permanent access of the LCBC to seasonal forecasts and the strengthening of its capacities in updating these forecasts as well as the production of monthly reports.
- (ii) **Establishment of a database to predict crises:** The Directorates of Agricultural Statistics and the national statistical institutes or offices publish related statistics after each agricultural season. To compare data and set up a regional database, it is necessary to set up a platform, linking the above-mentioned institutions, to define the modalities of collection (sampling frame, collection methodology, etc.) and transmission of agricultural and pastoral data. This database will enable the building of a model to estimate the food situation in the basin and prevent food disasters.
- (iii) **Cooperation with research institutions:** It is necessary to establish a platform for cooperation with national institutes in charge of agricultural research to organize the seed sector and provide agricultural producers with access to seeds that are adapted to the social and climatic context of their respective agro-ecological zones. To do this, it is necessary to sign a memorandum of understanding with these institutions and to carry out an inventory of crop (and animal) varieties adapted to the different agro-ecological area. Finally, seed multiplication centers must be set up in the production basins as well as measures to strengthen the capacity of the structures in charge of extension and dissemination.
- (iv) **Strengthening the adaptive capacity of populations:** The adaptive capacity of producers will be strengthened through the dissemination of hydro-agro-meteorological information and the provision of varieties adapted to the prevalent climatic conditions. The broadcasting of hydro-agro-meteorological information will be done in local languages through the regional stations of the national radio stations and by the community radio stations.
- (v) This information takes the form of seasonal climate forecasts produced by the specialized agencies of West and Central Africa (ACMAD, AGRHYMET, etc.), monthly reports (which are updates of these forecasts), and disaster warnings made by the Basin Observatory or national meteorological and disaster warning agencies. Capacity building for varieties adapted to agro-ecological areas will consist of training on the technical itineraries of the varieties to be disseminated. This can be done through farmer field schools in the production basins.

3.4.4. Strategic priority 4. Establishment of a consultation platform on adaptation to climate change in the Lake Chad Basin

Due to the geographical location of the basin, the members States of the LCBC belong to various regional institutions (ECOWAS, ECCAS, UEMOA, CEMAC) and their specialized agencies (CEBEVIRHA, CILSS, COMIFAC, etc.). It is important that the LCBC strengthens its cooperation with these regional institutions and their specialized bodies in the field of climate change adaptation in the agriculture, livestock and fishery sectors.

Recommendations

The following activities are recommended:

- (i) Creation of a consultation platform bringing together regional institutions such as CEMAC, ECOWAS, CILSS, UEMOA, the African Network of Basin Organizations (ANBO), NBA, etc.
- (ii) Preparation of an action plan for the operationalization of the platform;
- (iii) Preparation of the implementation roadmap.

4. IMPLEMENTATION PLAN OF THE REGIONAL STRATEGY FOR ADAPTATION TO CLIMATE CHANGE

This section presents the actors involved in the implementation of the Strategy, the coordination, the action plan, and the monitoring and evaluation mechanism.

4.1. Geographical area of intervention and beneficiaries

The geographical area of intervention of this strategy is the conventional basin of the Lake Chad. The conventional basin covers an area of 967,000 km² and comprises Chad, the Central African Republic, Nigeria, Niger and Cameroon. It is an area that is home to a population of about 47 million people in 2013 living mainly in rural areas (the proportion varies between 48% and 82% depending on the country). A map of the Lake Chad Basin is shown in Figure 8.

The main employment sectors are agriculture, livestock and fisheries. Between 26% and 84% of the active population in countries of the conventional basin practice agriculture.

In the livestock farming sector, the livestock population is estimated at 200 million heads, mainly cattle, camels, goats and sheep (FAOSTAT, 2014).

Fishing takes place in Lake Chad, reservoirs, flood plains and in the basin's hydrographic networks. It has been estimated that, in 2012, fishery production stood between 50,000 and 100,000 tons; the fishing industry is a source of income for between 200,000 and 300,000 people in the basin¹⁰.

The direct beneficiaries are the populations of the basin living in rural or peri-urban areas.

4.2. Bodies and stakeholders implementing the strategy: responsibilities

The Summit of Heads of State: The Summit of Heads of State is the supreme decision-making and policymaking body of the Commission.

The Council of Ministers: The Council of Ministers is responsible for the supervision and control of the Commission. It meets annually in ordinary session and consists of two Commissioners per Member State. At this ordinary session, it adopts the budget, the Commission's annual action program and any other planning document.

Technical Expert Committee: The CBLT Technical Committee was established in 2000. It was founded to contribute to the harmonization of water resources management in the basin. It is an advisory body responsible for providing technical advice to the Executive Secretariat and the Council of Ministers, whose sessions it also prepares.

The Executive Secretariat of the Lake Chad Basin Commission (LCBC): This is the implementing body responsible for:

- Collect, review and disseminate information on projects prepared by Member States and recommend planning for joint work and joint research programs in the Basin;
- Monitor the execution of studies and works in the Basin and keep Member States informed.

¹⁰ Lemoalle, J., & Magrin, G. (2014). *Le développement du lac Tchad Situation actuelle et futurs possibles*. (Collection expertise collégiale, Ed.), Ird. Marseille, France: Institut de Recherche pour le Développement (IRD).

DELIMITATIONS IN THE LAKE CHAD BASIN



Figure 8: Delimitations in the Lake Chad Basin

Regional decentralized services: Delegations or regional and departmental departments could support the implementation of the strategy through the facilitation, coordination, monitoring and evaluation, at the regional or departmental level, of the activities falling within their sub-sector

Development companies and agencies also participate in agricultural extension, provide inputs and equipment, liaise between producers and agricultural credit agencies, and support the creation and formation of groups. These include, amongst others:

- In Cameroon: Société de Développement du Coton (SODECOTON); Société d'Expansion et de Modernisation de la Riziculture de Yagoua (SEMRY) and Mandara Mounts Integrated Development Mission (MIDIMA); SODEPA (Société de développement Animal) ;
- In Niger: The National Office of Hydro-agricultural Developments (ONAHA), the Riz du Niger (RNI) and the Société Nigérienne d'Exploitation des Ressources Animales (SNERA).
- In Nigeria: Hadejia Jama'are River Basin Development Authority (HJRBDA) and Chad Basin Development Authority (CBDA), the Federal Ministry of Agriculture and Rural Development (FMARD), the Federal Ministry of Water Resources (FMWR), and the Federal Ministry Environment (FME);
- In Chad: National Agency for Rural Development (ANADER) and Coton-Tchad;
- In CAR: Société Cotonnière Centrafricaine (SOCOCA), Central African Agency for Agricultural Development (ACDA), and Agence Nationale de Développement de l'Élevage (ANDE).

Decentralized local authorities: They are an important link in the implementation of the strategy. Their mission is to promote local development. In Nigeria, for example, “Local Governments” are involved in agricultural development, natural resource management (other than mineral exploitation) and hydro-agricultural land management¹¹¹²¹³. In Niger, municipal councils deliberate on the preservation and protection of the environment, the management of natural resources and the management of transhumance corridors, grazing areas and pastoral water points¹⁴. In Cameroon, the mission of the councils of local authorities is to promote the economic and social development of local authorities¹⁵, and therefore the NAP recommends the integration of adaptation to climate change into their action plan.

Non-governmental organizations (NGO) and associations: National and international NGOs support the LCBC in the implementation of projects in the field. They support and accompany public service interventions in rural development. Their capacity to implement projects has certainly improved, especially the capacities of national NGOs. However, it is unclear how visible their actions are given the weakness of the existing monitoring system.

Producers: These are the direct beneficiaries of the activities to be implemented. Thus, they are the basic actors of the regional strategy for adaptation to climate change in the Lake Chad Basin. The achievement of the objectives of this strategy depends in part on their cooperation. As a result, they must be open to innovation, receptive to awareness messages and available for information gathering operations. In some regions, these millions of small farmers are

¹¹ BNRCC. (2011). *National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (NASPA-CCN)*. Ibadan, Nigeria: Building Nigeria's Response to Climate Change (BNRCC), Federal Ministry of Environment Special Climate Change Unit, Canadian International Development Agency.

¹² Ibietan, J. (2010). *The role of local government in rural development issues*. Knowledge Review, 20(2), 30–38.

¹³ Aleyomi, M. B. (2013). *Local Government Administration in Nigeria: a Review*. *Africana*, 6(2), 33–47.

¹⁴ Gouvernement de la République du Niger. (2011). *Code général des collectivités territoriales - Recueil des textes sur la décentralisation*. Niamey, Niger: Gouvernement de la République du Niger.

¹⁵ Gouvernement de la République du Cameroun. *Loi N° 2004/017 du 22 juillet 2004 portant orientation de la décentralisation (2004)*. Cameroun.

grouped into Producer Organizations (POs) organized around the production, storage, processing and marketing of agricultural products.

Universities, institutions, and research agencies:

National institutions: Agricultural research and extension of research results, training, is involved in the collection, processing and dissemination of scientific and technical information in the agricultural, pastoral, water and food security fields. These are:

- Cameroon: Institute of Agricultural Research for Development (IRAD); National Institute of Statistics; University of Maroua and University of Ngaoundéré.
- Niger: National Institute of Agricultural Research of Niger (INRAN), National Institute of Statistics; University of Diffa.
- Nigeria: Institute of Agricultural Research and Training (IAR&T), University of Kano, University of Maiduguri, National Bureau of Statistics (NBS), National Animal Production Research Institute (NAPRI), Lake Chad Basin Research Institute; National Institute of Freshwater fisheries.
- Chad: Chadian Institute of Agronomic Research for Development (ITRAD) National Institute of Statistics, Economic and Demographic Studies (INSEED), University of N'Djaména.
- CAR: Central African Institute for Agricultural Research (ICRA), Central African Institute for Statistics, Economic and Social Studies (ICASEES), Institut Supérieur de Développement Rural (ISDR)

At the regional and sub-regional level:

- The International Institute for Tropical Agriculture (IITA) which works on agricultural innovation to improve the production and productivity of key commodities in Africa, including cassava, banana and plantain, sweet potato, cowpea, maize, soybean;
- The AGRHYMET Regional Centre (CRA), a specialized institution of the Permanent Interstate Committee for Drought Control in the Sahel (CILSS), in addition to training, is involved in the collection, processing and dissemination of scientific and technical information in the fields of food security, water management and fight against desertification in the Sahel and ACMAD (the African Centre for Meteorological Applications for Sustainable Development) is also one of the major partners.

Technical and Financial Partners (TFPs): The LCBC receives assistance from several TFPs, namely the agencies and bodies of the United Nations system (FAO, UNDP and UNESCO), the European Union (EU), the United States, the Global Environment Facility (GEF), the German Cooperation (GIZ, BGR), the French Development Agency (AFD), the World Bank (WB), the Islamic Development Bank (IDB) and the African Development Bank (ADB).

4.3. Coordination of the Regional Strategy for Adaptation to Climate Change

The institutional framework for the implementation of the Regional Strategy for Adaptation to Climate Change is the Executive Secretariat of the LCBC. It can implement the Strategy in three ways:

- Directly through its technical, administrative and financial directorates;
- Indirectly through a Regional Coordination and National Coordination;
- Through the regional stabilization strategy¹⁶.

The LCBC may also use specialized institutions and NGOs or associations to carry out certain activities at the country level. However, it is important to stress that the activities planned in the Strategic Priority 3 will be implemented by the Technical Directorate supported by ACMAD, the AGRHYMET Centre and the National Statistical Offices or Institutes.

In case that the indirect option is considered, a steering committee will be set up. This committee will include, among others, the LCBC Executive Secretariat, the national departments in charge of climate change issues, the Donor Advisory Committee, the Stakeholder Committee, the Inter-Ministerial Technical Committee, the Account Courses and Civil Society Organizations (CSOs).

4.4. Steering Committee

Whichever option is chosen, the implementation of the strategy will be supported and supervised by a steering committee composed of the following members:

- Focal points of member countries to the Executive Secretariat of the LCBC;
- National Focal Points for the United Nations Framework Conference on Climate Change;
- Representatives of the LCBC Executive Secretariat;
- Stakeholder Committee Representative;
- Donor representative.

4.5. Implementation of the Regional Strategy for Adaptation to Climate Change

The implementation of the selected activities will follow the timetable integrated into the logical framework. The selected actions were prioritized according to a multi-criteria analysis based on feasibility, effectiveness, i.e. the vulnerability problems to be solved by the intervention, its socio-economic effect, its impact on the implementation of other measures and its social acceptance. Considering the observation situation in the basin and the importance of hydro-agro-meteorological information and the forecasting of food crises, it is urgent to start the implementation of the plan with strategic priority No. 3. This is even more important for the following reasons: the implementation of this strategic priority will have a positive impact on the implementation of other actions defined by the regional strategy; it includes institutional and diplomatic issues that are often slow in implementation; it will be implemented by the Technical Department.

¹⁶ LCBC, & AU. (2018). *Regional Strategy for the Stabilization, Recovery & Resilience of the Boko Haram-affected Areas of the Lake Chad Basin Region*. N'Djamena, Chad: Lake Chad Basin Commission (LCBC) and African Union (AU).

Table 2: Priority projects and objectives

Selected strategy and project	Objectives
1. Promotion of income-generating activities resilient to climate change	
1.1 Promotion of non-timber forest products (NTFPs)	Support the promotion of NTFPs
1.2 Promotion of value chains	Support the establishment of selected value chains in the basin
	Strengthen the capacity of different stakeholders for the selected value chains
1.3 Development of arts and crafts	Strengthen the technical, commercial and organizational capacities of craftspeople
	Promote production crafts
2. Identification, improvement and dissemination of appropriate agro-silvo-pastoral and fish farming techniques for adaptation to climate change	
2.1 Inventory of existing agro-pastoral and fishery practices for adaptation to climate change in the basin	Identify and capitalize on local climate change adaptation measures underway in the basin
2.2 Dissemination of selected good agro-pastoral and fishery techniques for adaptation to climate change	Disseminate the selected agro-pastoral and fishery practices for adaptation to climate change
2.3 Dissemination of varieties adapted to the context	Disseminate improved varieties adapted to the context
	Facilitate access to inputs by supporting the establishment of input shops
2.4 Support to agricultural development	Strengthen the capacities of agricultural extension services (NGOs, decentralized government services and farmer organizations)
	Reduce post-harvest losses
2.5 Support to agricultural diversification	Promote peri-urban agriculture
	Support irrigated agriculture through small irrigated perimeters
	Develop flood recession agriculture on the shores of Lake Chad
2.6 Improvement of animal health	Strengthen capacity to fight epizootic and climate-sensitive diseases
2.7 Intensification of livestock farming	Popularize sustainable pastoral techniques
	Support the intensification of small-scale livestock farming
2.8 Development of small-scale fishing	Reduce post-catch losses in fishing areas.
2.9 Development of aquaculture	Support individual and collective aquaculture initiatives
2.10 Capacity building for fisheries stakeholders	Train beneficiaries in production, processing, transformation, conservation and management techniques.
3. Cooperation and knowledge development on climate change and adaptation	
3.1 Development of an early warning system for natural disasters and risks (floods and droughts)	Provide the Basin Observatory with a seasonal climate prediction system
	Establish an early warning system for floods
3.2 Strengthening the production capacities of varieties	Strengthen cooperation between agricultural research institutes and the LCBC
	Provide seed centers with improved varieties adapted to different agro-ecological conditions
3.3 Establishment of a database to predict food crises	Set up a platform for collecting socio-economic data
	Develop a model for estimating food production in the basin
3.4 Dissemination of agro-meteorological information	Strengthen capacity to use agro-meteorological information and adapted varieties
3.5 Strengthening producers' capacity to adapt to climate change	Organization of farmer field schools
4. Establishment of a consultation platform on adaptation to climate change in the Lake Chad Basin	
4.1 Creation of a consultation platform on adaptation to climate change	Identify stakeholders and raise awareness among them
	Create a platform for consultation on adaptation to climate change at the LCBC
4.2 Development and implementation of an action plan for the operationalization of the platform	Preparing the basis for the implementation of the consultation platform
	Implementing the action plan for the operationalization of the platform

4.3 Accreditation of the LCBC to funds dedicated to climate change	Support the LCBC for accreditation to Climate Funds
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Table 3: Implementation plan of the regional strategy for adaptation to climate change

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
1 Promotion of income-generating activities that are resilient to climate change						
1.1 Promotion of non-timber forest products (NTFPs)						
1.1.1 Support for the manufacture of organic pesticides and cosmetics (from neem oil and sheabutter)	1,000 male and 500 female producers were supported in the production of organic pesticides and cosmetic products over a period of 5 years in the basin	x	x	x	x	x
1.1.2 Support to produce food products based on <i>Balanites aegyptiaca</i> and other plants.	5,000 male and 5,000 female producers were supported in the production of food products based on <i>Balanites aegyptiaca</i> and other plants over a period of 5 years in the basin.	x	x	x	x	x
1.2 Promotion of value chains						
1.2.1 Identification of products [rice, market gardening products (onion, tomato, peppers and okra), cowpea, groundnut, soya) and value chain studies	Study of value chains of 8 products in the basin over 2 years	x	x			
1.2.2 Support for the development of value chains by supporting the construction of infrastructure for production, processing, transformation, storage, conservation and marketing	Construction of infrastructure for 100 common interest groups and/or farmer organizations (half of which are composed of women) in the basin for a period of 3 years	x	x	x		
1.2.3 Organization of producers for the supply and commercialization circuit	5,000 male and 5,000 female producers in the basin were organized for the supply and commercialization circuit over 5 years	x	x	x	x	x
1.2.4 Capacity building for supervisors, producers and producer organizations	Capacity building of 1,000 supervisors and 10,000 producers (including 500 women) and of producer organizations over 5 years in the basin	x	x	x	x	x
1.3 Development of arts and crafts						
1.3.1 Identification studies of some craft sectors: textiles, leather goods, sculpture, pottery, manufacture of agricultural or transport tools, shoemaking, manufacture of Chorkor ovens and accessories (drying racks, oil press and isothermal box)	Studies carried out on 7 craft sectors in the basin over 2 years	x	x			

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
1.3.2 Strengthening the technical and organizational capacities of craftspeople and their cooperatives in the various craft sectors	Capacity building of 5,000 craftspeople (including 2,000 women) and their cooperatives in the craft sectors in the basin over 5 years		x	x	x	x
1.3.3 Support for the manufacture of products of high local use	Support to the production of 6 products with high local use for at least 500 craftsmen and 500 craftswomen in the basin over 5 years		x	x	x	x
1.3.4 Support for improvement of the product quality	1,000 male and 5,000 female producers are supported in the improvement of 5 products in the basin over 5 years	x	x	x	x	x
1.3.5 Facilitation of the supply of raw materials	10 centers are supported with raw materials in the basin over 4 years		x	x	x	
1.3.6 Support for the creation of exportable and commercially viable collections	3,000 craftsmen and 2,000 craftswomen were supported in the creation of exportable and commercially viable collections in the basin over 5 years	x	x	x	x	x
2 Identification, improvement and dissemination of appropriate agro-silvo-pastoral and fish farming techniques for adaptation to climate change						
2.1 Inventory of agro-pastoral practices for adaptation to climate change in the basin						
2.1.1 Regional survey on climate change adaptation measures and capitalization	1 survey on current adaptation measures in the basin over 2 years	x	x			
2.1.2 Organization of exchange visits	50 exchange visits for the benefit of 5,000 producers organized in the basin over 5 years	x	x	x	x	x
2.2 Dissemination of selected good agro-pastoral techniques for adaptation to climate change						
2.2.1 Dissemination of the selected measures	Dissemination of 9 measures, two per sector for three key sectors, for 100,000 producers in the basin over 3 years			x	x	x
2.2.2 Raising awareness on the adverse impacts of identified inadequate practices	The awareness of 5 000 000 producers (men and women) is raised			x	x	x
2.3 Dissemination of varieties adapted to the context						
2.3.1 Establishment of seed centers	Establishment of 10 main seed centers and 50 secondary centers in the basin over 5 years	x	x	x	x	x
2.3.2 Capacity building of extension structures (agricultural post, development activities and agencies, NGOs and farmer organizations)	Capacity building of 50 extension agencies in the basin over 5 years	x	x	x	x	x

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
2.3.3 Dissemination of selected improved varieties	20 varieties, 2 per crop, are disseminated in the basin over 5 years	x	x	x	x	x
2.3.4 Support for the creation of input shops in large production areas	100 shops are created in the basin over 5 years	x	x	x	x	x
2.4 Dissemination of tested adaptation measures in the agriculture sector: reduction of post-harvest losses						
2.4.1 Training of basic extension agents	300 extension agents (including 100 female agents) are trained over a period of 3 years in the basin		x	x	x	
2.4.2 Training of producers and farmer organizations in associative life, grain conservation management and techniques	Training is given to 10,000 producers and farmer organizations in grain conservation techniques, management and associative life in the basin over 5 years	x	x	x	x	x
2.4.3 Construction of community warehouses for crop storage	1,000 warehouses are built in the basin over 5 years	x	x	x	x	x
2.4.4 Support for the implementation of the warehouse receipt (<i>warrantage</i>) system in certain production basins	100 common interest groups or farmer organizations are supported for the implementation of the warehouse receipt (<i>warrantage</i>) system in the basin over 5 years	x	x	x	x	x
2.4.5 Improvement and enhancement of seed storage techniques	3 techniques are popularized and disseminated in the basin over 5 years	x	x	x	x	x
2.5 Dissemination of tested adaptation measures in the agriculture sector: Agricultural diversification						
2.5.1 Development of lowlands in peri-urban areas and development of market gardening	10,000 producers in lowlands in peri-urban areas and development of market gardening in the basin over 5 years	x	x	x	x	x
2.5.2 Support for small village irrigated perimeters	Development of small village irrigated perimeters for 1,000 producers in the basin over 5 years	x	x	x	x	x
2.5.3 Support for flood recession agriculture on the shores of Lake Chad	3,000 male and 2,000 female producers are supported in flood recession agriculture on the shores of Lake Chad over 5 years	x	x	x	x	x
2.6 Dissemination of tested adaptation measures in the livestock farming sector: promotion of animal health						
2.6.1 Equipment of veterinary services with epidemiological surveillance	5 State services in epizootic control are equipped with veterinary services equipment and epidemiological surveillance services in the basin over 4 years	x	x	x	x	

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
2.6.2 Strengthening the capacity of veterinary service agents in epidemiological surveillance	50 veterinary service agents have benefited from capacity building in epidemiological surveillance in the basin over 3 years			x	x	x
2.6.3 Construction of vaccination centers	100 vaccination centers are built in the basin over 5 years	x	x	x	x	x
2.6.4 Strengthening the capacity of farmers in prophylactic and diagnostic measures for certain diseases	500,000 farmers are trained in prophylactic measures and pathologic diagnosis in the basin over 5 years	x	x	x	x	x
2.6.5 Support for the creation of veterinary pharmacies	50 pharmacies are created in the basin over 5 years		x	x	x	x
2.7 Dissemination of tested adaptation measures in the livestock farming sector: Intensification of livestock farming						
2.7.1 Development of transhumance corridors	2,000 km of transhumance corridors are developed in the basin over 5 years	x	x	x	x	x
2.7.2 Creation of management committees	100 management committees are created the basin over 5 years	x	x		x	x
2.7.3 Support for the creation of livestock feed banks	100 feed banks are supported in the basin over 5 years		x	x	x	x
2.7.4 Support for fodder production and conservation	10,000 producers are supported for the production and conservation of fodder in the basin over 5 years	x	x	x	x	x
2.7.5 Development of pastoral wells	200 boreholes are drilled in the basin over 5 years	x		x		x
2.7.6 Promotion of peri-urban livestock farming through milk production, bovine, ovine and caprine fattening	1,000 male and 1,000 female producers are supported to promote peri-urban livestock farming through milk production, cattle, pig, sheep and goat fattening in the basin over 5 years	x	x	x	x	x
2.7.7 Support for the production, collection, processing and storage of milk in peri-urban areas	60 male and 40 female milk collectors are supported for the collection, processing and storage of milk in the basin over 5 years	x	x	x	x	x
2.8 Dissemination of tested adaptation measures in the fishery sector: Development of small-scale fishing						
2.8.1 Construction of boat landing stages	10 landing stages are built in the basin over 5 years		x	x	x	x
2.8.2 Support for the production and packaging of smoked fish	10,000 women are supported in the construction of ovens in the basin over 5 years	x	x	x	x	x

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
2.9 Development of aquaculture						
2.9.1 Construction of nursery centers	15 nursery centers built in the basin over 5 years	x	x	x	x	x
2.9.2 Support for the production of fish feed (financial and technical)	30 fish feed production centers are supported in the basin over 5 years	x	x	x	x	x
2.9.3 Support for the installation of ponds	3,000 ponds are installed in the basin over 5 years	x	x	x	x	x
2.9.4 Support for the stocking of natural ponds	100 ponds are stocked in the basin over 5 years		x	x	x	x
2.9.5 Training of State service technicians in aquaculture development	50 agents of the States technical services are trained in the development of aquaculture in the basin over 5 years	x	x	x		x
2.10. Capacity building for fishery stakeholders						
2.10.1 Training of beneficiaries on production, processing, transformation, marketing and management techniques	1,000 producers are trained in the basin on production, processing, transformation, marketing and management techniques in the basin over 5 years	x	x	x	x	x
2.10.2 Rehabilitation of the Djimtilo Training and Recycling Centre for Fishing and Aquaculture	A training and recycling center for fisheries and aquaculture is rehabilitated	x	x			
3. Cooperation and knowledge development on climate change and adaptation						
3.1 Development of an early warning system for natural disasters and risks (floods and droughts)						
3.1.1 Strengthening the piezometer network	A network of at least 60 piezometers is operational in the basin over 5 years	x	x	x	x	x
3.1.2 Strengthening the agrometeorological observation network	A network of at least 65 agro-meteorological stations is installed in the basin over 5 years	x	x	x	x	x
3.1.3 Strengthening the hydrologic station network	A network of at least 74 hydrological stations is operational in the basin over 5 years	x	x	x	x	x
3.1.4 Implementation of a data collection and transmission system	A system for collecting, transmitting and processing data is available in the basin over 5 years	x	x	x	x	x
3.1.5 Establishment of a cooperation platform with ACMAD, AGRHYMET and the National Meteorological Directorates	1 platform for cooperation with specialized centers is set up in the basin over 5 years	x	x	x	x	x

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
3.1.6 Strengthening the capacity of the observatory to update and disseminate seasonal and monthly climate forecasts	05 experts of the Basin Observatory Directorate are able to update and disseminate agro-meteorological information to stakeholders in the basin			x	x	
3.1.7 Participation in seasonal forecasting seminars organized by ACMAD and AGRHYMET	Participation of 2 experts/year for 05 years in PRESAO, a Regional Climate Outlook Forum activity dedicated to West Africa	x	x	x	x	x
3.1.8 Production of newsletters and distribution of monthly newsletter	5 seasonal forecasts and 35 monthly bulletins are made in the basin over 5 years	x	x	x	x	x
3.2 Early warning system for floods						
3.2.1 Elaboration of a flood contingency plan	1 contingency plan is made and operational					
3.2.2 Implementation of an early warning system for floods on the Chari-Logone system and the Kumadugu	1 early warning system for flooding on the Logone, Chari and Kumadugu rivers is implemented over 5 years	x	x	x	x	x
3.2.3 Strengthening the capacities of the Basin Observatory in data processing and analysis, triggering of the alert	5 experts are trained over 3 years in the basin	x		x		x
3.2.4 Design of a flood forecasting model	1 flood forecasting model is designed and operational in the basin over 5 years	x	x			x
3.2.5 Establishment of an information dissemination channel	1 information dissemination channel is set up and operational in the basin	x	x	x	x	x
3.3 Strengthening the production capacity of improved seed varieties adapted to the context						
3.3.1 Signature of a memorandum of understanding with agricultural research institutions and implementation of the clauses.	Signature of agreements and implementation	x				
3.3.2 Inventory in order of importance of the adapted and cultivated crop (and animal) varieties in the basin	1 inventory of improved and contextually adapted varieties is made in the basin over 5 years	x	x	x	x	x
3.3.3 Strengthening the capacities of agricultural research institutions in the production of improved basic seeds and in support of seed centers	5 agricultural research institutes have been strengthened in the basin over 5 years	x	x	x	x	x

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
3.4 Establishment of a database to predict food crises						
3.4.1 Design of a methodology for collecting food data	1 methodology and collection tools are developed over 5 years	x				
3.4.2 Conducting food production surveys	5 surveys are carried out on agricultural, pastoral and food production in the basin over 5 years	x	x	x	x	x
3.4.3 Design of model for food crisis forecasting	1 model for food crisis forecasting is developed and operational in the basin	x	x			
3.4.4 Strengthening the capacity of the LCBC to update the model.	5 LCBC experts are trained in updating the model	x	x	x	x	x
3.5 Strengthening producers' capacity to adapt to climate change						
3.5.1 Awareness-raising on the utilization of agro-meteorological information and local knowledge for crop establishment operations	The awareness of 5,000,000 producers is raised on the utilization of agro-meteorological information and local knowledge for crop production in the basin over 5 years	x	x	x	x	x
3.5.2 Establishment of school farms in production basins for the dissemination of varieties and the promotion of conservation management techniques for natural resources	Establishment of 10 school farms in the basin for the dissemination of varieties and the promotion of techniques for conservatory management of natural resources in the basin over 5 years	x	x	x		
4. Establishment of a consultation platform on adaptation to climate change in the Lake Chad Basin						
4.1 Creation of a consultation platform on adaptation to climate change						
4.1.1 Inventory of the stakeholders of the consultation	1 inventory of stakeholders is carried out in the basin over 5 years	x	x	x		
4.1.2 Awareness-raising of the stakeholders	2 awareness campaigns and a workshop are organized for stakeholders in the basin over 5 years	x	x	x	x	x
4.1.3 Development and establishment of a regional consultation platform on adaptation to climate change at the LCBC	1 consultation platform is set up in the basin at regional level and stakeholders are networked over 5 years	x	x	x		
4.2 Development and implementation of an action plan for the operationalization of the platform						
4.2.1 Development of an action plan for the operationalization of the platform	3 training workshops are organized for stakeholders in the basin over 5 years	x		x		x

Activities	Indicators	Period				
		A1	A2	A3	A4	A5
4.2.2 Implementation of the action plan	Preparation of position and participation in 5 COPs over 5 years	x	x	x	x	x
4.3 Accreditation of the LCBC to funds dedicated to climate change						

5. FINANCING PLAN

The implementation of the climate change adaptation strategy requires sufficient financial availability. This requires a financing plan that will make it possible to mobilize the necessary funds for its implementation.

To do this, this strategy has a provisional budget that requires the mobilization of funds from technical and financial partners.

5.1. Budget

In accordance with the strategic priorities developed above, the budget required for the implementation of the related priority projects amounts to 50,805,410,354 FCFA. 67.96% of this amount is devoted to priority 2, followed by priority 1, 23.67% and priority 3, 7.54%.

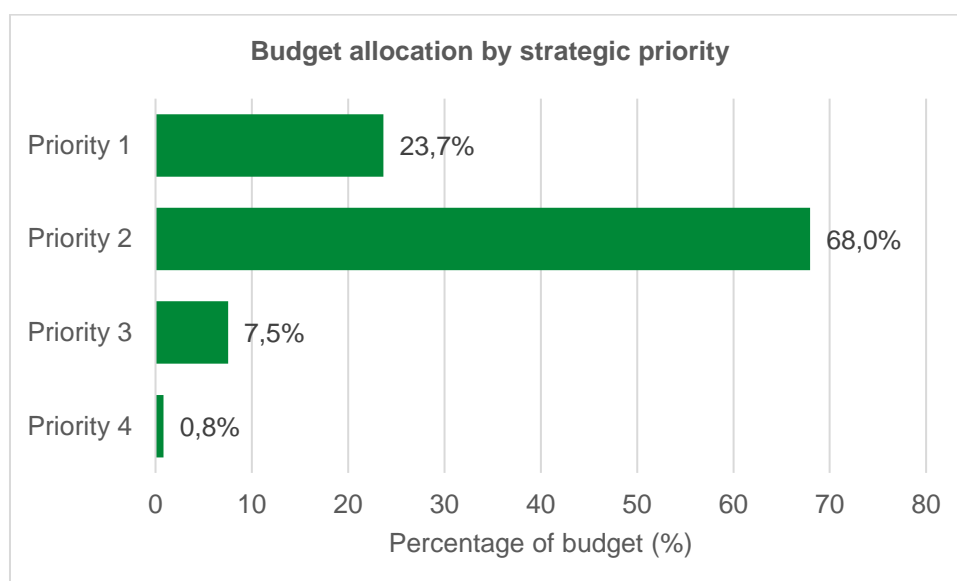


Figure 9: Budget allocation by strategic priority

5.2. Available funding

The programs and projects currently being implemented and planned within the LCBC constitute an asset that will contribute to the implementation of the strategy. These include, among others:

- Improving the management of the Lake Chad through climate change resilience and ecosystem stress reduction by implementing the Strategic Action Plan (SAP);
- Programme for the Rehabilitation and Strengthening of the Resilience of Socio-Ecological Systems (PRESIBALT);
- Regional Strategy for Stabilization, Recovery and Resilience of Areas in the Lake Chad Basin affected by the Boko Haram Crisis in the Lake Chad Basin
- Support Project for the Socio-Economic Reintegration of Vulnerable Groups in the Lake Chad Basin.

5.3. Main sources of funding to be explored

The activities of the LCBC are financed by donations and loans from Technical and Financial Partners (TFPs) and the contribution of member countries. In addition to these funds, the LCBC will take steps to access funds dedicated to climate and adaptation.

5.3.1. Traditional financial partners

In recent years, the LCBC has received funding from various partners who could support the adaptation projects documented in this report. Recent or ongoing interventions by these institutions are generally part of the broad field of adaptation to climate change, focusing on adaptive capacities or issues related to reducing sensitivity. These include the following:

- **Federal Ministry for Economic Cooperation and Development (BMZ)** of Germany has been supporting the Lake Chad Basin Commission since 2005. The current German Development Cooperation program "Sustainable Water Resources Management in the Lake Chad Basin" is being undertaken by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Federal Institute of Geosciences and Natural Resources (BGR).
- **French Development Agency (AFD)**: AFD has contributed to the project Preservation of Lake Chad, Contribution to the Lake Development Strategy (FFEM-AFD). The implementation of three of the components has been entrusted to the Research Institute for Development (IRD) and the International Office for Water (OIEau).
- **The World Bank (WB)**: WB supports the LCBC in the preparation of the Lake Chad Development and Climate Change Adaptation Plan.
- **The African Development Bank (AfDB) through the African Development Fund (ADF)** has financed several LCBC projects including the Lake Chad Basin Initiative Support Project (LCBI), PRODEBALT and PRESIBALT. The latter is currently being implemented.
- **The African Union through the African Water Facility (AWF)** has funded the initiative Lake Chad Conservation: Contribution to the Lake Chad Development Strategy.

5.3.2. Self-financing and contribution of the States

To finance its strategy, the LCBC could make strategic choices in terms of alternative and sustainable financing to access the many alternative and relevant financing opportunities available to comparable basin organizations. These strategic choices are recommended by the Joint Environmental Audit on the Drying of Lake Chad. These are:

- **Financing from within the basin** (Contribution of Member States; fee systems, remuneration of the contracting authority by the LCBC; sale of services).
- **Financing from outside the basin** (Public-private partnerships; donor contributions (loans for official development assistance).

5.3.3. Specialized financing

Several sources of financing for climate change adaptation or mitigation, specialized at the bilateral or the multilateral level, could be considered.

Bilateral cooperation

Some developed countries have created bilateral funds to help developing countries respond to climate change. Among these dedicated bilateral funds invested in Sub-Saharan Africa, there are:

- the Global Climate Change Alliance (European Union),
- the Bilateral initiatives of Germany (International Climate Initiative [IKI]),
- the Norway initiatives (International Climate and Forest Initiative [ICIF]) and
- the United Kingdom initiatives (International Climate Fund [ICF]).

International cooperation

For the financing of climate change mitigation and adaptation measures, the UNFCCC has created several multilateral funds to strengthen public financing. These funds include:

- the Adaptation Fund (AF),
- the Global Environment Facility (GEF),
- the Green Climate Fund (GCF) and
- the Climate Investment Fund (CIF).

Adaptation Fund (AF): Initiated in 2001 at the Marrakech Conference and operationalized in 2018, the Adaptation Fund was created by the Parties of the Kyoto Protocol at the United Nations Framework Convention on Climate Change (UNFCCC) to finance concrete adaptation projects and programs in developing countries that are parties to the Kyoto Protocol. The Fund is financed by 2% of the certified emission reduction units (CERs) from Clean Development Mechanism (CDM) projects, and by other sources of funding, such as voluntary contributions from donor countries.

Submission of projects to the Adaptation Fund can be made directly through National Implementing Entities (NIEs) and Regional Implementing Entities (RIEs) accredited to the Adaptation Fund Board (AFB). It can also be done through a Multilateral Implementing Entity (MIE). The MIEs selected by the eligible parties to submit proposals to the Council are responsible for financial aspects, monitoring and reporting. MIEs accredited by the Adaptation Fund include UN programs (UNDP, UNEP) and development banks (ADB, IDB, World Bank).

African National Entities and one Regional Entity, the West African Development Bank, have already accessed this fund. Accreditation is based on fiduciary standards: financial integrity, institutional capacity, transparency and inherent investigative powers.

The Global Environment Facility (GEF): It was established in 1991 and has been in operation for the longest time in the sector of environmental financing. It is the financial instrument of the United Nations Framework Conventions and it currently manages two funds under the UNFCCC, which supports the development of adaptation programs and plans and the implementation of projects in developing countries through the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). Up to 2020, the GEF strategy focuses on the causes of environmental degradation; the three new pilot programs based on an integrated approach to be launched under GEF-6 aim to address some causes of environmental degradation by focusing mainly on food security, urbanization and deforestation.

The GEF will remain at the forefront of another immediate priority: international action to strengthen the capacity of countries to resist climate change. The GEF's Climate Change Adaptation Program finances activities in the world's poorest and most vulnerable countries,

including through the LDCF and SCCF. The GEF will systematically work to undertake initiatives covering climate change adaptation and other priority areas of its work, in order to achieve simultaneous positive impacts on adaptation and the global environment.

Green Climate Fund: Established in 2010 at the 16th session of the Conference of the Parties, the Green Climate Fund is a financial mechanism of the United Nations, linked to the United Nations Framework Convention on Climate Change (UNFCCC). Its objective is to transfer funds from the most advanced countries to the most vulnerable countries to set up projects fighting the effects of climate change. It aims to have an impact on mitigation and adaptation in eight sectors identified by its board of directors, four of which fall within the scope of the LCBC:

- Forests and land use;
- Livelihoods of individuals and communities;
- Ecosystems and ecosystem services
- Health, food and water security.

All developing countries, which are Parties to the Convention, are eligible for funding from the GCF. The Fund provides recipient countries with access to funding through duly accredited national and subnational implementing entities, and intermediaries (including NGOs, ministries, national development banks and other national or regional organizations that meet the Fund's standards). Countries can also access funding through accredited international or regional entities, such as multilateral and regional development banks and agencies of the United Nations system. Private sector structures can also be accredited as an implementation tool.

Climate Investment Funds (CIF): Founded in 2008 at the initiative of the World Bank, the CIFs is the world's largest climate change financing instrument, providing countries around the world with the support they urgently need to accelerate the achievement of low-carbon and climate-resilient development. It provides developing countries with grants, soft loans, risk mitigation instruments and funds that attract substantial complementary financing from the private sector, multilateral development banks (MDBs) and other sources. The AfDB is serving as an implementing agency. The CIFs offer new financing opportunities that combine resources to finance climate action with funds provided by countries, MDBs and the private sector to promote development. Thus, CIFs make it possible to mobilize significant resources. They are also intended to strengthen the global knowledge on which the search for urgent solutions to climate problems is based. There are two CIFs:

- The Clean Technology Fund (CTF), which finances, through national investment plans, projects for demonstration, deployment and transfer of low-carbon technologies that have the potential to significantly reduce greenhouse gas (GHG) emissions.
- The Strategic Climate Fund (SCF), which funds three programs to test new sectoral approaches that can be applied on a large scale:
 - Forest Investment Program (FIP);
 - Pilot Program for Climate Resilience (PPCR);
 - Scaling Up Renewable Energy Program (SREP).

The conceptual diagram presented in Figure 10 illustrates the structure of climate investment funds.

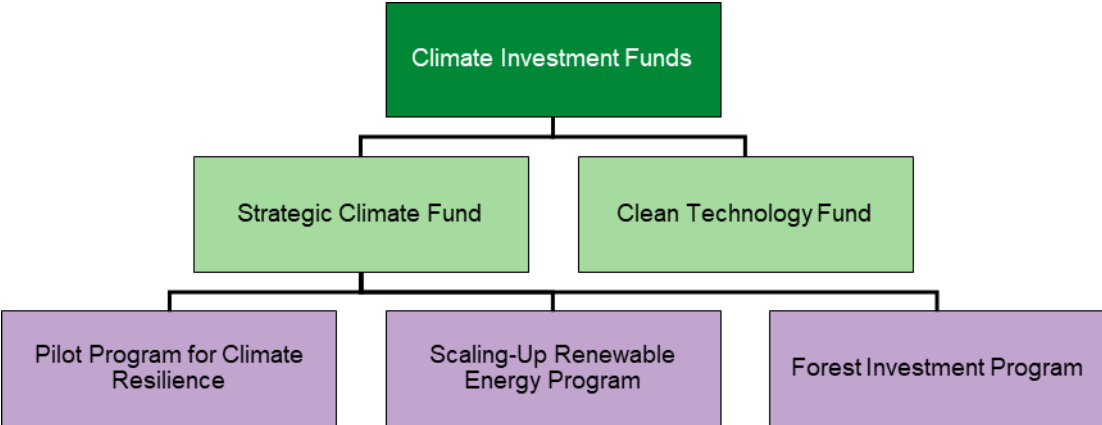


Figure 10: Climate Investment Funds

6. MONITORING AND EVALUATION SYSTEM OF THE STRATEGY

The implementation mechanism consists of the following main points:

- Resources and capacity to monitor and evaluate the implementation of the strategy;
- Monitoring and evaluation indicators;
- Monitoring and evaluation methodology; and
- External evaluation of the strategy.

6.1. Necessary resources and capacities for monitoring and evaluation

The monitoring and the evaluation of the implementation of the strategy will be carried out by the committees designated for this purpose. This could include a regional monitoring and evaluation committee and national committees in the LCBC member states.

The regional monitoring and evaluation committee, composed of technical departments of the LCBC and the regional coordination of the programme, will be responsible for informing the implementation status of all projects included in the strategy. Its mission will be:

- Managing a database capable of informing stakeholders and all interested parties about the measured performance of the Strategy.
- Ensuring monitoring and coherence in the implementation of the programme;
- Making necessary reorientation decisions in case of discrepancies between results and planned objectives;
- Validating the main implementation programming and reporting documents concerning the programme;
- Validating the direction lines of the calls for proposals;
- Validating the pre-selected proposals following the calls for proposals

The national monitoring and evaluation committees consist of representatives of:

- Relevant ministries;
- Non-Governmental Organizations (NGOs);
- Civil society;
- Projects and programs of the respective countries;
- Representatives of donor organizations.

This team works in conjunction with the regional committee by providing its database with information on the implementation progress.

6.2. Monitoring-Evaluation indicators

M&E systems for climate change adaptation at the sub-regional level are mainly based on a results-based management approach (including performance indicators). The Strategy will develop an M&E framework based on indicators, as well as strategies and models to consolidate and share a more qualitative analysis of the adaptation results achieved.

The indicators will be developed from the chains of vulnerability (causality) and climate impact. These chains will be developed in each of the vulnerable sectors pre-selected in each country. These indicators must take gender into account to ensure the availability of gender-sensitive indicators. Three types of indicators will be identified to measure the performance of the climate change adaptation strategy. These are vulnerability indicators, achievements indicators and outcome indicators.

Operational and strategic outcome indicators will be jointly identified by the entire M&E Technical Working Group.

The list of relevant indicators to assess adaptation in the basin should be reviewed and validated by all stakeholders. It will probably be necessary to produce new indicators using new studies, surveys or research to meet the needs of the M&E framework of the Strategy.

Operational outcome indicators must consider those already existing in the countries, but they must reflect the expected outcomes for each priority theme and correspond to the expectations of the programs, projects and activities of the national sectoral agencies.

The immediate strategic outcome indicators should also consider the strategic outcomes for each country's priority theme. These must be the subject of consultations with the various ministries concerned.

In short, a standardized system of indicators must be developed to facilitate the harmonization of existing initiatives across countries. In other words, the strategy must identify and harmonize the key indicators that will be fed by data and information collected at the sector and project levels by government agencies and implementing partners respectively. The objective is to facilitate comparison in space and time.

6.3. Methodology and monitoring-evaluation approach

This methodology is based on the timeline and the logical framework as well as the annual work plan to be developed at the beginning of each year, specific objectives, performance indicators, data sources, data collection method, data collection frequency and data collection officials.

The M&E system of the LCBC operates from the national to the regional level. Any project or programme carried out in the Basin area must report on the progress made to the LCBC.

At the regional level, monitoring-evaluation of climate change is coordinated by the technical department of the LCBC, which is responsible for collecting and disseminating data for all climate change activities. More specifically, the Cooperation and Projects Department (DCP) coordinates the development of M&E mechanisms through consultations with stakeholders and submits quarterly progress reports on adaptation to the LCBC member states through the Executive Secretary of the Commission.

At the national level, the Technical Directorates of the Ministries involved in the fight against climate change are responsible for collecting and centralizing data at the national level and supporting the development of the Results Framework of the National Climate Change Programme.

National structures should rely on coordination committees at the regional and departmental or prefectural levels to monitor and evaluate environmental development activities.

Data and information to be collected

The proposed M&E framework for adaptation will build on existing data and monitoring systems at the national and local levels. The information will come from secondary data sources, vulnerability mapping and assessments, models to simulate impacts and vulnerabilities in the future, and other documents or studies.

The data, information and knowledge will be collected on a quarterly or semi-annual basis to fill in the forms that will be prepared for this purpose. They arrive in the system in a simple and harmonized format to facilitate their aggregation

The bi-annual and annual reports produced by the partners of the various countries are the first sources that measure the progress of adaptation activities implemented in the field in relation to the defined objectives.

Quantitative surveys structured at the national level will provide a basis for understanding countries' progress in integrating adaptation into their planning processes.

Formal and informal consultation and dialogue on the implementation of climate change activities—such as the provision of climate services, local adaptation planning, the development of green structures—are also essential opportunities to understand what is happening on the field, why some measures work and others do not, and how these lessons can be taken into account in policies.

This collaborative approach can be complemented by the launch of targeted research projects on many topics related to climate change and adaptation, which can influence future discussions and planning. The production of localized climate projections will also be part of the data and information required in the framework of the learning system.

Results and dissemination of information

The regular and systematic production of results under this strategy takes the form of a national vulnerability and adaptation assessment, which is linked to the publication schedule of the biannual reports. In parallel, lessons learned from the various initiatives will be capitalized in guides, thematic reports and other documents, all of which will be available through the knowledge-sharing platform on national adaptation available on the websites of the LCBC and the Ministries of the countries concerned.

6.4. External evaluation of the strategy

It is recommended that independent external evaluations be carried out. These external evaluations should report on lessons learned from experiences in implementing the strategy. They will therefore be specific operations aimed at systematically and objectively assessing progress towards the achievement of expected outcomes.

This strategy documents will contain four types of external evaluation:

- A baseline evaluation containing the baseline data of the programme indicators;
- A midterm evaluation focusing on the effectiveness and efficiency of the strategy;
- An evaluation at the end of the implementation to assess the achieved results; and
- A retrospective evaluation to measure impacts, lessons learned and sustainability of the results. The value of such an assessment is also to provide a useful basis for the development of future policies and strategies.

Annex 1: Budget and schedule of the activities

Activities	Indicators	Budget (FCFA)	Period (2020-2025)						
			A1	A2	A3	A4	A5		
1 Promotion of income-generating activities that are resilient to climate change									
1.1 Promotion of non-timber forest products (NTFPs)									
1.1.1 Support for the manufacture of organic pesticides and cosmetics (from neem oil and sheabutter)	1,000 male and 500 female producers were supported in the production of organic pesticides and cosmetic products over a period of 5 years in the basin	300,000,000	x	x	x	x	x		
1.1.2 Support to produce food products based on <i>Balanites aegyptiaca</i> and other plants.	5,000 male and 5,000 female producers were supported in the production of food products based on <i>Balanites aegyptiaca</i> and other plants over a period of 5 years in the basin.	1,500,000,000	x	x	x	x	x		
1.2 Promotion of value chains									
1.2.1 Identification of products [rice, market gardening products (onion, tomato, peppers and okra), cowpea, groundnut, soya) and value chain studies	Study of value chains of 8 products in the basin over 2 years	250,000,000	x	x					
1.2.2 Support for the development of value chains by supporting the construction of infrastructure for production, processing, transformation, storage, conservation and marketing	Construction of infrastructure for 100 common interest groups and/or farmer organizations (half of which are composed of women) in the basin for a period of 3 years	5,000,000,000	x	x	x				
1.2.3 Organization of producers for the supply and commercialization circuit	5,000 male and 5,000 female producers in the basin were organized for the supply and commercialization circuit over 5 years	100,000,000	x	x	x	x	x		
1.2.4 Capacity building for supervisors, producers and producer organizations	Capacity building of 1,000 supervisors and 10,000 producers (including 500 women) and of producer organizations over 5 years in the basin	200,000,000	x	x	x	x	x		
1.3 Development of arts and crafts									
1.3.1 Identification studies of some craft sectors: textiles, leather goods, sculpture, pottery, manufacture of agricultural or transport tools, shoemaking, manufacture of Chorkor ovens and accessories (drying racks, oil press and isothermal box)	Studies carried out on 7 craft sectors in the basin over 2 years	75,000,000	x	x					

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
1.3.2 Strengthening the technical and organizational capacities of craftspeople and their cooperatives in the various craft sectors	Capacity building of 5,000 craftspeople (including 2,000 women) and their cooperatives in the craft sectors in the basin over 5 years	500,000,000		x	x	x	x
1.3.3 Support for the manufacture of products of high local use	Support to the production of 6 products with high local use for at least 500 craftsmen and 500 craftswomen in the basin over 5 years	2,000,000,000		x	x	x	x
1.3.4 Support for improvement of the product quality	1,000 male and 5,000 female producers are supported in the improvement of 5 products in the basin over 5 years	1,500,000,000	x	x	x	x	x
1.3.5 Facilitation of the supply of raw materials	10 centers are supported with raw materials in the basin over 4 years	100,000,000		x	x	x	
1.3.6 Support for the creation of exportable and commercially viable collections	3,000 craftsmen and 2,000 craftswomen were supported in the creation of exportable and commercially viable collections in the basin over 5 years	500,000,000	x	x	x	x	x
2 Identification, improvement and dissemination of appropriate agro-silvo-pastoral and fish farming techniques for adaptation to climate change							
2.1 Inventory of agro-pastoral practices for adaptation to climate change in the basin							
2.1.1 Regional survey on climate change adaptation measures and capitalization	1 survey on current adaptation measures in the basin over 2 years	100,000,000	x	x			
2.1.2 Organization of exchange visits	50 exchange visits for the benefit of 5,000 producers organized in the basin over 5 years	100,000,000	x	x	x	x	x
2.2 Dissemination of selected good agro-pastoral techniques for adaptation to climate change							
2.2.1 Dissemination of the selected measures	Dissemination of 9 measures, two per sector for three key sectors, for 100,000 producers in the basin over 3 years	5,000,000,000			x	x	x
2.2.2 Raising awareness on the adverse impacts of identified inadequate practices	The awareness of 5 000 000 producers (men and women) is raised	100,000,000			x	x	x
2.3 Dissemination of varieties adapted to the context							
2.3.1 Establishment of seed centers	Establishment of 10 main seed centers and 50 secondary centers in the basin over 5 years	1,000,000,000	x	x	x	x	x
2.3.2 Capacity building of extension structures (agricultural post, development activities and agencies, NGOs and farmer organizations)	Capacity building of 50 extension agencies in the basin over 5 years	500,000,000	x	x	x	x	x

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
2.3.3 Dissemination of selected improved varieties	20 varieties, 2 per crop, are disseminated in the basin over 5 years	3,000,000,000	x	x	x	x	x
2.3.4 Support for the creation of input shops in large production areas	100 shops are created in the basin over 5 years	1,500,000,000	x	x	x	x	x
2.4 Dissemination of tested adaptation measures in the agriculture sector: reduction of post-harvest losses							
2.4.1 Training of basic extension agents	300 extension agents (including 100 female agents) are trained over a period of 3 years in the basin	100,000,000		x	x	x	
2.4.2 Training of producers and farmer organizations in associative life, grain conservation management and techniques	Training is given to 10,000 producers and farmer organizations in grain conservation techniques, management and associative life in the basin over 5 years	50,000,000	x	x	x	x	x
2.4.3 Construction of community warehouses for crop storage	1,000 warehouses are built in the basin over 5 years	1,000,000,000	xx	x	x	x	x
2.4.4 Support for the implementation of the warehouse receipt (<i>warrantage</i>) system in certain production basins	100 common interest groups or farmer organizations are supported for the implementation of the warehouse receipt (<i>warrantage</i>) system in the basin over 5 years	100,000,000	x	x	x	x	x
2.4.5 Improvement and enhancement of seed storage techniques	3 techniques are popularized and disseminated in the basin over 5 years	75,000,000	x	x	x	x	x
2.5 Dissemination of tested adaptation measures in the agriculture sector: Agricultural diversification							
2.5.1 Development of lowlands in peri-urban areas and development of market gardening	10,000 producers in lowlands in peri-urban areas and development of market gardening in the basin over 5 years	2,000,000,000	x	x	x	x	x
2.5.2 Support for small village irrigated perimeters	Development of small village irrigated perimeters for 1,000 producers in the basin over 5 years	3,000,000,000	x	x	x	x	x
2.5.3 Support for flood recession agriculture on the shores of Lake Chad	3,000 male and 2,000 female producers are supported in flood recession agriculture on the shores of Lake Chad over 5 years	500,000,000	x	x	x	x	x
2.6 Dissemination of tested adaptation measures in the livestock farming sector: promotion of animal health							
2.6.1 Equipment of veterinary services with epidemiological surveillance	5 State services in epizootic control are equipped with veterinary services equipment and epidemiological surveillance services in the basin over 4 years	150,000,000	x	x	x	x	

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
2.6.2 Strengthening the capacity of veterinary service agents in epidemiological surveillance	50 veterinary service agents have benefited from capacity building in epidemiological surveillance in the basin over 3 years	75,000,000			x	x	x
2.6.3 Construction of vaccination centers	100 vaccination centers are built in the basin over 5 years	1,000,000,000	x	x	x	x	x
2.6.4 Strengthening the capacity of farmers in prophylactic and diagnostic measures for certain diseases	500,000 farmers are trained in prophylactic measures and pathologic diagnosis in the basin over 5 years	100,000,000	x	x	x	x	x
2.6.5 Support for the creation of veterinary pharmacies	50 pharmacies are created in the basin over 5 years	1,000,000,000		x	x	x	x
2.7 Dissemination of tested adaptation measures in the livestock farming sector: Intensification of livestock farming							
2.7.1 Development of transhumance corridors	2,000 km of transhumance corridors are developed in the basin over 5 years	2,500,000,000	x	x	x	x	x
2.7.2 Creation of management committees	100 management committees are created the basin over 5 years	100,000,000	x	x		x	x
2.7.3 Support for the creation of livestock feed banks	100 feed banks are supported in the basin over 5 years	500,000,000		x	x	x	x
2.7.4 Support for fodder production and conservation	10,000 producers are supported for the production and conservation of fodder in the basin over 5 years	200,000,000	x	x	x	x	x
2.7.5 Development of pastoral wells	200 boreholes are drilled in the basin over 5 years	3,600,000,000	x		x		x
2.7.6 Promotion of peri-urban livestock farming through milk production, bovine, ovine and caprine fattening	1,000 male and 1,000 female producers are supported to promote peri-urban livestock farming through milk production, cattle, pig, sheep and goat fattening in the basin over 5 years	400,000,000	x	x	x	x	x
2.7.7 Support for the production, collection, processing and storage of milk in peri-urban areas	60 male and 40 female milk collectors are supported for the collection, processing and storage of milk in the basin over 5 years	200,000,000	x	x	x	x	x
2.8 Dissemination of tested adaptation measures in the fishery sector: Development of small-scale fishing							
2.8.1 Construction of boat landing stages	10 landing stages are built in the basin over 5 years	1,000,000,000		x	x	x	x

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
2.8.2 Support for the production and packaging of smoked fish	10,000 women are supported in the construction of ovens in the basin over 5 years	1,000,000,000	x	x	x	x	x
2.9 Development of aquaculture							
2.9.1 Construction of nursery centers	15 nursery centers built in the basin over 5 years	750,000,000	x	x	x	x	x
2.9.2 Support for the production of fish feed (financial and technical)	30 fish feed production centers are supported in the basin over 5 years	600,000,000	x	x	x	x	x
2.9.3 Support for the installation of ponds	3,000 ponds are installed in the basin over 5 years	2,300,000,000	x	x	x	x	x
2.9.4 Support for the stocking of natural ponds	100 ponds are stocked in the basin over 5 years	500,000,000		x	x	x	x
2.9.5 Training of State service technicians in aquaculture development	50 agents of the States technical services are trained in the development of aquaculture in the basin over 5 years	50,000,000	x	x	x		x
2.10. Capacity building for fishery stakeholders							
2.10.1 Training of beneficiaries on production, processing, transformation, marketing and management techniques	1,000 producers are trained in the basin on production, processing, transformation, marketing and management techniques in the basin over 5 years	75,000,000	x	x	x	x	x
2.10.2 Rehabilitation of the Djimtilo Training and Recycling Centre for Fishing and Aquaculture	A training and recycling center for fisheries and aquaculture is rehabilitated	300,000,000	x	x			
3. Cooperation and knowledge development on climate change and adaptation							
3.1 Development of an early warning system for natural disasters and risks (floods and droughts)							
3.1.1 Strengthening the piezometer network	A network of at least 60 piezometers is operational in the basin over 5 years	504,000,000	x	x	x	x	x
3.1.2 Strengthening the agrometeorological observation network	A network of at least 65 agro-meteorological stations is installed in the basin over 5 years	612,547,980	x	x	x	x	x
3.1.3 Strengthening the hydrologic station network	A network of at least 74 hydrological stations is operational in the basin over 5 years	408,862,374	x	x	x	x	x
3.1.4 Implementation of a data collection and transmission system	A system for collecting, transmitting and processing data is available in the basin over 5 years	200,000,000	x	x	x	x	x

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
3.1.5 Establishment of a cooperation platform with ACMAD, AGRHYMET and the National Meteorological Directorates	1 platform for cooperation with specialized centers is set up in the basin over 5 years	80,000,000	x	x	x	x	x
3.1.6 Strengthening the capacity of the observatory to update and disseminate seasonal and monthly climate forecasts	05 experts of the Basin Observatory Directorate are able to update and disseminate agro-meteorological information to stakeholders in the basin	50,000,000			x	x	
3.1.7 Participation in seasonal forecasting seminars organized by ACMAD and AGRHYMET	Participation of 2 experts/year for 05 years in PRESAO, a Regional Climate Outlook Forum activity dedicated to West Africa	15,000,000	x	x	x	x	x
3.1.8 Production of newsletters and distribution of monthly newsletter	5 seasonal forecasts and 35 monthly bulletins are made in the basin over 5 years	25,000,000	x	x	x	x	x
3.2 Early warning system for floods							
3.2.1 Elaboration of a flood contingency plan	1 contingency plan is made and operational	100,000,000					
3.2.2 Implementation of an early warning system for floods on the Chari-Logone system and the Kumadugu	1 early warning system for flooding on the Logone, Chari and Kumadugu rivers is implemented over 5 years	150,000,000	x	x	x	x	x
3.2.3 Strengthening the capacities of the Basin Observatory in data processing and analysis, triggering of the alert	5 experts are trained over 3 years in the basin	50,000,000	x		x		x
3.2.4 Design of a flood forecasting model	1 flood forecasting model is designed and operational in the basin over 5 years	100,000,000	x	x			x
3.2.5 Establishment of an information dissemination channel	1 information dissemination channel is set up and operational in the basin	10,000,000	x	x	x	x	x
3.3 Strengthening the production capacity of improved seed varieties adapted to the context							
3.3.1 Signature of a memorandum of understanding with agricultural research institutions and implementation of the clauses.	Signature of agreements and implementation	50,000,000	x				
3.3.2 Inventory in order of importance of the adapted and cultivated crop (and animal) varieties in the basin	1 inventory of improved and contextually adapted varieties is made in the basin over 5 years	50,000,000	x	x	x	x	x

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
3.3.3 Strengthening the capacities of agricultural research institutions in the production of improved basic seeds and in support of seed centers	5 agricultural research institutes have been strengthened in the basin over 5 years	500,000,000	x	x	x	x	x
3.4 Establishment of a database to predict food crises							
3.4.1 Design of a methodology for collecting food data	1 methodology and collection tools are developed over 5 years	75,000,000	x				
3.4.2 Conducting food production surveys	5 surveys are carried out on agricultural, pastoral and food production in the basin over 5 years	500,000,000	x	x	x	x	x
3.4.3 Design of model for food crisis forecasting	1 model for food crisis forecasting is developed and operational in the basin	100,000,000	x	x			
3.4.4 Strengthening the capacity of the LCBC to update the model.	5 LCBC experts are trained in updating the model	50,000,000	x	x	x	x	x
3.5 Strengthening producers' capacity to adapt to climate change							
3.5.1 Awareness-raising on the utilization of agro-meteorological information and local knowledge for crop establishment operations	The awareness of 5,000,000 producers is raised on the utilization of agro-meteorological information and local knowledge for crop production in the basin over 5 years	50,000,000	x	x	x	x	x
3.5.2 Establishment of school farms in production basins for the dissemination of varieties and the promotion of conservation management techniques for natural resources	Establishment of 10 school farms in the basin for the dissemination of varieties and the promotion of techniques for conservatory management of natural resources in the basin over 5 years	150,000,000	x	x	x		
4. Establishment of a consultation platform on adaptation to climate change in the Lake Chad Basin							
4.1 Creation of a consultation platform on adaptation to climate change							
4.1.1 Inventory of the stakeholders of the consultation	1 inventory of stakeholders is carried out in the basin over 5 years	50,000,000	x	x	x		
4.1.2 Awareness-raising of the stakeholders	2 awareness campaigns and a workshop are organized for stakeholders in the basin over 5 years	50,000,000	x	x	x	x	x
4.1.3 Development and establishment of a regional consultation platform on adaptation to climate change at the LCBC	1 consultation platform is set up in the basin at regional level and stakeholders are networked over 5 years	75,000,000	x	x	x		

Activities	Indicators	Budget (FCFA)	Period (2020-2025)				
			A1	A2	A3	A4	A5
4.2 Development and implementation of an action plan for the operationalization of the platform							
4.2.1 Development of an action plan for the operationalization of the platform	3 training workshops are organized for stakeholders in the basin over 5 years	50,000,000					
4.2.2 Implementation of the action plan	Preparation of position and participation in 5 COPs over 5 years	200,000,000					
4.3 Accreditation of the LCBC to funds dedicated to climate change							

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