



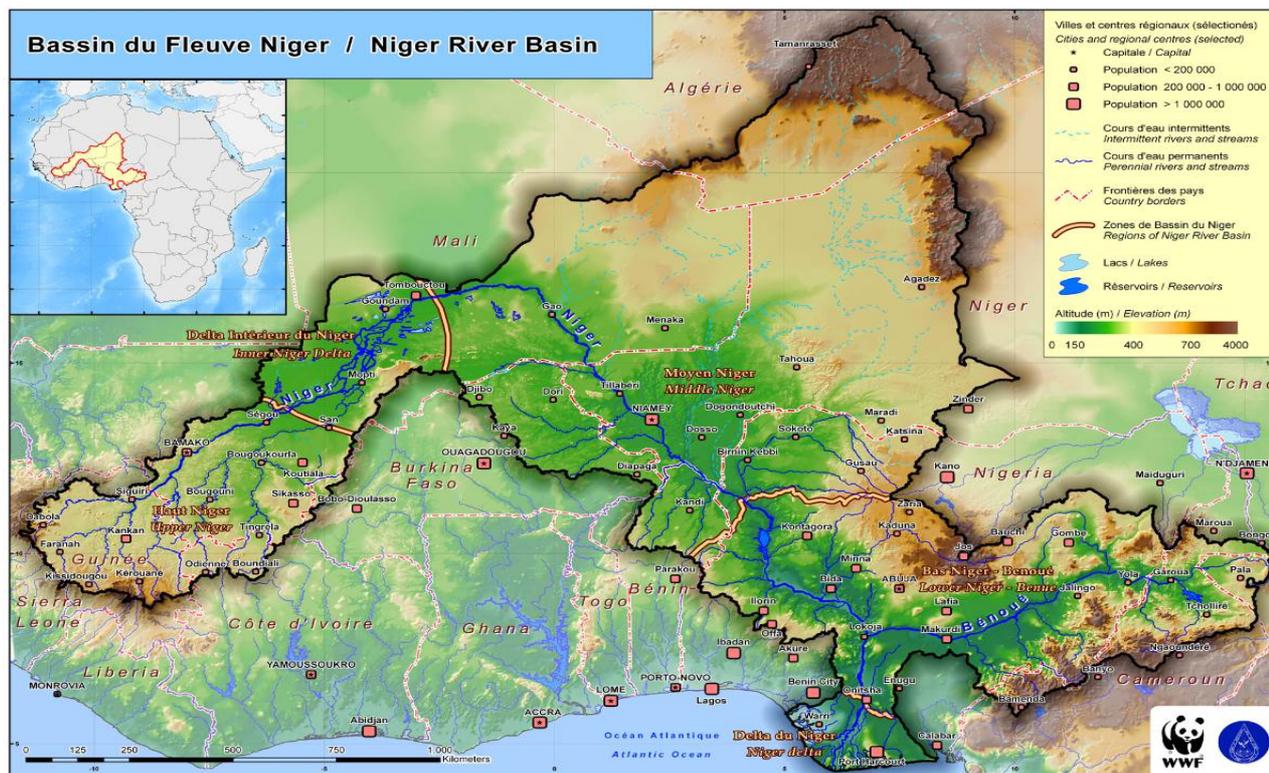
**AFRICAN DEVELOPMENT
BANK
(ADB)**



**EXECUTIVE SECRETARIAT OF
NIGER BASIN AUTHORITY
(NBA)**



**WEST AFRICAN
ECONOMIC AND
MONETARY UNION
(WAEMU)**



**STRATEGIC ENVIRONMENTAL AND SOCIAL STUDIES OF THE INTEGRATED
PROGRAM FOR DEVELOPMENT AND ADAPTATION TO CLIMATE CHANGE IN
THE NIGER BASIN (PIDACC/BN)**



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LIST OF ACRONYMS

NBA	Niger Basin Authority
ADM	Ader-Doutchi-Maggia
AGIR	Global Alliance for the Resilience Initiative
AHA	Hydro Agricultural Installations Development
APS	Pre-project Outline Report
BCEAO	Central Bank of West Africa
BV	Drainage Basin
CBLT	Lake Chad Basin Commission
ECOWAS	Economic Community for West African States
CES/DRS	Water and Soil Conservation / Soil Defense and Restoration
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CNCR	National Rural Code Committee
COFO	Land Commissions
COFOB	Community-based Land Commissions
COFOCOM	Communal Land Commissions
COFODEP	Departmental Land Commissions
CSIN-GDT	Strategic Investment Framework for Sustainable Land Management (CSIN-GDT)
DPES	Economic and Social Development Plan
DPG	Policy Statement
ESMF	Environmental and Social management Framework Plan
ESIS	Environmental and Social Impact Studies
FAE	African Water Facility
FAO	Food and Agriculture Organization
FEC	Extended Credit Facility
FMI	International Monetary Fund
G5 Sahel	Group 5 of the Sahel
GCF	Green Climate Fund
GNI	Gross National Income
GER	Gross Enrolment Rate
GIRE	Integrated Water Resources Management
GRN	Management of natural resources
GRM	Grievance Redress Mechanism
Ha	Hectare
HIMO	High Intensity Labor
ICCV	Index of climate change vulnerability
Initiative 3 N	Initiative <Nigeriens feed Nigeriens> >
INS	National Institute for Statistics
kg/ha	Kilogram per hectare
Kg/a	Kilogram per acre
Km	Kilometer
MDA	Ministry of Agricultural Development
MF	Ministry of Finance
MIRAH	Ministry of Animal and Fishery Resources
MS/ha	Dry matter per hectare
NAPA	National Adaptation Plan of Action
SDG	Sustainable Development Goals
MDGs	Millennium Development Goals
ONAHA	National Board for Hydro-Agriculture
PADD	Action Plan for Sustainable Development
PAFN	Natural Forest Management Project

PAGE	Partnership for Environmental Governance in West Africa
PANGIRE	National Action Plan for Integrated Management of Water Resources
PDRT	Tahoua Rural Development Project
PE/A	Water and Sanitation Policy
PEF	Economic and Financial Program
PFN	National Forest Plan
PGRN	Natural Resources Management Project
PI	Investment Program
PI	Irrigated Perimeter
GDP	Gross Domestic Product
PIDACC/BN	Integrated Program for Development and Adaptation to Climate Change in Niger Basin
PIK	Integrated Project Keita
P-KREMIN	Program « Kandadji » for Ecosystem Regeneration and Development of the Niger Valley
PLCE/BN	Program Combating Silting in the Niger Basin (PLCE/BN)
PNLP	National Malaria Control Program
PMET	Tahoua Region Water Mobilization Project
PN-AEPA	National Program for Drinking Water Supply and Sanitation
UNEP	United Nations Environment Program
PRN	Renaissance Program for Niger
Prod	Production
PS	Strategic plan
REGAC	General Census of Agriculture and Livestock
Rend	Performance
RGP/H	General Census of Population and Housing
SD/LCE	Master Plan for Fighting Silting
SDMV/GRE	Master Plan for Water Resources Development and Management
SDR	Strategy for Rural Development
SEEN	Operating Company for the Niger waters
SEP	Stakeholder Engagement Plan
SNDI/CER	National Strategy for Irrigation Development / Stormwater Conservation
SNF/Niger	National Focal Structure / Niger
SNPADB	National Structure for Biological Diversity
SP/CR	Permanent Secretariat / Rural Code
SPIN	Small-Scale Irrigation Strategy in Niger
SRP	Poverty Reduction Strategy
St	Stere (volume unit equivalent to 1m ³)
Sup	Area
SWOT	Strengths, Weaknesses, Opportunities, Threats
STIs	Sexually Transmitted Infections
UBBA	Upper Benue Development Basin Authorities
UNBA	Upper Niger Development Basin Authorities
UNDP	United Nations Development Program
VEC	Valued Environmental Components
VEE	Valued Environmental Elements
AU	African Union
WAEMU	West African Economic and Monetary Union
IUCN	International Union for Conservation of Nature
WWF	World Wild Fund

EXECUTIVE SUMMARY

Background and description of the PIDACC / BN program

Water erosion and silting are a serious threat, on the one hand for the flow of the Niger River and its tributaries downstream and for the maintenance of biological equilibrium and natural ecosystems and, on the other hand, for housing and all socio-economic activities. These phenomena increase from year to year due to the recurrent droughts which weaken the conditions of life of the populations and the biodiversity in the Niger basin. Because of the environmental constraints mentioned above, the living conditions of the populations of the Niger basin are very precarious. They impose adaptation actions aimed at increasing the resilience of populations in order to combat poverty, preserve and ensure sustainable management of the natural resources of the basin.

Objectives of the Strategic Environmental and Social Assessment (EESS)

EESS generally allows for earlier consideration of impacts before final program definition and allows better control of interactions or cumulative effects. The overall objective of environmental and social studies is to assess the sustainability and optimum nature of the PIDACC / BN investment options, priorities and objectives, with particular emphasis on the environmental, socio-economic, institutional and legislative implementation. The EESS also identifies risks and impacts related to climate change and anthropogenic pressure (agricultural and non-agricultural activities) on PIDACC / BN and propose appropriate adaptation actions.

Political and legal framework for environmental and social management

EESS has carried out an inventory of the regulatory and legislative aspects of the nine (9) member countries of the Niger Basin Authority (NBA), which comprise the framework for the program and are the purpose of this study. To this end, a brief review of the environmental policy of the nine countries was carried out. This framework reflects and takes into account the international texts ratified by these countries and which may be relevant to the management of the impacts and risks likely to be generated during the implementation of this program.

Institutional capacities for environmental and social management

The environmental and social management of the PIDACC / BN Program involves the following actors: the Technical Service of the NBA which coordinates the project; The technical services of the Ministries responsible for the Environment; Agriculture, Planning and Food Security, Industry; Hydraulics, Interior; Trade ; Infrastructure Energy; Transports ; Public Works, Forestry and Wildlife; Land affairs; Social Affairs; Public Health; Economics and Finance; Territorial Administration; Labor and Social Security; Scientific Research; Defense. These actors, whose list is not exhaustive, possess relative skills and abilities on environmental and social issues to be strengthened with a view to ensuring the effective and sustainable implementation of EESS.

Environmental and social issues in the project area

The Environment and Social issues are outlined below.

Environmental Issues

- Issue 1: Development of knowledge about water resources and its management;
- Issue 2: Water pollution control, sanitation and waste management;
- Issue 3: Conservation of wetlands and protection of biodiversity;
- Issue 4: Watershed management.

Socio-Economic Issues in the Area Covered by the program

- Issue 1: Improvement of the socio-economic conditions of the basin populations;
- Issue 2: Definition of the combination (s) of major developments and management guidelines
- Issue 3: Identification and implementation of actions to accompany infrastructure development;
- Issue 4: Identification and implementation of compensatory actions;
- Issue 5: Development of integrated cooperation mechanisms;
- Issue: Creation of a framework for dialogue and stakeholder participation;
- Issue 7: Training of stakeholders and capacity building;
- Issue 8: Strengthening the existing legal and institutional framework conducive to dialogue and concertation for cooperative action between the Member States of NBA.

Public Consultations

The various public consultations revealed that the program enjoys very high social acceptability. Indeed different categories of actors are unanimous in recognizing the program as a vector of sustainable socio-economic development. Indeed, it is perceived as a beneficial program, a response to a real social demand. This is due to the fact that it contributes to the management and sustainable development of the basin's water resources. Nevertheless, concerns were raised by the actors encountered and recommendations formulated to be taken into account in the implementation of the PIDACC / BN program.

Potential positive impacts of the PIDACC / BN program

POSITIVE POTENTIAL IMPACTS

The program is an important dimension for the economic and social development of the concerned areas covering the nine (9) member countries of NBA. Planned measures include:

Fighting erosion and silting

- 17,000 ha of stabilized dunes;
- 121500 ha of restored degraded land;
- 72,000 m³ of mechanical and biological treatment of gullies;

Sustainable agro - pastoral management:

- 26,750 ha of managed agroforestry;

- 94,400 ha of managed forests in a participatory manner;
- 24 000 ha of managed fauna and flora reserves;
- 36 participatory management plans for the sub-watersheds developed;
- 1,425 km of managed transhumance corridors;
- 24,000 ha of improved and protected natural habitats;
- 17,000 ha of rehabilitated spawning areas and 15 sustainable management plans for extractive activities.

Projects defined will control surface waters and significantly increase rainfed production (239,000 tons of cereals, 83,000 tons of cash crops) and develop off-season crops (150 000 tons of market gardening crops). These include the construction of multiple infrastructures such as:

Hydro- agricultural;

- 198 Small multi-purpose dams (396 million m³ of water) rehabilitated / built;
- 89 Irrigated lowlands;
- 22,500 ha of irrigated land Developed / rehabilitated.

Breeding to reduce pressure transit migratory herds and secure 6 million UBT;

- 161 Impoundments, ponds, wells and pastoral water wells constructed / rehabilitated;
- 1425 km of marked and managed transhumance corridors;

Navigation;

- 395 km of improved navigation sections;
- 71 landing docks and other areas where ships related activities constructed;

Fisheries

- 9 rearing stations rehabilitated / built;
- 16 000 ha Spawning areas and floodplains managed.
- 2400 tons of fish produced;

Breeding to reduce pressure transit migratory herds and secure 6 million UBT;

- 161 Impoundments, ponds, wells and pastoral water wells constructed / rehabilitated;
- 1425 km transhumance corridors marked and managed;

At the environmental level, The program will result in:

- resilient development of resources and ecosystems;
- protection of resources and ecosystems;
- better management of water and land;
- better management of the irrigable potential of the area covered by the program; good water management through adapted and appropriate arrangements (respecting the standards and charter of the irrigated area) and with irrigation and drainage networks;
- preservation of natural areas and wetlands; (technical supervision of farmers for better management of soil and water resources by limiting their overexploitation and degradation;

- the introduction of modern storage and processing techniques will have the effect of enhancing agricultural production capacity.

At the social level, The positive impacts of the program's activities mainly relate to:

- improving the resilience of populations;
- accompanying measures and social protection;
- community capacity-building;
- dissemination of good adaptation practices;
- dissemination of agro-climatic information;
- construction of multiple infrastructures in the sectors (Integrated Water Management (GIRE), livestock, fisheries, navigation, crossing, dams, etc.).

At the population level, the impacts will include:

- contribution to food security; fighting famine; improved protein intake;
- creation and enhancement of jobs (reduction of unemployment and the exodus of young people through the creation of local employment opportunities);
- improvement of living conditions. In addition, the Program will hire the unskilled labor from the beneficiary communities as a priority (if necessary after a period of training).

Also, the program will: (i) open up the areas where projects are located by the construction of runways, crossing structures; (ii) integration of development and adaptation to climate change; (iii) implementation of basin-wide actions in each of the nine (9) member countries of NBA (Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Guinea, Mali, Niger, Nigeria and Chad). PIDACC / BN is a regional and cross-border program. Its implementation is likely to generate significant negative environmental and social impacts. In this respect, and in accordance with the ADB's Environmental and Social Assessment Procedures (ESAPs) adopted in 2001, it has been classified as category 1 and is subject to a strategic environmental and social assessment (EESS).

PIDACC / BN NEGATIVE POTENTIAL IMPACTS

(i) Potential negative impacts

The negative environmental and social impacts include the following:

- the risks of soil erosion (soil instability) due to agricultural developments,
- loss of vegetation and biodiversity and degradation of natural habitats in the event of deforestation to prepare agricultural parcels,
- the risks of pollution and degradation of the water table and watercourses linked to the use of pesticides and fertilizers; construction of dams, development of shallows, development of irrigation schemes, construction of water reservoirs, sinking of wells, construction of docks,
- soil disturbance related to development; 90 km dykes to raise, construction of works protecting the villages, etc.
- the risk of water pollution due to the delimitation of spawning areas of 16 000 ha,
- at the social level, there could be an increase in tensions between farmers, livestock keepers and fishermen, on land problems or between livestock breeders and farmers linked to the

wandering of livestock that destroys crops; between farmers, fishers and stockbreeders in the management of water bodies.

Overall, the program's activities will have a definite negative impact on the population's living environment, habitat, socio-economic infrastructure and natural resources, not only because of planned developments but also infrastructure.

(ii) Land and cultural conflicts

The development of agricultural perimeters could lead to land conflicts in the event of non-concerted and non-negotiated expropriation and also in case of degradation of cultural sites.

(iii) Forest resource degradation and risks of incursion into nature reserves

Agricultural development could contribute to the reduction of forest and biological resources (prior clearing, disturbance of sensitive habitats and ecosystems that may lead to a decline in biological diversity, etc.). Land valuation will increase land pressure in the area with threats of degradation in buffer zones and protected areas (leased areas, biosphere reserves, classified forests). This pressure on the land resource will negatively affect the possibilities of acquisition of land by private owners due to higher bidding. Also, with the proximity of agricultural activities, there is a risk of increased poaching in protected areas. Drainage channels could be taken by aquatic fauna (manatees and crocodiles), which would damage local biodiversity. To avoid these risks, the program will have to establish eligibility criteria and implement monitoring measures for activities to be financed in the surrounding areas of the parks.

(iv) Strong pressure on water resources

Agricultural practices, including irrigation, will likely require the use of significant quantities of water resources if sustainable and water-saving technologies and technologies are not implemented. In terms of degradation of water resources, the main possible cause of water pollution could be the irrational use of fertilizers and pesticides. In addition, poor drainage of agricultural developments could increase the state of pollution and the eutrophication process. Poor hydraulic channel set-up could disrupt spawning areas. In addition, it will be necessary to highlight the risks of reduction of the quantities of water available for the users, the exacerbation of the competition; even conflicts.

(v) Environmental risks related to the use of chemical fertilizers

Fertilizers cause pollution in the event of intensive cultivation. They are sources of water pollution when they are applied in greater quantities than crops can absorb, or when they are washed away by water before they can be absorbed. Excess nitrogen and phosphates can be infiltrated into groundwater or run into surface water. This nutrient overload causes the eutrophication of tributaries of rivers, lakes, reservoirs and ponds and causes a proliferation of algae that destroy other plants and aquatic animals.

(vi) Development of aquatic plants and invasion of seed-eating birds

The new developments will create favorable environmental conditions for the development of invasive plants in the water bodies. This development will create the conditions for an increase

in the population of these species which will negatively impact on agricultural and fishing production or increase production costs through development of more intensive struggle means. The invasion of water bodies in protected areas and in buffer zones could affect the natural habitats of all biodiversity. The mobility and reproduction of animals could be disrupted with negative impacts on biodiversity, the safeguarding of which is a condition for maintaining or developing tourist activities in the area (Niger Basin). Also, the reproduction of fish from these bodies of water invaded by aquatic plants will be impaired due to eutrophication of these bodies of water (lack of oxygen, illumination, high CO₂ content); fisheries activities will be affected.

(vii) Land degradation and soil fertility

Land degradation resulting from the use of agricultural technology and practices is a factor limiting both the development of the rural sector and the protection of natural resources (land degradation or erosion; waterlogging, reduction of arable and pastoral areas).

(viii) Social and health pressures due to irrigation schemes

Irrigation canals could lead to loss of socio-economic activities (fields, grazing, etc.), restrictions on movement of livestock and forest degradation on their routes. Their poor alignment in water bodies could disrupt aquatic fauna, especially in spawning areas. During their exploitation, the invasion by water weeds and the presence of vectors of water-borne diseases (malaria, bilharziasis etc.) could pose a threat to the health of riverside populations, especially children. On the other hand, agricultural activities could also promote the development of Sexually Transmitted Infections (STIs) and HIV / AIDS with gender mixing (active periods of crops).

(ix) Environmental and health risks due to pesticides on human and animal health

Agricultural development will be accompanied by a farming intensification and will lead to an increase in the use of pesticides and chemical fertilizers, hence the likely negative impacts on human and animal health. In the absence of a real integrated pest management, increased agricultural production could lead to increased use of chemical pesticides, the effects of which are harmful to the environment. Pesticides are generally classified according to their target. Insecticides, herbicides or fungicides are the most commonly used designations. There are, however, other categories such as rodenticides (against rodents), acaricides (against mites, etc.), nematicides (against nematodes) or molluscicides (against slugs), etc. These pesticides can spread in the environment contaminating different matrixes (water, soil, vegetation, user, etc.). Pollution may be related to the use, storage of the concerned chemicals, their application and the natural transport of pollutants.

Treatment of agricultural crops under the PIDACC / BN program may result in pollution of the environment (physical, biological and human). The largest concentrations of pesticides go through the atmosphere after aerial spraying. The method of application of the products (aerosol) often results in a dispersion of these pollutants residuals which can go up to a distance of 5 km from the place of use depending on their density, thus causing pollution of surface water and the surrounding soil. The following risks can be noted on the environment:

- In crop treatment, the majority of pesticides reach the soil, either because the pesticides are directly applied on it or because the rain has leached out the foliage of treated plants.

- Soil is central to regulating the fate of pesticides in the environment and will have a dual role in storage and purification (Barriuso et al., 1996).
- Pesticides are affected by different physical, chemical and biological processes that will condition their degradation, their transfer to the other compartments of the environment and consequently their potential impact on exposed living creatures. In particular, it happens when the pesticide is present in liquid and gaseous phases that it will be available to be degraded by microorganisms (scrubbing) but also to be transferred to groundwater, whereas in the solid phase, it remains trapped in the soil (Storage).
- Thus, the behavior of pesticides will be more particularly controlled by the phenomena of retention on the constituents of the soil (organic matter, clays) and degradation. The greater the retention of the pesticide, the lower its mobility and the lower the risk of contamination of groundwater (eg deep). However, in this case, it is likely to be transferred to surface water by particulate transport during runoff or erosion events (Barriuso et al., 1996).
- Risks related to water pollution (surface water and groundwater), and more specifically the herbicides (including glyphosate) that are most present in polluted waters;
- Risks related to atmospheric air pollution. During aerial treatments or even by pumping, the wind favors the dissemination of the product in the atmosphere;
- Risks arising from mismanagement of packaging or accidents involving storage / handling of pesticides should also be taken into account ;
- Risks to biodiversity with potential impact on biocenosis especially on insects and other crop auxiliary pests. The persistence of pesticides is directly related to their degradation. This degradation is complete only when the product is transformed into a mineral molecule, such as CO₂, which is completely eliminated. This transformation may be such:
 - Biotic (degradation by microflora, microfauna and plants), hence the importance of maintaining biodiversity in agricultural soils;
 - Or abiotic (by hydrolysis, photolysis).

(x) Social risks in the event of reduced grazing areas

The area covered by the program had become the fallback zone for livestock in the dry season. The development of agricultural areas could also lead to the reduction and even loss of pasture, and this can be the source of conflicts between breeders and farmers. The development (channel, irrigation canals, drains) and crop production activities will drastically reduce pastoral activities. The issue of land management in relation to pastoral activities remains thus raised (area of passage, crossing corridors, access to water bodies for watering, animal wandering, water-related diseases, risks of poisoning through residues from agricultural inputs, drainage waters, potential conflicts of farmers).

The PIDACC / BN Program in the context of its development and the development of the areas granted must integrate the concerns of agro pastors. Actions to safeguard and mitigate the damage must be taken that will be induced by farmers activities on the life of the breeders and their environment to safeguard social peace and secure investments.

(xi) Risks of social conflicts with the movement of livestock towards the new perimeters

An indirect environmental impact could be the movement of livestock through the new irrigated and managed perimeters. In search of new pastures, livestock and their owners could invade the new irrigated perimeters. The program will have to take into account the needs of livestock.

(xii) Social risks in the event of a reduction in farming areas

There are also threats to farmers who may see a decline in their areas of activity because of the growing demands of agro-industrial perimeter developers.

(xiii) Impacts on the internal and external dynamics of populations

The population dynamics may be affected by the installation of the program on several angles: The Program will use the local or non-local labor, and thus needs to clarify employment procedures. This problem of recruiting the workforce external to the population must be analyzed as it may have consequences on population dynamics.

The negative impacts mitigation measures stated in this executive summary only relate to dam projects, rice mills and transhumance tracks whose impact we assessed. EESS is more concerned with generic impacts as well as generic mitigation measures for projects. Environmental and social impact assessments will further explore the potential negative environmental and social impacts and mitigation measures of the identified projects for (PIDACC / BN) program.

Mitigation measures for potential negative impacts of PIDACC / BN program

Projects	Potential negative impacts	Mitigation measures
DAMS Pre-operational phase of dam construction	<u>Impacts of Dams implementation phase</u> <ul style="list-style-type: none"> The concrete will be dumped on the ground will impact it and also generate dust. <u>Cofferdam in the phase of implementation</u> <ul style="list-style-type: none"> The vegetation and the rocky area will be removed this will cause the vegetation cover and the bare ground to disappear. <u>Foundations in the preparation phase</u> <ul style="list-style-type: none"> Removal of topsoil and rock and evacuated from site. Emission of gas and smoke from equipment; Noise; Production of dust and particulate matter 	<u>Mitigation measures in phase of implementation</u> <ul style="list-style-type: none"> Water the dam area to reduce dust <u>Cofferdam in the implementation phase</u> <ul style="list-style-type: none"> Greening the area with fast-growing plants, fertilizing degraded soils by bringing fertilized soil. <u>Foundations in the preparation phase</u> <ul style="list-style-type: none"> Greening the area with fast-growing plants, fertilizing degraded soils by bringing soil Wearing EPI Watering the site during construction, Use less noisy equipment. Watering the site during construction
1. Construction phase of the dam	<u>Works in phase of construction</u> <ul style="list-style-type: none"> This phase requires the transport of the materials which will generate the emission of dust, fine particles, engine exhaust, The humidification during the 	<u>Works in phase of construction</u> <ul style="list-style-type: none"> Watering the ground, wearing EPI, putting in place good moisture management. Take into account land-related aspects and cultural aspects Establishing good management of

Projects	Potential negative impacts	Mitigation measures
	<p>compaction of the embankments will require the discharge of water on the site which will infiltrate or drain to the rivers surrounding the site of construction of the dam,</p> <ul style="list-style-type: none"> • Air pollution by gases, fumes from compaction machines, noise impacts and waste oils. 	<p>watering and humification of backfill materials in order to avoid dumping into surrounding watercourses</p> <ul style="list-style-type: none"> • Using equipment in good condition, having updated technical visit, using oil products of good quality meeting the standards
2.Dam Operation Phase	<i>Operation Phase of development works and structuring hydraulic works (dams):00</i>	<i>Operation Phase of development works and structuring hydraulic works (dams):</i>
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Risks of land and cultural conflicts • Forest resource degradation and risks of incursion into nature reserves • Risk of disturbance of spawning grounds • Deforestation, land degradation by erosion. • Loss / reduction of grazing areas • Strong pressure on land and water • Risks of diseases such as STIs / HIV / AIDS. <p><u>Operation phase of perimeters:</u></p> <ul style="list-style-type: none"> • Strong pressure on water resources. • Environmental risks related to the use of chemical fertilizers (water and soil pollution) • Land degradation and soil fertility. • Impacts on internal and external dynamics of projects. 	<ul style="list-style-type: none"> • Information and awareness sessions. • Identify the boundaries, extent of the lake and establish a monitoring system for the lake. • Control of aquatic plants and birds. • Consultation with farmees. • Limiting flood zones; • Local employment and basic community infrastructure. • Awareness and information session on STI / HIV / AIDS. • Implementation of an integrated and controlled management system. • Establishment of a system for monitoring the use of chemical fertilizers in arable areas along the dam. • Establishment of a management system for arable land generated by the dam.
	<ul style="list-style-type: none"> • Environmental and health risks due to pesticides on human and animal health. 	<ul style="list-style-type: none"> • Properly train officers on the safe use of pesticides and the maintenance of treatment equipment; • Avoid contamination by placing buffer zones, • Make pictograms of danger and prohibition of smoking in front of pesticide storage warehouses or packing depots; • Properly handle empty containers that are highly sought after (rinse, drill, grind and convey to the landfill); • Regularly monitor, through analyzes, the

Projects	Potential negative impacts	Mitigation measures
	<ul style="list-style-type: none"> • Social risks in case of reduced grazing areas. • Risks of social conflicts with the movement of livestock to the new perimeters. 	<p>levels of pesticides in water;</p> <ul style="list-style-type: none"> • Appoint Health, Safety, Quality Officer. • Conduct Information, Education and Communication (IEC) sessions for local residents on the risks and dangers of pesticides and fertilizers; Conduct IEC sessions for pesticide applicator staff; • Carry out cholinesterase tests on all pesticide applicator staff before campaigns, campaigns, after campaigns ; • Require the wearing of Personal Protective Equipment (PPE) of all pesticide applicators (hood, bezel or face shield, mask, gloves, boots, combination). <ul style="list-style-type: none"> • Consultation with livestock keepers, creation of transhumance corridors & water points and awareness raising. • Delimitation of rangelands and pastures. • Protection of water points, encouraging forage crops to meet the demand of fodder farmers.
Tracks Of Transhuman Corridors.	<p>Track Creation Work Phase :</p> <ul style="list-style-type: none"> • Loss of biodiversity along the route and at the borrow sites. • Encroachment on arable land and socio-economic activities. • Obstruction of irrigation and drainage channels and runoff paths. • Pollution from construction waste. 	<p>Work Phase:</p> <ul style="list-style-type: none"> • Wise choice of sites. • Compensatory Reforestation. • Focus on existing careers • Rehabilitation after construction • Staff awareness and protection • Ecological management of construction waste and evacuation to the municipal waste disposal site
1.Track Creation Work Phase.		
2.Tracks operation phase.	<p>Operation phase:</p> <ul style="list-style-type: none"> • Nuisance due to dust, • Reduction of cultivable areas through the development of corridors. • Land use through the corridor. • Conflicts related to land use and transhumance. 	<p>Operation phase:</p> <ul style="list-style-type: none"> • Regular watering of tracks and awareness. • Consultation on land and water use. • Compensation in case of expropriation • Information / awareness for populations and work staff.

INTRODUCTION

I. BACKGROUND AND RATIONALE

1.1.1. Program Context

Water erosion and silting are a serious threat, on the one hand for the flow of the Niger River and its tributaries downstream and for the maintenance of biological equilibriums and natural ecosystems and, on the other hand, for habitats and all socio-economic activities. These phenomena have increased from year to year due to recurrent droughts which weaken the conditions of life of the populations and the biodiversity in the Niger basin. Due to the environmental constraints mentioned above, the living conditions of the populations of the Niger basin are very precarious. They impose adaptation actions aimed at increasing the resilience of populations in order to combat poverty, preserve and ensure sustainable management of the natural resources of the basin.

1.1.2. Program Rationale

The Integrated Program for the Development and Adaptation of Climate Change in the Niger Basin (PIDACC / BN) is justified by the need to promote sustainable social development, to protect the major water infrastructures built in the basin and the main wetlands of the Niger basin and to consolidate and extend the important achievements of the previous (PLCE / BN) Niger Basin Program fighting silting. It aims to carry out actions at the basin level in each of the nine (9) member countries of NBA (Niger, Mali, Chad, Guinea, Benin, Cameroon, Nigeria, Cote d'Ivoire and Burkina Faso).

For the implementation of the program, the Niger Basin Authority (NBA) is carrying out a Strategic Social Environmental Assessment which will provide an overview of the environmental and social conditions prevailing in the Niger Basin.

EESS generally allows for earlier consideration of impacts before final program definition and allows better control of interactions or cumulative effects. The overall objective of environmental and social studies is to assess the sustainability and optimum nature of the PIDACC / BN investment options, priorities and objectives, with particular emphasis on the environmental, socio-economic, institutional and legislative implementation. EESS will also need to identify the risks and impacts of climate change and anthropogenic pressure (agricultural and non-agricultural activities) on PIDACC / BN and propose appropriate adaptation actions.

II. OVERALL DESCRIPTION OF THE PROGRAM

The program focuses on the following three (3) components: (i) Development of resilience of resources and ecosystems; (ii) Development of population resilience, and (iii) program coordination and management. Gender issues and environmental protection are integrated transversally to all components.

2.1. OBJECTIVE OF THE PROJECT

The overall objective of the program is to carry out preliminary studies which will then be used to establish the feasibility of the PIDAACC / BN and catalyze investments through technical, economic, financial, and environmental and social studies.

2.2. EXPECTED OUTCOMES

The short-term outcomes of the project are:

- Preliminary technical studies of the country components on integrated agricultural sector development and adaptation to climate change;
- Regional summary of preliminary studies conducted;
- Strategic Environmental and Social Assessment (EESS) and its Strategic Environmental Management Framework conducted;
- Environmental and Social Impact Assessments (EIES) of country components on integrated agricultural sector development and adaptation to climate change, and related Environmental and Social Management Plans conducted;
- Regional summary of environmental and social impact assessment (EIES) conducted;
- Financial resources for the implementation of the program mobilized.

2.3. PIDACC COMPONENTS

The program is structured around the following four components: (i) Resilient development of resources and ecosystems; (ii) Development of population resilience, and (iii) Program coordination and management. Gender issues and environmental protection are integrated transversally to all components.

2.3.1. Component 1 : Resilient development of resources and ecosystems

This component aims to increase the resilience of resources and ecosystems by combating wind and water erosion through regeneration of vegetation cover.

Sub-component 1.1: Protection of resources and ecosystems: This sub-component aims to protect water resources, soil and ecosystems and includes the following three components: (i) erosion and silting, through the implementation of actions protecting hydraulic work, Kori treatment, dune fixation, shoreline protection and watershed management; (ii) sustainable forest management and protection of biodiversity and wetlands through forest and agroforestry development and support for the sustainable management of Ramsar sites; (iii) control of water pollution. The main expected achievements include the following:

Controlling erosion and silting

- 17,000 ha of stabilized dunes;
- 121500 ha of restored degraded land;

- 72,000 m³ facilities of mechanical and biological treatment for gullies;

Sustainable agro sylvo pastoral management:

- 26,750 ha of managed agroforestry;
- 94,400 ha of managed forests in a participatory manner;
- 24 000 ha of managed fauna and flora reserves;
- 36 participatory management plans for the sub-watersheds developed;
- 1,425 km of managed transhumance corridors;
- 24,000 ha of improved and protected natural habitats;
- 17,000 ha of rehabilitated spawning grounds and 15 sustainable management plans for extractive activities.

Sub-component 1.2: Strengthening shared management of natural resources

This sub-component aims at strengthening communities' capacity to adapt and intervene through the development of best practice guides, dissemination of good adaptation practices, dissemination of agro-climatic information and support to users. Planned achievements include:

- tools for climate change adaptation developed,
- Integrated Water Resources Management Plans (GIRE) ;
- a capacity building program for 320 managers and 50 professional association managers;
- improved regional coordination in the implementation of PS/PO ;
- a payment mechanism for environmental services (PES) to finance sustainably the protection actions of the Niger basin.

2.3.2. Component 2: Improving the resilience of populations

This component will be national in nature and will have to contribute significantly to the development of socio-economic infrastructures and the protection of the resources and ecosystems of the basin in each country - two of the three priority areas of action identified in the PADD and the Associated Investment Program. It aims at the rehabilitation and / or construction of hydro-agricultural, livestock, fishing and navigation infrastructure. It includes the rehabilitation and construction of hydro-agricultural infrastructure, animal husbandry, fishing and navigation. It is structured according to the following two sub-components: (i) Development of multi-purpose infrastructure and (ii) Accompanying measures and social protection.

Sub-component 2.1: Hydro-agricultural infrastructure: This sub-component includes 4 components:

(i) Hydro-agricultural infrastructure, consisting of the rehabilitation and construction of small multi-purpose dams and reservoirs, hydraulic structures (flood thresholds), development of ponds and lowlands with control of water, and the rehabilitation of small irrigated perimeters. The component includes the last phase of the construction of the Bambakari dam in Burkina

Faso, the construction of 9 water reservoirs in Benin, the construction of 9 water reservoirs in Cote d'Ivoire and the construction of 20 reservoirs of water in Cameroon.

(ii) Livestock infrastructure which comprises rehabilitation of pastoral hydraulic infrastructure, transhumance corridors and pastoral areas. In addition, agro-sylvo-pastoral support actions at the basin level have been integrated in order to rehabilitate and create pastoral areas, promote forage crops and improve the management of cross-border transhumance.

(iii) Navigational infrastructure which consists of the construction and / or rehabilitation of navigation sections and landing stages or port. It includes, in particular, the carrying out of a basin-scale study of the river transport potential on the river and its tributaries, activities to control and enhance water hyacinth along waterways, the rehabilitation of the Garoua port in Cameroon and the Chad-Cameroon-Nigeria navigable section; and (iv) fisheries infrastructure, which comprises the rehabilitation of rearing stations. This component includes support for the development of fishing and aquaculture activities around large reservoirs, ponds, dams and reservoirs, including the rehabilitation of rearing stations, and the provision of equipment to fishermen (Nets, dugouts, wharves, ice, smoking and threading units, etc.) The improvements envisaged under this sub-component will make it possible to control surface water, and a significant increase in rainfed cereal production (239 000 tonnes, 83 000 tonnes of cash crops) and develop off-season crops (150 000 tonnes of vegetable crops).

Hydro-agricultural infrastructure;

- 198 small multi-purpose dams (396 million m³ of water) rehabilitated / built;
- 89 landscaped shallows;
- 22,500 ha of irrigated land developed / rehabilitated perimeters.

Livestock infrastructures to reduce the transit pressure of transhumant flocks and secure 6 million UBT

- 161 reservoirs, ponds, wells and pastoral water wells constructed / rehabilitated;
- 1425 km of marked and managed transhumance corridors;

Navigation infrastructure

- 395 km navigation sections improved by scything ;
- 71 landing docks and docks constructed;

Fisheries infrastructure

- 9 rearing stations rehabilitated / built;
- 16 000 ha of spawning and floodplain areas.
- 2400 tonnes of fish produced;

Sub-component 2.2: Accompanying measures and social protection: This sub-component includes:

Organization of infrastructure committees

- 300 infrastructure Management Committees with at least 30% representativeness for trained women;
- 200 infrastructure upgrading sub-projects;

Organization and structuring of fisheries stakeholders

- 50 organizations of fishermen and fisheries processing companies reinforced;
- restoring the reproductive potential of spawning and floodplain areas to ensure sustainable exploitation of inland fisheries resources;
- promote the development of aquaculture;
- strengthen the capacity of fishermen's organizations.
- 30 floating fish cages;
- 45 fish water reservoirs;

Community adaptation infrastructure

- community action plans for adaptation to CCs developed and implemented;
- 27 Community infrastructure (culverts, wells, village protection works);
- 450 ha of market garden areas for 90 groups of women;
- 90 sub-projects per 1000 young people financed.

Support for vulnerable groups

- access of 9,000 women and 3,000 young people to recovered land;
- 100 SMEs for youth employment, including 30 for women;
- 45 multifunctional platforms for women's groups.

Flood Protection:

- 90 km of raised dyke
- 1,000,000 producers sensitized to climate change adaptation techniques ;
- 30,000 producers supported for the use of climate information;
- 200 community agents and associations in REDD+ ;
- a mechanism for disseminating agro-climatic information.

Sub-component 2.3: Strengthening adaption capacities of communities: Sub-component 3 includes 3 components:

- Development of good practice guides,
- Dissemination of good adaptation practices and
- Dissemination of agro-climatic information, and
- Support to users through:

- a) capacity building of local technical services in the nine countries for the implementation of IWRM, sustainable land management and adaptation and resilience to climate change;
- b) strengthening the organizational and technical capacities of natural resource users for the management and maintenance of water infrastructure, implementation of IWRM, sustainable land management, adaptation and resilience to climate changes; and
- c) Capacity-building in the collection, centralization and sharing of information and establishment and operation of a network for monitoring solid transport and water quality.

2.3.3. Component 3: Coordination and management of PIDACC

This component will be regional and national and aim to ensure effective and efficient program management at the regional level by NBA and each country for the national components in order to achieve the expected outcomes of the program. It includes the setting up of regional and national program coordination, technical and financial management, supervision of activities, monitoring and evaluation and annual audits.

2.4. DISTRIBUTION OF THE INVESTMENT BUDGET AMONG COUNTRIES

The distribution of investments for the proposed actions is presented in Table 2 below. Costs are estimated at CFAF **172 452** million.

Table 1 : Budget of Program Components

Components	BENIN		BURKINA		CAMEROON		COTE D'IVOIRE		GUINEA		MALI		NIGER		NIGERIA		CHAD		NBA		Total		
	10 ⁶ FCFA	%	10 ⁶ FCFA	%	10 ⁶ FCFA	%	10 ⁶ FCFA	%	10 ⁶ FCFA														
Component 1 : Development of resilience of resources and ecosystems	5 938	9.76%	6 050	9.94%	5 920	9.73%	6 956	11.43%	6 914	11.36%	12 745	20.95%	6 190	10.17%	5 960	9.79%	4 150	6.82%	10 448	17%	60 823	37%	
Component 2 : Development of population resilience	10 404	9.96%	18 294	17.52%	9 026	8.64%	14 811	14.18%	9 856	9.44%	13 063	12.51%	8 959	8.58%	14 470	13.86%	5 500	5.26%	3457	3%	104 383	59%	
Component 3 : Program Coordination and Management	838	11.56%	690	9.52%	934	12.88%	757	10.44%	687	9.48%	750	10.35%	740	10.21%	1 200	16.56%	650	8.97%	1190	16%	7 246	4%	
Total	17 180	9.6%	25 034	14.50	15 880	9.1%	22 524	13%	17 457	10%	26 558	15.4%	15 889	9.21%	21 630	12.54%	10 300	5.97%	15 095	9%	172 452	100%	

III. METHODOLOGY OF SOCIAL AND STRATEGIC ENVIRONMENTAL ASSESSMENT (EESS)

The Social and Strategic Environmental Assessment (SSEA) was prepared in order to meet the requirements of the TDRs issued by the Niger Basin Authority (NBA) in charge of the management of the Niger Basin on the one hand and on the other hand, validated by the African Development Bank.

The environmental assessment presents an analysis of method for interaction between the project and the biophysical and social environment. Figure 1 illustrates the approach used for the environmental assessment. The environmental assessment process followed the following stages: At the preliminary stages, decisions were made on the determination and evaluation of the direct and indirect areas of influence of the country projects. Optimal areas were selected after assessing various factors, including public safety, environmental, socio-economic, land and cost constraints.

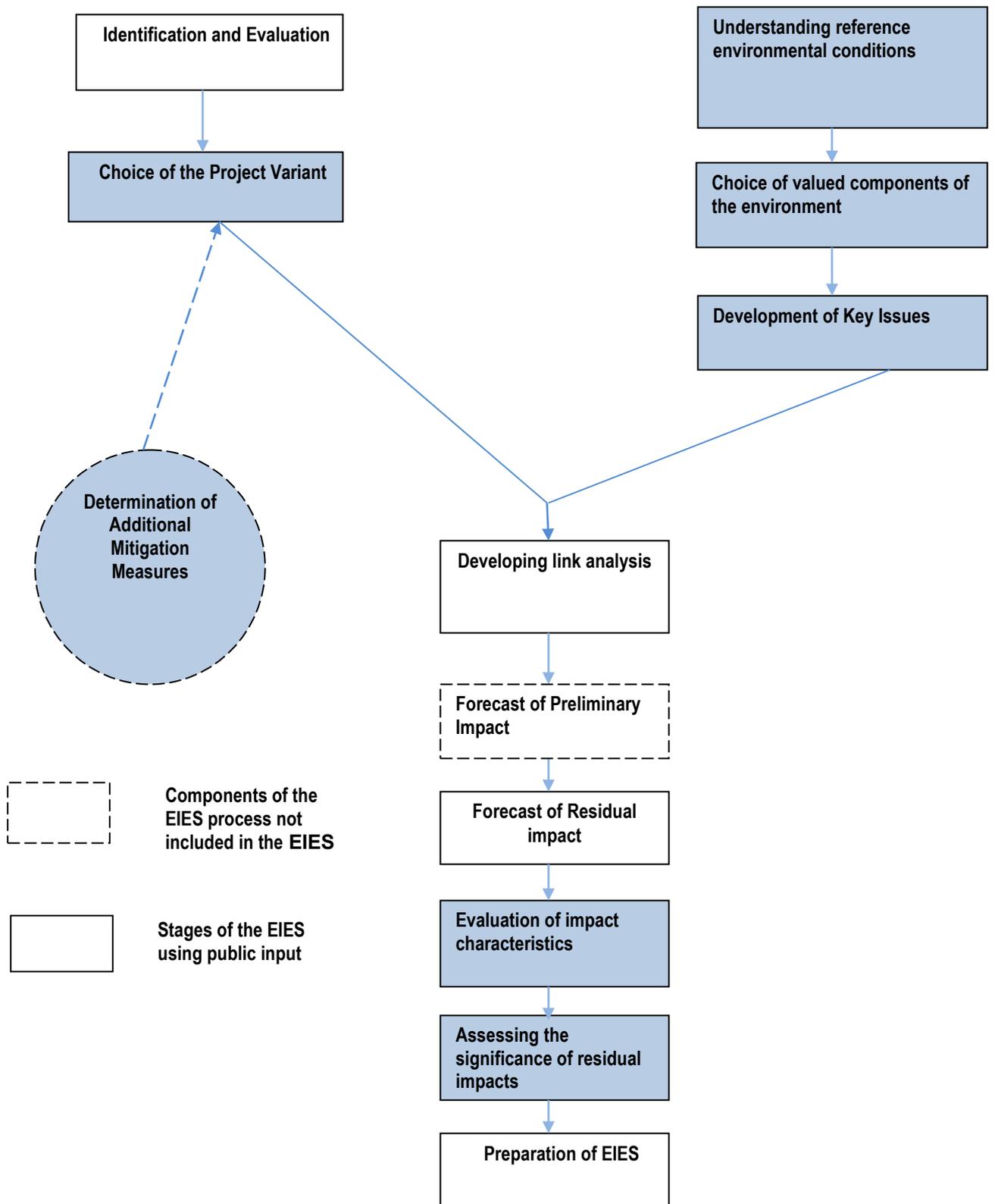


Figure 1 : Approach used for environmental assessment

At the same time, the data collection was carried out on the receiving environment (both biophysical and social) covering the member countries of NBA during field missions and during the public consultations that took place in the nine (9) countries. These missions were the opportunity to see the Valued Environmental Components (CVE) or the Valued Environmental Elements (EVE) of the sub-projects on the basis of a number of elements, including utility or value to the public and scientific interest.

Key issues are then developed, reflecting public concerns about the potential impact of the program on key elements. The experts then proceeded to determine the possible potential impacts of the program on the environment. They proposed ways to mitigate these potential impacts. Residual impacts (ie, those likely to remain after mitigation) have been characterized and their importance determined by taking into accounts the value of CVE and the significance of the impact.

3.1. PUBLIC CONSULTATION

The process of public participation in projects includes individuals, representatives of non-governmental organizations (eg, public and environmental interest groups), representatives of government agencies and elected officials. The public input during the consultation phase enhanced EESS for the following components: (i) understanding of environmental reference conditions; (ii) the choice of CVE for the biophysical and human environment; (iii) development of key issues; (iv) the identification of additional mitigation measures and (v) assessment of the relative importance of residual impacts.

The reference conditions were determined on the basis of published data and field surveys, supplemented by information from public consultations. For example, environmental and social assessment includes elements that the public has expressed a greater concern about the development of CVE. These CVE include elements of the physical as well as biological and human environment. They formed the basis of the key issues, to which the results of the environmental assessment provides some answers. In assessing the significance of impacts, the value of resources was taken into account. When a CVE was highly valued, it was more likely that an impact would be perceived as important as in the case of a less valued CVE.

3.2. ITERATIVE PROCESS

The environmental assessment was an iterative process. The design of the program was reviewed by the environmental assessment team, taking into account the proposals made by the technical design team. Where potential impacts have been identified, proposals to modify the technical design have been made to reduce or avoid impacts. The design of the program contemplated in this environmental assessment incorporates several mitigation measures.

3.3. RECEIVING ENVIRONMENTS

Before predicting the effects of the program on the natural and social environment, it is necessary to understand the conditions in the absence of the program, ie the "reference conditions". The baseline conditions for the receiving environment were determined through visits to potential sites of intervention, review of documentation, and consultations with

resource persons. The studies examined the following components of the physical, biological and human environments.

3.3.1. Physical Environment

This comprised: air quality; climate change; sound environment; Soils and land; hydrogeology; sediment quality and hydrology.

3.3.2. Biological Environment

This comprised: vegetation; flora; wetlands; sensitive wetlands; terrestrial and avian fauna and aquatic fauna.

3.3.3. Human Environment

This comprised: archeology and heritage resources; socio-economic aspects; land use and visual resources.

3.4. VALUED ENVIRONMENTAL (CVE)

3.4.1. Justification for the choice of Valued Environmental Components (CVE)

Strategic Social Environmental Assessment focuses on issues of particular environmental importance (including the physical, biological and human environments) as identified by the study team and the public and identified in the TORs. These issues have therefore been identified from various sources: Country Environment Codes; Country Mining Codes; Forestry codes; Water Codes; Guidelines of the World Bank and SFI; ADB guidelines; public consultations; discussions with regulators and local governments; information from EIES of similar developments in the nine (9) member countries of NBA; scientific literature; and experience from ID-SAHEL staff and its consultants.

A number of factors influenced the selection of CVEs, including: (i) The probability of effect occurring if the resource were affected, that is, whether there is a link between the affected component and other components; (ii) the sensitivity or vulnerability of the component; (iii) the uniqueness or rarity of the component; (iv) the sustainability of the component or ecosystem; (v) the value attributed to the resource by interested parties; (vi) recognition of the importance of a component by a law, regulation, policy or the decision of a court or customary court and (vii) risks to the health, safety or well-being of the population.

3.4.2. Choice of Valued Environmental Components (CVE)

CVEs were chosen to represent characteristics of particular importance to each of the physical, biological and human environments. In addition to examining the potential effects of the program on **CVEs**, the Social Environmental Assessment also examined a number of environmental components that are not considered **CVEs**. If the effects of the program on these components have been studied, it is because the impacts on these characteristics are likely to have a ripple effect on **CVEs**.

3.4.2.1. Choice of CVEs from the physical environment

The CVEs chosen for the physical environment are as follows: air quality; climate change; the sound environment; Soils; hydrogeology (groundwater supply); and hydrology (surface water).

The logic that led to the choice of each of these CVEs of the physical environment is described below.

- Air quality: Air quality was chosen as a CVE because it is one of the main concerns raised in the Environmental Codes and because air quality is linked to other components, human health, vegetation and fauna.
- Climate change: This component was chosen because it is part of the NBA concern strongly expressed in the ToRs. This phenomenon is very important in the program.
- Sound environment: The CVEs selected to assess the program's noise impacts determine the potential effects of the program on the sound environment of local residents.
- Soil and land use: The CVEs were selected to determine the potential effects of the project on soil and land. After revising the soil and land concerns contained in the TOR and communicated during the public consultation program, land and soil quality were selected as CVE to address the potential impacts of the program.
- Hydrogeology (Groundwater supply): Groundwater is currently the main source of water in the various localities visited.
- Surface water quality: The project is located next to the rivers and near several plans and streams.

The project's exploration and exploitation phases may have an impact on the quality of surface water. According to the Environment Code, the effects on the quality of surface waters constitute one of the main concerns with regard to the impacts of the project.

3.4.2.2. Choice of CVEs from the biological environment

The selected CVEs for the biological medium include: (i) vegetation and wetlands; (ii) terrestrial fauna; (iii) Inland fish and their habitat; and (v) terrestrial mammals and habitats.

The logic behind the selection of each of these CVEs from the biological environment is provided below.

- Vegetation and wetlands: The selected CVEs are used to focus the analysis of project impacts on vegetation and wetlands. As stated in the Environmental Code, the conservation and protection of "lands, shores, wetlands and present and future flooded areas" from the direct or indirect impacts of the program are important to the Ministries. All of these elements are reflected in the CVE on coastal and intertidal wetland ecosystems. In addition, the TORs stress the need to consider the direct and indirect effects of the project on "the vegetation of aquatic, riparian and terrestrial environments, with particular emphasis on threatened or vulnerable species, or likely to be designated, and species of economic and cultural interest ". As a result, both endangered and vulnerable plant species and traditional plants are considered CVEs for this program.

- Terrestrial and Avian Fauna: To examine the potential impacts of the program on terrestrial and avian wildlife and its habitats, four **CVEs**: abundance of fauna; diversity of fauna; quality and quantity of fauna habitats; and species at risk.

The impact analysis on the identified **CVEs** is based on the issues identified in the Environmental Code and the Forest Code, as well as consultations with stakeholders and government agencies, discussions with non-governmental organizations, review of relevant literature and research, and professional judgment of the research team.

- Inland fish and fish habitat: the Environmental Code stresses that the direct and indirect effects of the program on "the vegetation of aquatic, riparian and terrestrial environments must be taken into account, with special emphasis on threatened or vulnerable species, or likely to be designated as such, and species of economic and cultural interest". Inland fish and their habitat are therefore considered a **CVE**. As above, habitat and fish are not designated in the legal sense, but in the biological and ecological sense.
- Terrestrial mammals and their habitat: Terrestrial mammals are victims of the same potential effects as fish/fish habitat. There are also concerns about sensory disturbances.

3.4.2.3. Selection of CVEs from the human environment

The **CVEs** chosen from the human environment include: (i) archeology and heritage resources; (ii) socio-economic aspects and use of land resources; and (iii) visual resources.

The logic behind the choice of each of these **CVEs** is provided below.

- Archeology and heritage resources: The **CVEs** selected to assess the potential impacts of the program on archaeological and heritage resources are related to the disruption of historical resources and the exposure of heritage resources. The authors of the Environmental Codes consider the issue of archaeological resources and that of cultural heritage as important issues.
- Socio-economic aspects and use of land and resources: Because of their high social value, economic land use and resource use, eight **CVEs** were selected; resulting from the issues identified through interviews, review of relevant literature, and based on the professional judgment of the study team. **CVEs** for socio-economic aspects are as follows:
 - the economic impacts of the pre-operational phase of the program including but not limited to (i) Job creation; (ii) Improvement of infrastructure; and (iii) Improvement of administrative infrastructures ;
 - the impacts of the implementation phase of the program;
 - impacts de la phase d'exploitation des projets du programme ;
 - tourism and the use of natural resources;
 - residential property;
 - the risk of disputes between residents and the outside workforce.

- Visual Resources: Visual resources are a highly valued component of the environment within the villages' population, as well as by visitors to the region. Although their ecosystem value is low, visual resources have a high social value and are collectively considered as **CVEs**. Visual resources are assessed based on landscape **CVEs** and ambient light.

3.5. KEY ISSUES

The key issues reflect the concerns raised during the public consultations and identified by the Experts. They are used to target evaluation of the potential effects of the program on **CVEs**. Key issues were developed to demonstrate that their concerns have been addressed and that environmental and social assessment provides a clear answer to the issues that arise.

In some cases, information was required about a scientific discipline as regard to the effects of the program on a **CVE** that was being addressed by another discipline. In such cases, key questions were also developed to address issues that had not been identified as **VECs**, but which required an assessment because of linkages to the potential effects on an identified **CVE**.

IV. NATIONAL POLICY, LEGAL, INSTITUTIONAL ENVIRONMENTAL FRAMEWORKS

4.1. BENIN

4.1.1. Environmental Policy of the Government of Benin

The Republic of Benin has been committed since 1990 to a process of setting optimal conditions for environmental management for sustainable development. To this end, a Ministry in charge of the environment and technical structures was set up to raise the level of environmental awareness of all actors and then to integrate the environment into all decision-making processes and development actions . In addition, subscribing to the global dynamics of poverty reduction strategies, Benin has initiated genuine actions to support grassroots communities in order to get them better equipped to improve their own living conditions.

Law No. 98-030 of February 12, 1999 on the Framework Law on the Environment of the Republic of Benin (hereinafter "Framework Law") sets out the main principles of environmental management and the main environmental policy instruments. In the Republic of Benin, the management of the environment is governed by the following main principles:

- The Beninese environment is a national heritage and is part of the common heritage of humanity.
- Every citizen has the right to a healthy, satisfying and sustainable environment and has the duty to defend it;
- Different social groups should be involved at all levels in the formulation and implementation of national environmental policy. This principle is essential in the fight against poverty and favors the development of the country;
- The authorities should make every effort to optimize investment in the development of national capacities for the effective implementation of national environmental policy;

Any act prejudicial to the protection of the environment entails the direct or indirect responsibility of its author who must ensure the repairing.

The Article 43 of the Framework Law states that *"No occupation, operation, construction or establishment likely to constitute a source of nuisance of any kind may be carried out or carried out on the shore of the sea and on the whole extent of the maritime public domain without the authorization of the competent Beninese authorities"*. The authorization mentioned is granted only after technical advice from the ABE which must report on the impact assessment produced by the developer. The proposed projects can neither hamper free access to the public maritime domain nor free movement on the beach.

Benin's will to assess the environmental and social impacts of any project whose activities are likely to significantly modify the environment and those affecting areas at risk or ecologically sensitive is reflected concretely by the requirements of the environmental assessment process described in the *Decree 2015-382 of July 9, 2015*.

4.1.2. Regulatory and legislative framework of Benin

Land rights

The Law No. 2013-01 on Land and Property Code in the Republic of Benin (adopted on January 14, 2013) aims to determine the basic rules and principles applicable to land and property (ie, Natural and artificial public domain) and to regulate the organization and operation of the land and property tenure in the Republic of Benin.

The land tenure in effect in the Republic of Benin is that of the confirmation of land rights determined by the provisions of Title III of the Code. It governs all rural, peri-urban and urban land and is based on a contradictory procedure for confirmation of land rights, which results in the issuance of a Certificate of Land Ownership (CPF). The alleged customary rights exercised collectively or individually on land not covered by the rural land plan and those not registered are confirmed. No individual, no collectivity may be compelled to transfer his rights except for public interest and subject to a fair and prior compensation.

The state owns the national territory. Within the framework of the implementation of development policies and for public interest, the State and the territorial communities, by means of fair and prior compensation, have the right to expropriate any holder of land rights.

The expropriation of immovables or real property rights in the public interest is pronounced in the following cases: construction of roads, railways, ports, airports, schools and universities, town planning, urban planning, rural development, research or mining, environmental protection, public hygiene and sanitation, water and energy development and distribution, installation of public services, creation or maintenance of the public domain and all other works or investments of general, regional, national or local interest.

Marine Land Law

Benin's land law is addressed in the *Law N°. 2010-11 of the Maritime Code of the Republic of Benin*. This law determines the different Beninese maritime areas, sets the legal tenure and governs the legal relations relating to maritime navigation.

This Law applies to the project because of the importation of hydrocarbons by ship. However, it is specified in Article 4 that the provisions of international conventions ratified by the Republic of Benin or any other international conventions to which the Republic of Benin adheres in international maritime navigation shall prevail over Beninese laws and regulations. The Beninese territorial sea extends over a breadth of 12 nautical miles from the baseline which corresponds to the low-water line (average of the waters at low tide). The sovereignty of the Benin State, as described in article 13 of the law, is exercised fully on this territorial sea as well as on its soil, its subsoil and its overlying airspace.

The Law No. 2002-16 of October 18, 2004 according to article 25 of Law No. 2002-16 of October 18, on the fauna tenure in the Republic of Benin, stipulates that protected areas include, in all cases where this is possible, a buffer zone that is intended to carry out activities or socio-economic developments compatible with the objectives of the protected area, for the

benefit and with the participation of the local populations. However, it is the management plan of the protected area that should specify, where appropriate, the exact location of the protected areas and the partially protected areas, including buffer zones and socio-economic activities exercisable therein (article 49). The Article 50 of Law No. 2002-16 on fauna specifies that *"all works, installations or installations likely to affect the physical integrity or ecological balance of protected areas must, prior to their realization, be preceded by an environmental impact assessment, carried out in accordance with the legislation in force"*.

Protected fauna and flora species

The Article 30 of Law No. 2002-16 specifies that *"all wild animals in Beninese territory, including migratory species, shall benefit from the protection measures granted to fauna by this Law and by international conventions to which Benin is a party"*. The Articles 31 to 39 of this Law introduce legislation for the different classes of animal species whose lists of classified species are included in Decree No. 2011-394 of May 28, 2011.

The Law No. 98-030 of February 12, 1999 on the Framework Law on the Environment of the Republic of Benin (hereinafter "Framework Law") sets out the main principles of environmental management and the main environmental policy instruments.

Article 43 of the Framework Law states that *"No occupation, operation, construction or establishment likely to constitute a source of nuisance of any kind may be carried out or carried out on the shore of the sea and on any scope of the maritime public domain without the authorization of the competent Beninese authorities"*. The authorization mentioned is granted only after technical advice from ABE which must report on the impact assessment produced by the developer. The projects proposed can neither hamper free access to the public maritime domain nor free movement on the beach.

The impact assessment is the procedure for determining the effects that a project may have on the environment (Article 87). According to the Framework Law and Regulations, this Pic Network Ltd (hereinafter PICL) Port and Ground Infrastructure Project requires an Environmental Compliance Certificate issued by the Minister Responsible for the environment. Such authorization may be granted only after the proponent submits an extensive impact assessment to the ABE which may provide technical advice to the Minister for the Environment.

The Law No. 90-032 of December 11, 1990 on the Constitution of the Republic of Benin constitutes the supreme law of the State to which the Beninese swears loyalty, faithfulness and respect. With a view to ensuring environmental protection, legislative provisions have been provided for in the Law, in particular under section 27 which states that *"Everyone has the right to a healthy, satisfactory and sustainable environment; State shall ensure the protection of the environment"*.

Provisions relating to public hygiene

The Law No. 87-015 of September 21, 1987 on the Public Hygiene Code. Chapter VII concerns more particularly the hygiene of industrial installations (Articles 93 to 100). It also contains the provisions on hygiene relating to border health checks. The Code is governed by the provisions of the International Health Regulations adopted by the World Health Organization (WHO) in accordance with Articles 21 and 22 of its Constitution. This law also sets out the provisions concerning the fight against noise and pollution of the natural environment. Atmospheric pollutants include industrial fires and emissions. It shall prohibit, inter alia, any dumping or dumping at sea of industrial waste likely to harm public health or aquatic fauna and flora unless otherwise indicated by the Minister of Public Health.

The provisions for the application of certain provisions of Law 87-015 are defined in the *Decree No. 2011-394 of May 28, 2011 on the conservation, development and sustainable management of fauna and its habitats in the Republic of Benin* defines protected areas as any area enjoying special protection and management measures and including marine protected areas (AMPs), reserves and national parks. This decree includes two annexes which specify the protected animal species (category A) and partially protected (category B) in Benin.

4.1.3. Administrative Framework for Environmental Management

At the central level, the Ministry of the Environment is responsible for the formulation, implementation and coordination of national environmental policy, mainly through the Environment Directorate (DE), the Department of Urban Planning and Sanitation (DUA), the Beninese Environment Agency (ABE) and the Delegation for Land Use Planning (DAT). At the deconcentrated level, the environment is managed mainly by the departmental departments of the ministries concerned with the coordination of departmental prefects.

(i) The Ministry of Agriculture, Livestock and Fisheries

With a responsibility that covers crops, livestock, fisheries, forests; this ministry has within it the Directorate of Rural Engineering. This department is responsible for the implementation of the State policy in the fields of hydro-agricultural development and rural equipment. To this Directorate there is a unit for lowlands endowed with the autonomy of management and in charge of the development of the lowlands.

In this respect, the Directorate of livestock can not be published. This directorate is responsible for the implementation of the national policy related to livestock. It has had under its supervision large sectoral projects completed or under implementation with the pastoral water reservoirs. In relation to this directorate, it should be remembered that it is a culture in the construction of water reservoirs in view of the numerous agro-pastoral detentions carried out with the technical support of the pastoral water services within projects and consisted of rural engineering officer seconded to serve in projects under trusteeship of this Directorate.

The Water Reservoir Management Committees (CGRE) created in the intervening zones of the various projects with components of water reservoirs are not to be left out. The CARDER decentralized structures of the Ministry of Agriculture, Livestock and Fisheries are also

involved in the construction of water reservoirs through one of its technical departments: the Directorate for Planning and Rural Development.

(ii) Ministry of Mines of Energy and Hydraulics (MMEH)

This Ministry is responsible for mobilizing water resources through the Directorate of Hydraulic (DH). Its main Technical Directorate which enables it to assume this competence.

(iii) Ministry of the Environment, Housing and Urban Development (MEHU)

The Environmental Directorate and the Benin Environmental Agency are structures of the MEHU, which are responsible for protecting water bodies, monitoring the execution of work related to the management of water and water reservoirs.

The Benin Environmental Agency is involved in the development and management of agro-pastoral water reservoirs through the validation of environmental impact studies.

(iv) Ministry of Public Works and Transport (MTPT)

The Ministry also has human resources capable of managing the project in the field of water reservoirs. As part of the earthworks work for the development of the tracks, this Ministry has had to make pools. The CNERTP (National Center for the Study and Research of Public Works) under the supervision of this Ministry, it intervenes in the research of materials on the one hand and the control of works on the other hand in the construction of water reservoirs.

(v) Intersectoral institutions

In particular: (i) the National Committee Water (ii) the National Committee for Drinking Water and Sanitation (CNEPA) (iii) the Standing Committee on Flood Control (NPLI) (iv) the National Committee Environment (CNE) (v) the Higher Committee for Water and (vi) These various structures, through their attributions, intervene in the field of hydro-pastoral development.

(vi) The Communes

According to the laws on decentralization, the Commune is a major actor in the management of water resources within its territorial jurisdiction. It may request the assistance of the technical services of the State, if necessary, to create its own technical services. It may in its capacity as contracting authority, delegate, be assisted, asserted, subcontract or contract.

It is clear, therefore, that the vast majority of public stakeholders are numerous without a judicious division of powers. We are witnessing the fact that everyone intervenes in isolation. There is not a single level of coordination for the various stakeholders.

4.2. BURKINA FASO

4.2.1. Policy framework for environmental and social management

In Burkina Faso, environmental management policies have been developed and strengthened by several sectoral policies and other policy documents. These environmental strategy papers are in line with the search for conditions for the sustainability of economic and social development compatible with the management and environmentally sound exploitation of

natural resources and the environment. Burkina Faso has drawn up its National Environmental Action Plan (1991-2005) and its Plan for the Environment and Sustainable Development (2005-2020). The forestry Management Framework Program and the National Plan of Action to Combat Desertification and the National Soil Fertility Policy will also be noted.

(i) National Prospective Study "Burkina 2025"

The main objectives of the prospective study "Burkina 2025" are: to carry out a retrospective analysis of the economic, social, political and cultural situation; to analyze the determinants and mechanisms of evolution of Burkinabe society; to explore the real prospects for Burkina Faso over a period of 25 to 30 years and their conditions of implementation; to define the desired profile of the Burkinabe society in 2025; to identify the desired long-term development strategy as well as the intermediate strategies to be implemented to make these developments possible; to define the role and place of Burkina Faso within the various subregional and regional groups; to develop a long-term policy framework for all development actors.

(ii) National Policy for Sustainable Development

In October 2013, Burkina Faso adopted a National Policy for Sustainable Development with the following vision: "By 2050, Burkina Faso, an emerging country within the framework of a sustainable development where all sectoral strategies, all development plans and programs contribute to improving the standard of living and quality of life of the population, particularly the poorest ". The aim of the National Policy for Sustainable Development is to define the overall framework for the implementation of sustainable development in Burkina Faso. It lays down general guidelines for the formulation and supervision of sectoral policies, development strategies, plans and programs, as well as planning and budgeting at both national and decentralized levels. It sets out the principles and responsibilities for the intervention of the central public administration, decentralized communities, civil society organizations, private sector and other development actors. It determines the necessary means as well as the monitoring, evaluation and control system essential to the achievement of sustainable development. The National Policy for Sustainable Development has reviewed and incorporated all the missing aspects of the National Environmental Action Plan (PANE) adopted in 1991 and revised in 1994, which has long been the national 21 agenda.

(iii) National Forestry Policy

The main objective of the National Forestry Policy (1998) is to contribute to combating desertification, achieving food self-sufficiency and meeting national needs for energy, softwoodlumber and timber. It is centered on three options, namely: a significant reduction in the imbalance between supply and demand for wood energy, service wood, timber and food and medicinal products; rehabilitation of degraded forests; the improvement of the living environment through the development of green belts around urban centers and the promotion of forestry entities at the level of village communities.

(iv) National policy for Sustainable Livestock Development (PNDEL)

Adopted in September 2010, the vision of this policy to 2025 is to achieve a competitive and environmentally friendly livestock farming around which real chains of values are organized carried by professionals, oriented towards the market and which contributes to improve food security and improve the welfare of Burkinabé. The overall objective of the National Policy for Sustainable Livestock Development is to strengthen the contribution of livestock to the growth of the national economy and hence to food and nutrition security and to improve living conditions of the population.

This overarching objective is divided into four (4) specific objectives, which are: (i) develop capacities of sub-sector actors through innovative capacity building and public-private partnership; (ii) ensure land tenure security and sustainable management of pastoral resources through support for agro-business and the creation of animal intensification zones (individual and collective ranches), (iii) increase productivity and animal productivity on a sustainable basis, through structuring investments in the fields of food, genetics and animal health; (iv) improve the competitiveness of animal products and strengthening the link between production and the market through the construction of structuring market infrastructures, the promotion of nutritional and health quality and promotional activities.

(v) Land -Use Planning Policy

Burkina Faso's national land-use planning policy adopted in 2006 is based on the following three fundamental orientations, at the center of which the issue is acute: economic development, that is to say the effective realization of creative activities of wealth; social integration of integrating human, cultural and historical factors into development activities; The sustainable management of the natural environment, which consists in ensuring the best living conditions for the populations without compromising the living conditions of future generations. The national land-use planning policy specifies the role of the various actors and confirms the need for land coherence for the efficient execution of development actions.

Land planning is a policy of spatial organization aimed at ensuring the harmonious development of the national territory through, among other things, a better distribution of people and activities. While clearly asserting the predominant role of the State in spatial planning, spatial planning policy also makes it clear that spatial planning can not be the business of the State alone. Local and regional authorities, civil society and the private sector have an important role to play not only in their participation in the definition of planning schemes but also in their implementation.

(vi) National Policy for Rural Land Security (PNSFMR)

The National Policy for Rural Land Security, developed in 2007, aims to ensure equitable access to land for all rural actors, guarantee their investments and efficiently manage land disputes in order to contribute to the reduction of poverty, the consolidation of social peace and the achievement of sustainable development. The overall objective is to ensure that all rural actors have fair access to land, guarantee their investments, efficient management of

land disputes, in order to contribute to poverty reduction, consolidation of social peace and the achievement of sustainable development ".

The six main guidelines of PNSFRMR are: 1) to recognize and protect the legitimate rights of all rural actors on land and natural resources; 2) to promote and support the development of legitimate local institutions at the grassroots level; 3) to clarify the institutional framework for conflict management at the local level and improve the effectiveness of local conflict resolution bodies; 4) improve the management of rural areas; 5) to establish a coherent institutional framework for rural land management; 6) to strengthen the capacities of the State services, local authorities and civil society with regard to land.

(vii) Policy Letter for Decentralized Rural Development (PLDRD)

Adopted by the Government in 2002, the policy letter for decentralized rural development describes the general context, broad development guidelines and strategies, decentralized rural development and the reforms and actions needed for decentralized rural development.. With regard to guidance, PLDRD foresees an acceleration of the development for productive potential while preserving the environment. In the field of the environment, the PLDRD aims to implement the provisions of the environmental code and the forest code. The following basic principles are essential for the implementation of the PLDRD: community participation; decentralization; integration into the management of natural resources (water, soil, vegetation complex); income generation and rural employment; the contribution to local development and thus the fight against poverty; the contribution to the conservation of biological diversity. The framework programs for the implementation of the PLDRD include: (i) the National Third Phase Management Program (PNGT2-III), which promotes local development throughout the national territory; (ii) the Partnership for the Improvement of Natural Ecosystems Management project (PAGEN), the objective of which is to improve the conservation of the biodiversity of critical natural ecosystems on a sustainable basis through the promotion of management systems which has been closed for some years.

(viii) Water Policy and Strategies

Adopted in 1998, the Water Policy and Strategy document clearly states the use of IWRM as a new approach to water management. It holds nine principles and ten strategic guidelines. The nine basic principles adopted are: (i) equity, (ii) subsidiarity, (iii) harmonious development of regions, (iv) watershed management, (v) balanced water resources management, (vi) protection of users and nature, (vii) the levy-pay principle, (viii) the polluter-pays principle, and (ix) participation.

The ten strategic guidelines are: holding the watershed approach; promoting interregional and international cooperation; increasing the efficiency and management capacity of the services involved; implementing remediation strategy and measures to protect resources; establishing a water monitoring and quality network; promoting the management of the maintenance of hydraulic infrastructures; prioritizing rehabilitation and consolidation of water infrastructure; seeking profitability and / or effectiveness of investments; looking for the lowest cost of

maintenance and sustainability of systems and structures; reducing water-related risks through better knowledge of these risks.

(ix) Letter of Intent for Sustainable Human Development Policy (LISHDP)

In 1995, the Government of Burkina Faso developed the LISHDP, the aim of which is to focus the development strategy of the country on the concept of human security enabling every Burkinabé to have access to: economic security linked to access to education, vocational training and gainful employment; health security through lower-cost access to both preventive and curative medical care; food security through access to basic food including drinking water; environmental safety through the preservation of a healthy environment; individual and political security through the promotion of the virtuous principles of good governance of the city, namely the rule of law, responsibility and participation, efficiency and transparency.

(x) National Gender Policy (PNG) of Burkina Faso

The overall objective of the National Gender Policy is to promote participatory and equitable development of men and women by ensuring access and equal control over resources and decision-making spheres, while respecting their fundamental rights. The specific objectives of PNG are: (i) to promote equal rights and equal opportunities in terms of access and control of basic social services; (ii) to promote participatory economic development, more equitable access and distribution of resources and incomes; (iii) to develop equal participation of men and women in decision-making at all levels; (iv) to promote the institutionalization of gender in all areas; (v) to promote a dynamic partnership for gender and development; (vi) to develop information and awareness-raising mechanisms aimed at all actors for a change in behavior and a mentality in favor of equity and equality in relations between men and women.

Taking gender into account in the SCADD is one of the cross-cutting issues. It must be constantly present at all levels of dialogue, policy and in the process of formulating sectoral policies and programs. Guidelines are being developed to facilitate the implementation of this guidance. Implementation of PNG will take place through seven (7) strategic axes in synergy with one another. These include: (i) improving the access and controlling all Burkinabe men and women equally and equitably to basic social services; (ii) promoting equal rights and opportunities for women and men in access and controlling resources and equitable income-sharing; (iii) improving equal access of women and men to decision-making; (iv) promoting the institutionalization of gender through its integration into the planning, budgeting and policy implementation systems at all levels, (v) promoting respect for rights and elimination of violence, (vi)) promoting of gender for a change of behavior in favor of equality between men and women in all spheres of socio-economic life; (vii) development of an active gender partnership in Burkina Faso.

(xi) Sector Policy for Industry, Trade and Handicrafts (2011-2020)

The overall objective of POSICA is to meet the challenges of diversifying the Burkinabe economy through a dynamic and competitive private sector, creating jobs and income. The following operational / specific objectives will contribute to the achievement of this overall

objective. They are: (i) developing a critical mass of competitive industries geared towards the processing of local raw materials and exploiting emerging technologies; (ii) to promote promising sectors to increase the internal and external commercial potential of Burkina Faso; (iii) developing the craft sector; (iv) creating an enabling environment for the development of a vibrant private sector; (v) strengthening MICA's institutional and organizational capacity. In order to better implement its sectoral policy, MICA puts special emphasis on mainstreaming cross-cutting themes such as gender, environment, human rights, population, land use planning and so on.

(xii) Sectoral Policy for Energy 2014 - 2025

The sectoral policy for energy is based on the following four strategic guidelines: promoting the use of endogenous resources; taking advantage of the opportunities of sub-regional cooperation; ensuring universal access to quality energy services; making energy an engine for sustainable development. The overall objective pursued through the implementation of this policy is to make energy accessible to all by promoting the sustainable use of our endogenous resources and taking advantage of the opportunities of sub-regional cooperation. This global objective is divided into two specific objectives: making energy available and accessible to all; strengthening the institutional and operational capacity of the sector. To achieve the above objectives, the Ministry of Energy intends to implement the following programs: Program 1: "Energy"; Program 2: "Steering and supporting the services of the Ministry in charge of energy and other actors in the sector".

(xiii) Mines Sector Policy 2014 - 2025

The overall objective pursued by the sectoral mining policy is to promote a competitive mining sector capable of boosting economic growth and sustainable development in Burkina Faso. The overall objective defined above falls into two (02) specific objectives: to promote the mining sector as a lever for sustainable development; to strengthen the institutional and organizational capacities of the Ministry in charge of mines and other actors in the sector. The sectoral mining policy is based on the principle of conducting mining activities in such a way as to ensure the preservation and management of the environment, the rehabilitation of exploited sites and the taking into account of the aftermath. In the implementation of its mining policy, the State will ensure the integration of mines into the socio-economic development of local communities affected by mining activities.

(xiv) Strategy for Accelerated Growth and Sustainable Development (SACSD) 2011-2015

The overall objective of the SACSD is to achieve strong and sustained economic growth, generating multiplier effects on the level of income improvement, the quality of life of the population and anxious to take into accounts the main determinants of Sustainable management of natural resources. Specifically, SACSD will pursue the following objectives: (i) achieving an average annual GDP growth rate of 10% over the period 2011-2015; (ii) reducing the incidence of total poverty to less than 35% by 2015; (iii) sustainable management of the environment; (iv) controlling population growth; (v) ensuring equal access and controlling women and men to resources and decision-making spheres, while respecting their human rights.

The Strategy for Accelerated Growth and Sustainable Development was adopted in 2010. It is the central repository for the government's economic and social development policy for the period 2011-2015. SACSD states that sustainable development implies "sustainable consumption and production methods" that guarantee sustainable growth and a healthy environment, capable of meeting the aspirations of present and future generations. On the one hand, it aims to accelerate the development of agricultural, pastoral and mining production and, on the other hand, to guarantee access to drinking water and sanitation at all levels of the population. The second generation of the SACSD is being developed and should cover the period 2016-2020.

(xv) Strategy for Rural Development (SRD) to 2015

SRD adopted in 2003 is intended to be a harmonized vision and reference framework for rural development, focusing on: (i) strengthening food security, (ii) increasing incomes for the rural poor and particularly the vulnerable : Women and young people; (iii) efficient management of natural resources; (iv) effective empowerment of people to take ownership of their development destiny. The development objective of this strategy is to ensure sustained growth of the rural sector with a view to contributing to the fight against poverty, strengthening food security and promoting sustainable development.

(xvi) Environment Plan for Sustainable Development (EPSD)

The Environment Plan for Sustainable Development (EPSD) sets out guiding principles and benchmarks for sustainable development for all sectors in order to build an acceptable living environment. In a way, it determines the strategy around which to build a framework for poverty reduction and sustainable development that takes into account the environment in all its dimensions. The design of the EPSD is based on a long-term vision of environmental policy in a concerted and coordinated framework of actions.

(xvii) National Land Use Planning and Sustainable Development of the Territory (NLPSDT)

The National Land Using Planning for the Development and Sustainable Development of the Territory ((NLPSDT), adopted in December 2013, determines the general purpose of the land and the nature and location of major infrastructure facilities throughout the national territory; its time horizon is one generation (25-30 years). NLPSDT is built on the principles of national unity, equity in public equipment and services, and economic efficiency. The seven strategic areas of NLPSDT that will have to be jointly invested in order to constitute a global development action are: (i) demographic regulation, (ii) land issue, (iii) public facilities, (iv) Agriculture, (v) internal opening-up, (vi) urban policy, and (vii) infrastructure and mining. In addition, NLPSDT defines separately the regional guidelines including the Sahel region. These guidelines address rehabilitation and conservation measures as well as management and development actions.

(xviii) National Action Program for Adaptation to Climate Variability and Change

The National Action Program for Adaptation to Climate Variability and Change (PANA of Burkina Faso), August 2006, focuses on: current climate situation and trends; vulnerability of

key sectors to current climatic shocks; projected climate trends and their adverse, actual and potential effects; relation of PANA with the country's development objectives; identification of basic needs for adaptation; identification of climate change adaptation practices; identification of priority adaptation actions.

(xix) National Rural Sector Program (NRSP) for Burkina Faso 2011-2015

SRNP is the operational instrument for the implementation of the Strategy for Accelerated Growth and Sustainable Development in the rural sector for the period 2011-2015. It reflects the Government's desire to develop a single framework for planning and implementing rural development policy. PNSR also provides all actors in the sector with a frame of reference that allows their actions to be integrated into a shared national program and to assess their respective contributions for its implementation.

NRSP is part of a vision of the rural sector, a modern, professional, competitive, population-oriented, market-oriented, environmentally friendly sector around 2025, organizes a true processing industry. The overall objective of NRSP is to contribute to strengthening the foundations for sustainable rural development that generates strong and sustained growth in the rural sector in order to effectively combat poverty and food insecurity. The specific objectives of NRSP are: (i) to achieve strong double-digit growth in the rural sector over the period 2011-2015; (ii) to improve food and nutrition security and sovereignty; (iii) to increase the incomes of rural populations; (iv) to promote sustainable development and natural resource management; (v) to improve access to safe drinking water and sanitation for all; (vi) to promote the development of partnership between rural actors according to roles and responsibilities by building capacity.

NRSP takes into account and implement into the operational plan in its ministerial programs all rural development policies and strategies, in particular the National Policy for Rural Land Security, the National Policy for Sustainable Livestock Development and the National Policy for Environmental, National Water Policy and National Policy and Strategy for Sanitation. It is also part of the ongoing reforms of decentralization and full communalization that give new responsibilities to local actors in rural development.

(xx) National Adaptation Plan (NAP)

Since October 2013, Burkina Faso has been in the process of drawing up the National Adaptation Plan (NAP), built on the results of analyzes of vulnerability to climate change in the priority sectors of agriculture, livestock, environment, energy, health, transport, infrastructure, housing and cross-cutting sectors (women's associations and civil society organizations). Indeed, aware of the magnitude of the risks associated with climate change (CC), the government of Burkina Faso through MERH took the initiative to enhance the results of the implementation of the 3 PANA projects. The NAP is formulated on the basis of the results of the vulnerability analysis to the CCs of the identified priority sectors (agriculture, livestock, environment and natural resources, health, energy, infrastructure and habitats, etc.) depending on the scenarios of the CCs to 2025-2100 horizons already achieved. PNA aims to: (i) minimize, reduce or avoid risks related to climate change; (ii) to improve the

capacity to adapt to climate change; (iii) to promote the integration of climate change adaptation into development objectives. PNA was developed to further inform policy-makers and decision-makers in climate change mitigation and adaptation efforts.

(xxi) Action Plan for Integrated Water Resources Management

This Plan, adopted in March 2003, constitutes a vast project for the reconstruction of a public regulation of the water sector based on the deconcentration of the services of the State Public Administration, decentralization, planning and social dialogue. For the next 15 years, it will set up targeted areas of action, including: the establishment of a set of planning tools (master plans and management plans, water information system); strengthening of human resources (public administration of the State, local authorities, the private sector and civil society); the reconfiguration of the institutional framework in the water sector; the creation of an enabling environment through the development of regulatory texts and mechanisms for their application; research development; information, education, awareness raising, advocacy.

(xxii) National Program for Monitoring Ecosystems and the Dynamics of Desertification

The National Program for Monitoring Ecosystems and the Dynamics of Desertification, developed in 2009, appears to be a vision to provide the country with an effective ecological monitoring system, coupled with widespread eco-citizenship challenges of availability, accessibility and exploitation of environmental information for sustainable development. Priority areas of intervention are precisely those that can accelerate the achievement of ecological monitoring objectives and remove the foreseeable obstacles. They are: priority 1 (creating the conditions for the exchange and sharing of data between existing systems on a routine basis); priority 2 (to strengthen the capacities of existing systems to make the sectoral data necessary for good ecological monitoring available); priority 3 (ensuring proper coordination of ecological monitoring actions in the strategic and operational plans); priority 4 (produce and promote ecological monitoring results that encourage action).

(xxiii) Other sub-regional and / or cross-border policies

In addition to national policies, the Sahel Region, because of its cross-border nature, is affected by policies adopted at the sub-regional and / or cross-border level.

- the Environmental Policy of the WAEMU Member States;
- the West African Water Resources Policy (ECOWAS);
- ECOWAS Environmental Policy;
- the Action Plan for the Sustainable Development of the Niger Basin (NBA).

4.2.2. Institutional Framework for Environmental and Social Management

At the central level, the Ministry of the Environment and Fisheries Resources is the ministerial department which plays a leading role in the environment. Within the framework of PPCS, other key ministries involved in environmental and social management are: Ministry of Agriculture, Water Resources, Planning and Food Security; the Ministry of Industry, Trade and Handicrafts (MICA); the Ministry of Energy and Mines; the Ministry of Infrastructure, Ministry for the opening-up and Transport; etc.

Other local actors are also involved: PPCS management; Local Authorities, Mining Companies, Professional Organizations of Producers (farmers, breeders, miners, etc.) and NGOs and / or national and local OCBs. The institutional framework for environmental and social management of the project involves the following actors at national, regional and local level.

(i) Ministry of Environment and Fishery Resources (MERH)

Presentation of structures

At the institutional level, the Ministry of the Environment and Fisheries Resources (MERH) is responsible for the country's environmental policy. MERH is organized around the following structures: (i) at the central level, three (3) Headoffices that are the Directorate General for the Preservation of the Environment and Sustainable Development and the General Directorate for Forests and Wildlife, the General Directorate for Fishery Resources; The National Environmental Assessment Office; the Permanent Secretariat of the National Council for Environment and Sustainable Development, a structure for consultation and coordination; (ii) at the deconcentrated level, thirteen (13) Regional Directorates, forty-five (45) Provincial Directorates responsible for environmental policy implementation at local and regional levels.

Operationally, the National Environmental Assessment Office represents the armed wing of the Ministry of the Environment and Fisheries Resources for the implementation of the environmental impact assessment procedure. The National Environmental Assessment Office established by decree on the organization of MERH, is a body whose task is to coordinate the implementation and monitoring of the national policy on environmental assessment and environmental inspection. The missions assigned to the office are: to promote environmental assessments; to supervise the carrying out of environmental impact studies through a preliminary framework of the study; to ensure the analysis and validation of impact assessment reports; to carry out a periodic review of projects and programs with major environmental impacts; to contribute to the harmonization of EIES procedures and content in the subregion; to participate in the facilitation of environmental units within ministerial departments and other state and parastatal companies in the field of EIES.

Capacity in environmental and social management

The Ministry of the Environment and Fisheries Resources includes four main structures in charge of environmental and natural resource management: The Directorate General for the Preservation of the Environment and Sustainable Development (PESD) the Directorate-General for Forests and Wildlife (DGFW); the General Directorate of Fisheries Resources (DGHR) and the National Council for Environment and Sustainable Development, responsible for the implementation of the entire environmental procedure. All of these departments have far more pronounced powers on natural resource issues and management of the living environment. At the level of the Sahel Region, the activities of the MERH departments are limited to the application of forestry legislation and support / advice in actions to offset the environment.

To fulfill its missions its missions, National Council for Environment and Sustainable Development, has a staff of about 30 agents among whom 8 technical officers with the following profiles; Engineer of Water and forests, environmentalist, sociologist, lawyer. National Council for Environment and Sustainable Development, does not have decentralized structures, which limits its effective operationality in terms of proximity in the conduct and especially the monitoring of the implementation of EIES. However, at the regional level, it is supported in its mission by the regional directorates of the environment and fishery resources.

In order to ensure supervision, a general guide for carrying out studies and environmental impact statements is drawn up. This guide is supplemented by sectoral guides to promote the environmental procedure. Despite the classification of the projects into three categories "A", "B" and "C", National Council for Environment and Sustainable Development, does not have a screening form to achieve this classification.

Its size is not yet at the level of its structuring, and deserves to be strengthened. Existing experts have expertise in EIES, but their capacities need to be further strengthened (in environmental and social assessment, environmental monitoring, etc.) through a bold program within the framework of this project or in relation to other programs in course. This capacity-building program should include (i) in-situ training, (ii) training abroad, (iii) technical support (technical assistance) and logistics (vehicles) as part of the monitoring to ESMF measures of this project. These strengthening measures will enable National Council for Environment and Sustainable Development, to meet its expectations and responsibilities in this project (evaluation, approval and monitoring).

(ii) Ministry of Animal Resources (MRA)

Presentation of structures

In view of the even greater opportunities and opportunities for the promotion of livestock production, Decree number 97-468 / PRES / PM of October 31, 1997 has come politically to support the missions assigned to the Ministry of Animal Resources, which include: reorganization of traditional breeding through training and supervision of breeders and cooperation between them; development of pastoral areas; promotion of livestock feed industries; increased forage production for a better contribution to intensive livestock production; promotion of private or state farms; qualitative strengthening of animal health infrastructures and services; quality control of products of animal origin; promotion of the livestock support industry through the processing of by-products: foodstuffs of animal origin, hides and skins, manuring; the search for stable and remunerative outlets for livestock products; etc.

The Regional Directorates of Animal Resources are the deconcentrated bodies of the Ministry. The Regional Directorates are responsible for coordinating actions for the development of animal resources and for ensuring the operation, management and development of the structures of the Ministry of Animal Resources within their territorial jurisdiction. As such, they are responsible for coordinating and controlling the activities of the Provincial Directorates.

The MRA organizational chart includes regional, provincial and departmental structures to carry out its missions. The Regional Directorate of Sahel Animal Resources (DRRA / Sahel) is the structure responsible for coordinating the national policy of the livestock sector on a regional scale. Its mission is to coordinate actions for the development of animal resources and to ensure the operation and management of the structures of the Ministry of Animal Resources within its territorial scope. In this capacity, it is responsible for coordinating and controlling the activities of the Provincial Directorates, identifying and contributing to the monitoring of other stakeholders in animal resources. In this department, the supervisory network includes four provincial directorates, thirteen Livestock Technical Support Areas, a Pastoral Support Zone and thirteen veterinary posts, responsible for the execution of missions at the departmental level and villages.

Capacity in environmental and social management

One of the features of this department is the shortage of design frameworks and especially support frameworks and computer tools that hamper the execution of the missions assigned to it. In addition to these shortcomings, there is also a certain inadequacy between the support needs of the livestock sectors and the supply of specialized personnel.

Despite the important efforts to take environment into account in livestock policies and programs, it remains an institutional plan; there is no specialist in environmental and social assessment in the directorates / structures involved. There is no environmental unit, to be the privilege service with the National Environmental Assessment Office In the livestock sector, there are confirmed thematic experts (veterinarians, pastoralisms, etc.), who were trained in environmental and social assessment and management. The project should promote the establishment of an environmental and social unit.

(iii) Ministry of Agriculture, Water Resources, Sanitation and Food Security

Presentation of structures

The Ministry of Agriculture, Water Resources, Sanitation and Food Security is responsible for defining and conducting agricultural policies, water resources, sanitation and food security in Burkina Faso. In the area of agriculture and food security: in order to ensure the implementation of the Ministry's policies in the areas of production, extension, support for the rural world, promotion of plant, packaging and quality of agricultural products, the Directorate General of Plant Production is structured around several directorates including the Plant Protection and Packaging Department and the Extension and Development Research Department.

In the field of agricultural research, the Institute of the Environment and Agricultural Research (INERA) is the national reference structure. Its mission is to contribute to the implementation of agricultural research policies, to organize and manage agricultural research, to provide technical support for agricultural development, to contribute to scientific training and information, to ensure the link between research and development. In the areas of water resources and sanitation: the Ministry's mission is to develop and implement the national water and sanitation policy. It is responsible for the integrated management of water

resources in Burkina Faso. It includes three general directorates at the central level; the Directorate General of Water Resources (DGRE), the Directorate General of Watersheds (DGBV) and the General Directorate of Sanitation (DGA). It is represented at regional and local level through 13 Regional Directorates and 45 Provincial Directorates. The planning and management of water resources is done by river basins in accordance with the GIRE principles. The country is divided into 5 Water Agencies corresponding to the 5 national watersheds. The Sahel Region is covered by the Liptako Water Agency.

Capacity in environmental and social management

At the institutional level, the establishment of the environmental unit within the ministerial department should be welcomed and should be linked to National Environmental Assessment Office. However, this unit is lethargic. In the agricultural sector, there is the creation of an office of good agricultural practices which, in its actions, is responsible for the promotion and dissemination of good agricultural practices. There are also confirmed thematic experts (agronomists, phytosanitary specialists, etc.) who were not trained in environmental and social assessment and management.

(iv) Ministry of Industry, Trade and Handicrafts (MITH)

The missions of the MICA are defined by Decree N ° 2011-479 / PRES / PM / MITH of June 26, 2011, organizing the Ministry of the Industry of Trade and Handicrafts. Under the terms of the decree, MITH is responsible for the implementation and monitoring of government policy in the areas of industry, commerce and crafts. Although the departmental audit carried out in 2010 rescaled and corrected the allocations of certain structures, the department continues to assume the role of promoter of the private sector, industry, commerce and crafts. From the promotion of industry to that of internal and external trade, from the promotion of the private sector to that of handicrafts, quality and metrology, industrial property, economic formalities of trade and investment, the ministerial department takes into account in its attributions the life of the various actors of the private sector of Burkina Faso. Under PPCS, the following directorates will be mainly concerned: Directorate General for Industry; the General Directorate of Company; the Directorate General of Crafts.

Capacity in environmental and social management

MITH does not have expertise in environmental and social management. However, with the establishment of the Burkinabé Agency for Standardization, Metrology and Quality, there is a hope that certain environmental concerns (safety, quality, etc.) will be at the heart of the activities of this structure.

(v) Ministry of Energy and Mines

The Ministry in charge of Energy, which, through the Directorate General of Energy, carries out the tasks of design, development, coordination and implementation of energy policy. In order to bring the administration of the energy sector closer to the population, regional directorates of mines and energy have been set up. Their operationalization will be progressive. In the energy sector, we also note:

- National Electricity Company of Burkina (SONABEL), which is responsible for managing the first segment of the electricity sub-sector as provided for by law. It has a monopoly on distribution in this segment. It also has a monopoly on transport activities throughout the country;
- the Burkinabe National Hydrocarbons Company which is responsible for the import, storage of liquid and gaseous hydrocarbons, transport, packaging, sale and distribution of these products, construction of storage infrastructures to guarantee sufficient energy security in Burkina Faso, support for the search for alternative energy and the popularization of energy use or consumption techniques;
- the Regulatory Authority of the Electricity Sub-sector, whose tasks include ensuring the application of legislative and regulatory texts governing the electricity sub-sector under objective conditions of transparency and non-discrimination, and protecting the interests of consumers and operators by taking all appropriate measures to ensure that sound and fair competition in the subsector is ensured.

Capacity in environmental and social management

At the institutional level, the adoption of the decree on the creation of environmental units within the ministerial department should be welcomed and should be linked to National Environmental Assessment Office. However, at the ministry level, this unit is in lethargy and the sector does not have experts in charge of environmental and social issues. SONABEL, on the other hand, has a high-performance department in charge of Standards, Safety and Environment that supports the company in taking into account safety and environmental requirements relating to energy activities.

(vi) Ministry of Infrastructure, Opening-up and Transport

This Ministry is responsible for implementing the Government's policy on infrastructure, opening-up and transport, notably through its General Directorates (General Directorate for Strategic Sectoral Studies, General Direction for Roads, General Direction for Road Maintenance, General Directorate for Works of Art, General Directorate for Land and Maritime Transport, etc.), its supporting and related structures. In terms of implementation and environmental monitoring, efforts are noted in the implementation of road projects (several environmental impact studies have been carried out). The Ministry has a functional environment unit with proven competencies in the Directorate General for Strategic Sectoral Studies, which ensures the integration of environmental and social concerns in road programs.

(vii) Local authorities

At the decentralized level, local and regional authorities, which depend on the Ministry of Territorial Administration for Decentralization and Security, are competent to take measures concerning pollution and nuisances. In this context, the mayor is competent when there is a link between the environment and safety or public health. The local authorities have competence in the management of their environment: The General Code of Collectivities in Article 89 confers a general competence to the municipalities to fight against "insalubrity, pollution and nuisances" and to provide "opinions on the installation of polluting industries"; In addition, local communities, non-governmental organizations, associations, civil society

organizations and the private sector, in accordance with Article 8 of the Environmental Code, have the right to participate in the management of their environment. They participate in the decision-making, development, implementation and evaluation of plans and programs that affect their environment. Furthermore, it is the responsibility of local and regional authorities, under Article 12 of the Environmental Code, to participate in the management of the environment through the implementation of the competences transferred to them. They exercise these powers in accordance with the regulations in force. The mechanisms put in place by local and regional authorities to deal with environmental problems must be in harmony with measures at national level.

Capacity in environmental and social management

There are Environment and Local Development Committees especially at the level of municipalities. However, it is necessary to note the weakness of the intervention capacities of these communities, in particular in terms of monitoring the implementation of the projects that are carried out in their territory. The role of local elected officials and the technical staff of local authorities are to support the State and the projects negotiated by the latter, to support the promoters in implementing activities. They are required to enforce the administrative procedure of the Environmental Assessment as well as all the environmental requirements. They also have the role of developing local development policies and strategies, identifying local priorities and projects, participating in the monitoring of the implementation and evaluation of sub-projects carried out in their localities, establishing funding mechanisms, etc.

Local actors have received new environmental expertise, but they still lack capacity. In order to do this, a major effort must be made to develop their capacities so that they can ensure that environmental issues are effectively taken into account in the design and implementation of sub-projects. They will contribute to the management of land issues and other types of conflicts that may arise during the implementation of the project.

(viii) Non-governmental and civil society organizations

Several national and international non-governmental organizations (NGOs) and civil society organizations (CSOs) are supporting the sectors of socio-economic development in several areas: advocacy, capacity building, information, awareness raising, mobilization and social support. These NGOs are grouped together in several consultative frameworks and some of them could be important instruments for mobilizing actors to stimulate a more vigorous dynamic in the environmental management of the project. These local structures can play an important role in monitoring the implementation of project activities, but also in monitoring and good governance activities.

4.2.3. Legal framework for environmental and social management

a) International conventions and subregional agreements on the environment

Burkina Faso has ratified several international conventions on the environment. The environmental components concerned are water resources, forest, wildlife and fisheries resources, pollution and nuisance caused by agricultural and pastoral activities. The following

international conventions may be relevant to the activities of the Sahel Pole of Growth Project.

- the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, ratified by Decree 2002-294 of August 02, 2002;
- the United Nations Convention on Biological Diversity ratified by Decree 93-292 RU of September 20, 1993;
- the Kyoto Protocol to the United Nations Framework Convention on Climate Change, ratified by Decree No. 2004-536 / PRES / PM / MAECR / MECV / MFB of November 23, 2004;
- the United Nations Framework Convention on Climate Change, ratified by Decree 93-287 RU of September 20, 1993;
- the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and / or Desertification, particularly in Africa, ratified by Decree 95-569 of December 29, 1995;
- the African Convention on the Conservation of Nature and Natural Resources (the so-called Algiers Convention) ratified by Decree No. 68-227 of November 23, 1968 ;
- the Bonn Convention on the Conservation of Migratory Species of Wild Animals, ratified by Zatu AN VI-012 of August 23, 1989;
- Convention for the Protection of the World Cultural and Natural Heritage;
- the RAMSAR Convention on Wetlands of International Importance especially as Waterfowl Habitat, ratified by Zatu AN VII-02 of August 23, 1989;
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), ratified by the Zatu AN-02 of August 23 1989;
- the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, ratified on 04/11/1998;
- the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, ratified by Zatu 86-016 of March 05, 1986 and by Zatu AN VI-021 of January 13 1989;
- the Stockholm Convention on Persistent Organic Pollutants, ratified by Decree No. 2004-300 of July 20, 2004;
- the 4th Lomé Convention on Cultural Practices that are Prejudicial to the Environment.

b) National legislative and regulatory framework

There are several texts governing the management of natural resources and the environment, but there is a low level of application (RAF, forest codes, environment, pastoralism law). Particular attention is now paid to the need to reflect or harmonize the requirements of sustainable land management and the laws and regulations adopted or envisaged in the framework of decentralization (general code of local authorities) and managing different sectors of development (forestry, pastoralism, water, soil, etc.).

(i) *The Constitution of June 2, 1991*

Environmental legislation is therefore based on the constitution of Burkina Faso of June 2, 1991 which stipulates that "the sovereign people of Burkina Faso are aware of the absolute necessity of protecting the environment" and that "the wealth and natural resources belong to the people and are used to improve their living conditions. " In addition, "the right to a healthy environment is recognized. Protection, defense and promotion of the environment are a duty for all".

(ii) *The Sustainable Development Policy Act*

The Law No. 008-2014 / AN of April 08, 2014 laying down the framework law on sustainable development in Burkina Faso aims to: create a unified national reference framework to ensure the coherence of the interventions of the actors through legal reforms , appropriate policies and institutions; ensure economic efficiency, environmental sustainability and social equity in all development actions. The Act provides that "the right to sustainable development is guaranteed to all"; "Any natural or legal person shall have the right to participate in the decision-making process in the field of sustainable development"; "The State is responsible for the design, development and implementation of the national sustainable development policy". The Act creates the National Council for Sustainable Development (CNDD) under the institutional supervision of the Ministry in charge of sustainable development.

(iii) *The Environmental Code*

The Environmental Code (Law n ° 006-2013 of April 02, 2013) lays down the rules relating to the fundamental principles of environmental preservation which are, the fight against desertification, sanitation and the improvement of the environment life of the populations, the implementation of the international agreements ratified by Burkina Faso with regard to the preservation of the environment, prevention and management of natural and artificial disasters. The Code stipulates that activities likely to have significant effects on the environment are subject to the prior notice of the Minister for the Environment. The opinion shall be drawn up on the basis of a Strategic Environmental Assessment (EES), an Environmental Impact Assessment (E.I.E) or an Environmental Impact Statement (E.I.E). Pending the revision of certain texts in application of the 2013 Code, several implementing texts were adopted by the Government in application of the 1997 Code. They are essentially the following texts:

- Decree 2001-342 / PRES / PM / MEE of July 17, 2001 on the scope, content and procedure of the study and environmental impact statement;
- Decree No 2001-185 / PRE / PM / MEE of May 07, 2001 laying down standards for releases of pollutants into air, water and soil;
- Decree No 98-322 / PRES / PM / MEE / MIHU / MATS / MEF / MEM / MCC / MCIA of July 28, 1998 laying down the conditions for opening dangerous, unhealthy and inconvenient establishments.

(iv) Law n ° 064-2012 / year laying down rules on biotechnology safety

This Law applies to the development, testing, production, dissemination, storage, destruction or disposal, import, export, transboundary movement, including the transit of any genetically modified organism and any product constituted or containing a genetically modified organism. The provisions of this Act shall not apply to the transboundary movement of pharmaceutical products derived from genetically modified organisms. The Act establishes a national biosafety authority, called the National Biosafety Agency, abbreviated to ANB, and two advisory bodies: the National Biosafety Observatory (ONB); The National Scientific Committee on Biosafety (CSNB). The Act also provides for safety measures, risk assessment and risk management, and the deliberate or accidental release of genetically modified organisms.

(v) The Forest Code

The Forest Code, adopted by Act No. 003/2011 / AN of April 5, 2011, "is intended to lay down the fundamental principles for the sustainable management and development of forestry, wildlife and fisheries resources" (Article 1). Paragraph 2 of article 4 stipulates that: "... the sustainable management of these resources is a duty for all. It implies compliance with the regulations in force with regard to the protection, exploitation and enhancement of the forest, fauna and fisheries heritage ". For this purpose, Article 48 of the Treaty states that 'any major works involving clearing shall be subject to prior authorization by the Minister for Forestry on the basis of an environmental impact assessment'. Other aspects of the Act that are of particular interest to this study are contained in sections 235; 236 and 237.

In addition to this law on environmental protection, there are numerous decrees and implementing decrees concerning the sustainable management of forest resources, the strategic issues in the preservation of the climate, the production substratum of soils, stabilization of riverbanks and maintenance of the diversity of plant / animal species and natural ecosystems, reservoirs of genetic vitality. These main decrees are:

- Decree No 98-3120 / PRES / PM / MEE / MATS of 17/07/1998 on the use of fires in rural areas in Burkina Faso;
- Order No. 98-8 / MEE / SG / DGEF / DP of 12/05/1998 defining measures for the protection and conservation of fishery resources in Burkina Faso;
- Order No. 99-15 / MEE / MEF / MATS of 09/06/1999 setting the fees for the exploitation of fishery resources;
- Joint Order N ° 2009-073 / MECV / MAHRH of August 27, 2009 regulating agricultural clearing in Burkina Faso.

(vi) The Rural Property Security Act

The Law N°. 034-2009 / AN of July 24 2009 on Rural Land Tenure (RLT) on land tenure security in rural areas was adopted by the Government by decree in Council of Ministers on March 25, 2009. In accordance with the guidelines of the land policy adopted in 2007, the law seeks to recognize and secure the rights of all land actors (State, local authorities, rural populations holding customary land rights and private operators). Taking into account the

previous weaknesses of the Agrarian and Land Reorganization Act, the law is particularly concerned with determining in detail the mechanisms through which legitimate "land tenure" will be legally recognized (recognition of possessions) and secured Rural land ownership certificates). The law also provides interest to institutions responsible for rural land management: (i) at the local level Rural Land Services (RLS) of rural communes, assisted by village land commissions and responsible for the constitution and management of the securing of local land rights and the preservation of local resources for common use; (ii) at the intermediate level, the maintenance and strengthening of the State's departments, whose mission is, inter alia, to assist RLS in their activities; (iii) at the central level, the creation of a national agency, in charge, in particular, of securing the areas of the State in rural areas and of providing assistance to the constitution / management of communal areas on request and on contractual basis.

(vii) Framework Act N° 034-2002 / AN of November 14, 2002 relating to pastoralism

This Law on Pastoralism has enabled Burkina Faso to fully assert its national sovereignty over the management and exploitation of its natural resources linked to pastoralism. The law distinguishes between: (i) areas assigned to the grazing of animals which are spaces whose main function is the exercise pastoral activities (pastoral areas for special development, grassland areas reserved for grazing and spaces forage crops for direct grazing of animals); and (ii) areas open to grazing animals which are spaces whose main function is non-pastoral but which support pastoral use rights (forest areas open to pasture, agricultural land left fallow and fields of post-harvest crops).

Different rights are granted by law to pastoralists, namely: animal mobility, the right to cross borders and the right to move herds for pastoral purposes throughout the national territory. The main duties of pastoralists are to keep their animals, to respect the animal health policy and to hold a national transhumance certificate (CIT). Three types of livestock trails have been identified by law: access roads; transhumance tracks; and marketing leads. In addition to the Law on Guidance on Pastoralism, there are a number of regulatory texts of paramount importance in terms of securing and enhancing pastoral areas and facilities, including:

- Decree N.2007-410 / PRES / PM / MFB (03/07/2007) lays down the conditions for the allocation, occupation and exploitation of pastoral areas managed by the State and local authorities. Concerning the securing of special pastoral areas and grazing land areas;
- Decree N.2007-416 / PRES / MRA / MAHRH / MTD / MEDEV / MECV (06/07/2007) defines the methods for identifying and securing pastoral areas for special development and land Livestock grazing;
- the Raabo joint N.AN VI-0012 / FP / AGRI-EL / MET / HE / MAT / MF (05/09/1989) determining the livestock tracks. This text specifies among other things: the itineraries of ten axes each defined by a list of localities situated from north to south of the country and ending at the border with one of the neighboring countries (Benin, Cote d'Ivoire, Togo, Benin and Niger); the standards and requirements for the creation of these runways; and the list of 41 breeding stations known as "exit gates and official livestock entries to and from neighboring countries".

Burkina Faso has ratified regional and international conventions on the protection and management of pastoral resources, including decision A / DEC.5 / 10/98 regulating transhumance among ECOWAS member states.

(viii) The National Environmental Impact Assessment Procedure

Decree 2001-342 / PRES / PM / MEE of July 17, 2001 specifies the scope, content and procedure of the study and the environmental impact statement. Article 5 of the Decree on Impact Studies classifies projects into three (03) categories:

- Category A : Activities subject to an environmental impact assessment (EIE) ;
- Category B : Activities subject to an Environmental Impact Statement (NIE) ;
- Category C: Activities that are not subject to an environmental impact assessment or to an environmental impact statement.

(ix) The Agrarian and Land Reorganization (ALR)

All the natural resources, permanent or renewable, are governed by the use and management and exploitation standards defined in the land legislation based on land and land reorganization through law n ° 034-2012 / AN Of July 2, 2012, the Law on Agrarian and Land Reorganization in Burkina Faso. The ALR is intended to regulate the use, management and exploitation of natural resources, whether permanent or renewable. The ALR defines the land-use planning principles as well as the methods of allocation and exploitation of both rural and urban land. According to this law, "the national land estate is a common heritage of the nation" (Article 5). However, the law also stipulates that "the national land estate shall include the State's land, local authorities land and private property". (Article 6). Similarly, the ALR sets out the basic principles of land use planning, rural and urban land management, water management, forests, wildlife, fisheries, quarrying and mining substances. Finally, it recognizes the principle of "fair and prior compensation" in the event of expropriation for public purposes.

In June 2009, Burkina Faso adopted a specific rural land law that "determines the land and land tenure applicable to rural land and the principles of land tenure security for all actors in rural land". This law has eight (8) implementing decrees to make it operational. The provisions of this law will therefore apply to the land activities undertaken in the Growth Pole Project. ALR is a general scope and is in harmony with the new rural land law. ALR requires that prior to any development of rural land, appropriate measures be taken to know the potentialities and ensure their protection from the environmental point of view (environmental impact assessment).

(x) The Water Management Guidance Act

This law, adopted in 2001, (i) makes water, in accordance with the constitution, a common heritage of the entire nation, thus breaking with the vision of public domianality of water; (ii) provides for water administration involving the State, local authorities, users, civil society and scientists in coordination and consensus-based decision-making frameworks at national level river basin and the region (committees, subcommittee), local (local river basin committees); (iii) opts for a method of financing based on financial incentives, levies and pollution charges,

the amounts of which are to be agreed and proposed by the different actors grouped within the basin committees; (iv) provides planning and management tools at the basin, sub-basin scale (master plan and development plan, water information system, water police, etc.); (v) clearly states out the water tenure and the water services tenure.

(xi) The Pesticides Control Act (PCA)

Act N°. 006/98 / AN of March 26, 1998 on pesticide control prohibits the free sale, offering for sale or distribution of pesticides without prior authorization from the competent ministry, in this case the ministry of agriculture. This law is of great importance insofar as improving productivity requires the use of pesticides and other chemicals in the control of pests in agriculture and livestock.

(xii) The Code of Public Health

The Public Health Code (Act No. 23/94 / ADP of May 19, 1994) empowers the Ministry of Health to take joint measures with the ministries responsible for the environment and water to prevent pollution of drinking water for the protection of the environment and the health of populations. The Code emphasizes environmental health protection, including air and water pollution (measures to prevent the pollution of water provided for consumption); pesticides; combating all forms of waste; sanitation of conurbations.

(xiii) The Animal Health Code Act

Focusing on four (04) areas, namely the veterinary organization, the practice of veterinary medicine, veterinary pharmacy and sanitary measures, Law AN VII 0016 / FP / PRES of November 22, 1989 animal health in Burkina Faso for its implementation has been accompanied by the following decrees:

- Decree N ° AN VII-0113 / FP / AGRI-EL of November 22, 1989 regulating the zoo sanitary police in Burkina Faso;
- Decree AN VII - 0114 / FP / AGRI-EL of November 22, 1989 regulating veterinary public health in Burkina Faso

(xiv) The other environmental texts involved in the Sahel Growth Pole Project

- The General Code of Local and Regional Authorities;
- The Law 2005-022 on the Code of Public Hygiene;
- Decree No. 2001-185 / PRE / PM / MEE of May 07, 2001 laying down standards for releases of pollutants into air, water and soil.
- Decree 2007-816 / PRES promulgating Law 024- 2007 / AN of November13, 2007 on the protection of cultural heritage in Burkina Faso;
- The Mining Code and its implementing decrees such as the decree on the management of mining titles;
- The Investment Code and the Investment Guidance Act ;
- Law 2014-017 / AN 2014 of May 18, 2014 prohibiting the import, marketing and distribution of non-biodegradable plastic packaging and bags in Burkina Faso.

4.3. CAMEROON

4.3.1. Legal framework

4.3.2. National legal framework

The Government of Cameroon, in order to guarantee a healthy environment for its citizens and to ensure the implementation of sustainable development, has developed a set of laws and legal regulations for the protection of the environment. This paragraph will briefly present, in relation to the fields, the national legal texts relating to the said project.

a) Texts in the field of the environment

In the field of the environment, the legal framework is very rich and includes, in addition to the 1996 Constitution, a set of national laws and regulations that have been developed with a view to protecting the environment and sustainable development. These include:

(i) The Law N ° 96/06 of January 18, 1996 revising the constitution of June 2, 1972.

This law guarantees from the preamble the right of all citizens to a healthy environment as follows: *"Everyone has the right to a healthy environment. The protection of the environment is a duty for all. The State shall ensure the defense and promotion of the environment "*.

(ii) Law N ° 96/12 of August 5, 1996 laying down the framework law on the management of the environment.

This framework law is the basic legal instrument for the protection of the environment in Cameroon. The Article 17 stipulates *that "any promoter or project owner of any development, work, equipment or installation project which, because of its size and nature, is liable to damage to the environment, is obliged to carry out an impact assessment in accordance with the requirements of the specifications, making it possible to assess the direct and indirect effects of the project on the ecological balance of the settlement area or any other region , the framework and the quality of life of the population and the environmental impact in general "*. The project of asphaltting from the Olama road - Kribi, section Kribi - Grand Zambi is part of this category of projects.

(iii) Decree N ° 2013/0171 / PM of 14/02/2013 laying down the procedures for carrying out environmental and social impact assessments.

This decree explains how environmental and social impact assessments are carried out, specifies, inter alia, the content of EIES, the procedure for drawing up and approving EIESs, the monitoring arrangements and environmental monitoring procedures. Depending on the nature and significance of the project, this decree identifies 4 types of EIESs, namely the Environmental Instructions, the EIES Summary, the Detailed EIES, and the Strategic Environmental Assessment. It also sets out in each case the procedures for carrying out consultations and public hearings. This project falls into the detailed EIES category.

It is worth recalling that this text repealed Decree 2005/0577 / PM of 23/02/2005 laying down the procedures for carrying out environmental impact assessments.

(iv) ***Decree No. 2012/0882 / PM of March 27, 2012 laying down the procedures for the exercise of certain powers transferred by the State to communes in the field of the environment;***

(v) ***Decree N ° 2012/2808 / PM of September 26, 2012 laying down the conditions for the performance of the duties of inspector and environmental controller.***

These texts lay down the powers and prerogatives of environmental inspectors and controllers and describe the conduct of environmental inspections and controls.

(vi) ***Decree No. 2012/2809 / PM of September 26, 2012 setting out the conditions for the sorting, collection, storage, transport, recovery, recycling, processing and final disposal of waste.***

This Decree recommends the environmentally sound management of waste.

(vii) ***Decree N ° 2011/2582 / PM of August 23, 2011 laying down detailed rules for the protection of the atmosphere.***

It defines the different types of air pollutants and means of controlling air quality.

(viii) ***Decree N ° 2011/2583 / PM of August 23, 2011 regulating noise and odor nuisance.***

This decree prohibits, inter alia, the carrying out of activities or noisy works, hampering the neighborhood beyond the emission values and periods laid down by the body responsible for standardization and quality.

(ix) ***Decree N ° 2011/2584 / PM of August 23, 2011 laying down the procedures for protecting the soil and subsoil.***

This Decree lays down conditions for the protection of soil and subsoil and / or for erosion and desertification control, loss of arable land, pollution by chemicals, fertilizers and pesticides. It lists the fertilizers, pesticides and other chemicals subject to authorization and the conditions for their authorization.

(x) ***Decree No. 2011/2585 / PM of August 23, 2011 establishing the list of hazardous and noxious substances and the rules governing their discharge into inland waters.***

It shall draw up a list of noxious or dangerous substances prohibited or subject to prior authorization and specify that these lists may be supplemented by those of the international conventions ratified by Cameroon or, as appropriate, those adopted by the Minister in charge of animal welfare, environment.

(xi) ***Decree N ° 2006/1577 / PM of September 11, 2006 amending and supplementing certain provisions of Decree N ° 2001/718 / PM of September 03, 2001 on the organization and functioning of the Interministerial Committee on the Environment.***

The Decree establishes the composition of the Interministerial Committee on the Environment (CIE), which is responsible for advising on the validation of EIES reports.

(xii) Order No. 001 / MINEP of April 03, 2013 on the organization and functioning of the Departmental Committees for monitoring the implementation of Environmental and Social Management Plans (ESMF).

This order specifies, among other things, the composition and the different missions of these committees to effectively apply ESMFs from EIESs.

(xiii) Joint Decree No. 004 / MINEPDED / MINCOMMERCE of October 24, 2012 regulating the manufacture, import and marketing of non-biodegradable packaging.

(xiv) Order N ° 0070 / MINEP of April 22, 2005, defining the different categories of operations whose implementation is subject to an Environmental Impact Assessment.

This order lists and classifies the different categories of projects whose implementation is subject to an Environmental Impact Assessment.

(xv) Order No. 00001 / MINEP of February 03, 2007 defining the general content of the terms of reference (TOR) of the Environmental Impact Studies.

This decree defines the various elements of the terms of reference for an Environmental Impact Assessment: summary or in detail.

(xvi) Order n ° 00004 / MINEP of July 03, 2007 setting the conditions for the approval of consulting firms to carry out environmental impact assessments and audits.

It sets out the conditions to be fulfilled by the consulting firms to obtain the approval of the Ministry in charge of the environment for carrying out environmental impact assessments and audits. Article 11 stipulates that an EIES or environmental audit report may be received by the Ministry in charge of the environment only if it has been carried out by an approved consulting firm under the conditions laid down by the legislation in force in this area.

b) Texts in the field of forestry, wildlife and fisheries

(i) Law N ° 94/01 of January 20, 1994 on the forest, wildlife and fisheries tenure.

For the purposes of this law, forest refers to any land covered by vegetation, with trees, shrubs and other species capable of supplying products other than agricultural products predominant. The Act and its implementing legislation establish the conditions for integrated management by ensuring the conservation and sustainable use of resources and various ecosystems. It specifies from the environmental point of view, in Article 16, paragraph 2 that "The implementation of any development project likely to cause disturbance in a forest or aquatic environment shall be subject to a prior environmental impact assessment". It requires integrated, sustained and sustainable management of forest, wildlife and fisheries resources.

(ii) **Decree No. 95/531 / PM of August 23, 1995 laying down detailed rules for the application of the forestry tenure.**

c) **Texts in the field of land**

In land matters, the following texts must be taken into account:

- the Law of June 25, 1902 relating to the leasehold lease;
- Law No. 19 of November 26, 1983 amending the provisions of Article 5 of Ordinance No. 74-1 of July 6, 1974 setting land tenure;
- Ordinance No. 74-1 of July 6, 1974 on land tenure and determining the land allocation framework;
- Decree No. 84/311 of May 22, 1984 laying down detailed rules for the application of Act No. 80/22 of July 14, 1980 on enforcement services for land ownership;
- Decree No. 2005/481 of December 16, 2005 amending and supplementing certain provisions of Decree No. 76/165 of April 27, 1976 setting the conditions for obtaining title to land.

This last decree updates the conditions for demarcation and obtaining the land title in relation to the old text dating back to 1976. Among other aspects, the following cases are distinguished: any person whose rights have been infringed as a result of registration of any person entitled to apply for a land title on a dependency of the national domain, the precision of the place where the application for the title is filed, etc.

d) **Texts relating to the protection of water resources**

The text that organizes this area is the following:

(i) **Law n ° 98/005 of April 14, 1998 on the water tenure.**

This law establishes the legal framework for water and the provisions relating to its safeguarding, management and protection of public health. In Article 4, it prohibits the performance of acts liable to affect the quality of groundwater, surface water and / or the sea, or to damage public health and aquatic fauna and flora or -marines. Similarly, Article 6 of that Law provides that any natural or legal person owning an installation liable to cause pollution of water must take measures to limit or eliminate those effects. It also stipulates that any person who produces or holds waste must ensure its own disposal or recycling or have it disposed of or recycled in approved facilities and shall inform the public about the effects of the production, the disposal, or recycling of waste on water, the environment and public health, as well as on preventive or compensation measures.

This law includes several decrees to facilitate its application in particular:

(ii) **Decree N ° 2001/165 / PM of May 8, 2001 specifying the methods of protection of surface water and groundwater against pollution.**

The above texts also protect water resources against miscellaneous spills, including those of biofuels and related products.

e) Texts relating to the right to work

The project will require a large amount of labor. Workers are likely to come from different parts of the country, but mostly from local and riparian communities. Thus, the texts relating to the right to work must be taken into account. It's about:

- (i) Act No. 92/007 of August 14, 1992 governing the Labor Code, repealing the former Code of November 27, 1974 which was no longer adapted to the working society;**
- (ii) Act No. 76-12 of July 8, 1976 on the organization of rapid vocational training;**
- (iii) Ordinance No. 73-17 of May 22, 1973 on the organization of social welfare.**

f) Health laws

The health of populations is not without risk with the arrival and settlement of non-indigenous workers in the project area and the development of activities all around.

The relevant texts are:

- (i) Act No. 64 / If / 23 of November 13, 1964 on the protection of public health;**
- (ii) Act No. 96/03 of January 4, 1996 on the framework law on health;**
- (iii) Order No. 039 / MTPS / IMT of November 26, 1984 laying down general hygiene and safety measures in the workplace.**

g) Texts relating to compensation

Article 545 of the Civil Code stipulates that "No one may be compelled to cede its property, except for reasons of public utility, and by a fair and prior indemnity". Thus, people affected by the project may be called upon to cede land, crop areas and / or constructions for the implementation of the project. The relevant texts are:

- (i) Act No. 85/009 of July 4, 1985 on expropriation for public purposes and on compensation;**
- (ii) Decree No. 66/385 of December 30, 1966 on the revalorisation of rates for the pricing of State land;**
- (iii) Decree No. 13 / MINAGRI / DAG of February 19, 1982 on Corrigendum and Addendum to Order No. 58 / MINAGRI of August 13, 1981 amending the tariffs of allowances to be paid to owners for the destruction of cultivated trees and food crops;**
- (iv) Order No. 0832 / Y.15.1 / MINUH / D000 of November 20, 1987 laying down the bases for calculating the market value of constructions subject to expropriation for reasons of public utility;**
- (v) Order No. 0832 / Y.15.1 / MINUH / D000 of November 20, 1987 laying down the bases for calculating the market value of constructions subject to expropriation for reasons of public utility;**
- (vi) Decree N ° 2003/418 / PM of February 25, 2003 setting the tariffs of compensation to be paid to the owner who is the victim of destruction of crops and cultivated trees for public purposes;**

(vii) *Instruction N ° 000005 / I / Y.2.5 / MINDAF / D220 of December 29, 2005, recalling the basic rules on the implementation of the expropriation tenure for public purposes.*

h) *Texts relating to the cultural and natural heritage*

On cultural or tourist grounds, mention should be made of Federal Law N ° 63/22 of June 19, 1963, which provides for the protection of monuments, objects and sites of a historical or artistic nature, repealed by Law N ° 91/008 of July 30, 1991 on the protection of the cultural and natural heritage in view of the importance to be granted to tourism and tourist sites and to the archaeological heritage which may be discovered during construction.

i) *Texts relating to the protection of road heritage*

The law governing the protection of road heritage is as follows:

(i) Law n ° 96/07 of April 8, 1996 on the protection of the national road heritage

This Law establishes road weighing, which is defined as a technical operation designed to check the compliance of the standards relating to the permissible gross weight and the axle load for any vehicle with a gross vehicle weight in excess of 3.5 tons. Weighing is carried out at so-called weighing stations, which may be stationary or mobile. Thus, any driver of an overloaded vehicle, that is to say, whose load exceeds the tolerance limits provided for, is liable to the payment of a fine. This fine shall apply to each of the weighing stations crossed in the event of a vehicle being advanced.

In 2004, this law was supplemented by the following:

(ii) Act No. 2004/021 of July 22, 2004 amending and supplementing certain provisions of Act No. 96/07 of April 8, 1996 on the protection of the national road heritage.

The amended and supplemented provisions are those relating to the exceeding of the total authorized weight and the creation of the road fund.

Cameroon and its partners pay particular attention to the protection of road assets. In all the projects financed by the African Development Bank, awareness-raising on compliance with axle loads is planned.

j) *Petroleum law*

Given the large amount of hydrocarbons that will be stored and consumed in this project, it is necessary to mention some legal texts that govern this field in Cameroon. These are:

(i) Law N ° 99/013 of December 22, 1999 on the Petroleum Code;

Article 82 of the Act stipulates that every hydrocarbon operator must take all measures to safeguard the safety of persons and property and to protect the environment, natural habitats and ecosystems.

(ii) Decree No. 2000/465 of June 30, 2000 laying down the terms and conditions for the application of the Petroleum Code;

(iii) Order n ° 22 / MINMEE of September 28, 2001 specifying certain conditions for the exercise of activities in the downstream petroleum sector.

4.3.3. International legal framework

(i) *Agreements signed and / or ratified by Cameroon*

Cameroon has signed and / or ratified a number of regional and international conventions for the protection of the environment. These various ratified conventions, which relate to the present study, are:

- Convention on Biological Diversity;
- Convention on Climate Change;
- Kyoto Protocol to the United Nations Framework Convention on Climate Change is an international treaty to reduce greenhouse gas emissions;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention or Washington Convention);
- UNESCO Convention for the Protection of the World Cultural and Natural Heritage;
- Ramsar Convention on Wetlands of International Importance;
- Stockholm Convention on Persistent Organic Pollutants;

This convention, adopted in Stockholm on May 22, 2001, sets out a list of twelve organic pollutants (POPs) which should not be used by the Project Manager in the context of the work. These products are used as pesticides, thermal fluids and dielectrics or synthetic intermediates (hexacholobenzene, DDT, polychorophenyls (PCBs) or constituents' industrial process by-products (PCBs, dioxins). These POPs are among the most toxic substances, threatening the environment and human health. They move long distances and accumulate in the food chain (bioaccumulation). A procedure for the Prime Contractor for the purpose of not importing, using, storing, evacuating these products must be put in place in the form of contractual clauses.

- Bonn Convention on Migratory Species of Wild Animals;
- African Convention on the Conservation of Nature and Natural Resources (Algiers Convention);
- Agreement for Cooperation and Consultation among the States of Central Africa on the Conservation of Wildlife;
- Convention No. 138 of the International Labor Organization (ILO) on the minimum age for admission to employment. The Convention covers the prohibition of child labor as a whole;
- Convention No. 182 of the International Labor Organization (ILO) on the worst forms of child labor.

Some of these conventions, including the biodiversity and climate change conventions, include the adoption by the signatory countries of mechanisms for assessing environmental impacts. The same is true of the Rio Declaration of the United Nations Conference on Environment and Development (CNUED). It states in principle 17 that *"an environmental impact assessment, as a national instrument, must be undertaken in the case of activities*

which are likely to have significant adverse environmental effects and dependent on the decision of a competent national authority ".

Cameroon places importance on these various international conventions and agreements ratified. For this reason, Article 14 (2) of Law No 96/12 of August 5, 1996 laying down the framework law on environmental management stipulates that *"the Environment Administration must ensure that Cameroon's international environmental commitments are incorporated into national environmental legislation and policy"*.

4.3.4. Institutional frame

Several institutions are involved in this environmental and social impact assessment, both in terms of its achievement and in terms of its implementation.

a) Departmental and interdepartmental institutions

(i) The Ministry of Public Works (MINTP)

According to the Presidential Decree No. 2013/334 of September 13, 2013 on the reorganization of the Government, MINTP is responsible for the maintenance and protection of the road heritage, as well as the supervision and technical control of the construction of public buildings. In this capacity, it carries out all studies necessary to adapt the local ecosystems to these infrastructures in conjunction with MINEPDED, MINRESI, research or teaching institutions and any other competent body.

Regarding the decentralized services for the study, the MINTP divisions concerned are:

- The Regional Delegation of Public Works in the South;
- The Departmental Delegation of Public Works of the Ocean.

(ii) The Ministry of the Environment, Nature Conservation and Sustainable Development (MINEPDED)

MINEPDED newly organized by Decree No. 2012/431 of October 1, 2012 is responsible for the development and implementation of the Government's environmental and nature protection policy with a view to sustainable development. It is responsible for:

- the definition of modalities and principles for the rational and sustainable management of natural resources;
- the definition of environmental management measures in liaison with the relevant Ministries and specialized bodies;
- the preparation of sectoral environmental protection master plans in liaison with the relevant ministerial departments;
- coordinating and monitoring the interventions of regional or international cooperation agencies in the field of the environment and nature protection in liaison with the Ministry of Foreign Affairs and the relevant Administrations;
- monitoring of environmental compliance in the implementation of major projects;
- public information with a view to encouraging participation in the management, protection and restoration of the environment and nature;

- the negotiation of international conventions and agreements relating to the protection of the environment and nature and their implementation in liaison with the Ministry of Foreign Affairs.

It has at the central level services dealing with issues relating to environmental impact assessments. It is the Directorate of Environmental Policy Development and more specifically the Environmental Assessment Sub-Directorate. It is also represented at the decentralized level. As far as this project is concerned, the relevant external services of MINEPDED in this study are:

- the MINEPDED Regional Delegation in the South;
- the MINEPDED Departmental Delegation of the Ocean.

In addition, it supervises the Interministerial Committee on the Environment (CIE), which advises on environmental and social impact assessment reports.

(iii) The Ministry of Forestry and Wildlife (MIFW)

The Ministry of Forestry and Wildlife is responsible for the development and implementation of the Government's policy on forests and wildlife. Among other things, it is responsible for the development and management of protected areas; inventory and protection of fauna and flora; the implementation of the international conventions ratified by Cameroon in respect of forestry, fauna and hunting in liaison with the Ministry of Foreign Affairs. It must also ensure that the project does not incite hunting and / or does not involve any protected areas existing or likely to exist along the route of the project.

(iv) The Ministry of Mines and Technological Development

MINIMIDT is responsible for geological prospecting and mining activities. It is in charge of the regulation of industrial and commercial activities and particularly follows the resulting effects that may result. In the context of the opening and operation of material borrowing sites and quarries, the ministry issues permits or operating permits.

(v) The Ministry of Properties, Cadastre and Land Affairs

It is responsible for the preparation, implementation and evaluation of the State's land, land and cadastral policy. It is specifically responsible for:

- the protection of the public and private properties of the State against any attack, in collaboration with the relevant administrations;
- the acquisition and expropriation of immovable property for the benefit of the State and public administrative establishments and publicly-owned companies, in collaboration with the administrations and the relevant bodies.

The ministry ensures that sites occupancy is in compliance with the laws and regulations in force. In the event of the project causing the expropriation of the land on which the local population operates, it would intervene in the census of the areas concerned, as well as in compensation and resettlement where appropriate. In addition, the secretariat of the commission for the assessment and evaluation of assets is provided by the Head of Departmental Services for Properties.

It is this ministry that signs the decree declaring the public utility of the project.

(vi) *The Ministry of Social Affairs*

This ministry is directly concerned with the project, and as such, it should monitor and take charge of vulnerable people. Decree 2005/160 of May 25, 2005 assigns to the Ministry of Social Affairs the task of formulating, implementing and evaluating the Government's policy on social prevention and assistance, protection of the individual.

(vii) *The Ministry of Labor and Social Security*

This ministry is responsible for supervising the application of the Labor Code and the international conventions ratified by Cameroon, the development and implementation of the social security and welfare policy. It supervises the National Social Security Fund (CNPS). It acts as arbitrator in the negotiations between the employer and the employees if necessary.

(viii) *The Ministry of Public Health*

MINSANTE will be interested in monitoring the implementation of the measures taken for the health of the workers and the people living alongside the project.

(ix) *The Ministry of the Economy, Planning and Regional Development*

The Ministry of Economy, Planning and Regional Development was established by Decree No. 2007/268 of September 7, 2007, amending and supplementing certain provisions of Decree No. 2004/230 of Organization of the Government. It is responsible for the formulation and implementation of the nation's economic policy and for regional planning. It is responsible for spatial planning, coordination and carrying out spatial planning studies, both at national and regional level, for the development of land-use planning standards and rules and for the control of their implementation, monitoring and control of the implementation of national, regional or local planning programs, monitoring subregional organizations concerned with the management or preservation of the sub- regional ecosystem.

(x) *The Ministry of Territorial Administration and Decentralization*

It plays the role of Ministry of the Interior, in this capacity it represents territorially all the administrations in the decentralized services. Its officers (Prefects) ensure, among other things, the presidency of the departmental expropriation commissions. The ministry is responsible for the supervision of the départements, the urban communes and the traditional leadership.

(xi) *The Ministry of Transport*

The Ministry of Transport is responsible for the development and implementation of the Government's policy on road transport and safety. As such, it is responsible for:

- studying and participating in the drafting and implementation of legislative or regulatory measures relating to road safety and prevention in liaison with the other relevant Administrations;

- ensuring or controlling the organization and operation of road transport and road safety in liaison with the relevant Administrations.

The Ministry has a Directorate of National Meteorology responsible for monitoring the implementation of conventions and protocols in the field of meteorology and the atmospheric environment.

(xii) *The Ministry of Scientific Research and Innovation (MINRESI)*

MINRESI is responsible for the development and implementation of the Government's policy on scientific research and innovation. As such, it is responsible for:

- the valorisation, extension and exploitation of research results, in liaison with all sectors of the national economy and the relevant ministerial departments and organizations concerned;
- the technological watch in liaison with the relevant Administrations.

(xiii) *The Ministry of Defense (MINDEF)*

MINDEF is responsible for the development and implementation of national defense policy. It intervenes in the protection of persons and property against criminal organizations.

(xiv) *The Interministerial Committee on the Environment (CIE)*

The Interministerial Committee on the Environment (CIE) was established by Act No. 96/12 of August 5, 1996 laying down a framework law for the management of the environment. It was only made operational in 2001 by Decree No. 2001/718 / PM of September 3, 2001 on the organization and functioning of this institution. The Decree was amended and supplemented by Decree N ° 2006/1577 / PM of September 11, 2006. The CIE is responsible for examining the terms of reference and the reports on environmental impact assessments and audits and for giving opinions on their admissibility.

(xv) *The Departmental Committee for Monitoring Environmental and Social Management Plans*

This committee was established by Order No. 0010 MINEP of April 03, 2013 on the organization and functioning of departmental committees for monitoring the implementation of environmental and social management plans. Its purpose is to monitor all environmental and social management plans within the Department's jurisdiction.

It is responsible, inter alia, for:

- ensuring compliance with and implementation of the environmental and social management plan as approved by the Interministerial Committee on the Environment
- promoting and facilitating consultation between project promoters and populations, with a view to implementing Environmental and Social Management Plans.

(xvi) Decentralized territorial authorities and traditional leaderships

Municipalities have a "global" responsibility for the operation of sanitation with regard to the operation and management of equipment. As a result, they can play a predominant role either during the construction phase or during the operation of the road. As for traditional leaderships, their role is crucial given their knowledge of the environment and their capacity to mobilize or sensitize local populations. Moreover, the choice of the accompanying measures of the project is proposed for them, in order to ensure a harmonious integration of the project in the social climate. That is why they are involved in public consultations.

4.4. COTE D'IVOIRE

4.4.1. National Policy on the Environment

In August 1994, exchanges between national authorities, local representatives, bodies such as the World Bank, the International Development Association (IDA) and civil society led to the preparation of an official report on the coastal environment of Cote d'Ivoire which was adopted by the government on May 24, 1995. This report became what is now called the National Environmental Action Plan of Cote d'Ivoire (PNAE-CI).

PNAE-CI dated 2011 defines the political future of the environment in Cote d'Ivoire for the period 1996-2011 and addresses the following ten (10) areas of concern: Sustainable management of agricultural development; Preservation of biodiversity; Human Settlements Management; Coastal zone management; Combating industrial pollution and nuisances; Integrated Water Management; Improvement of energy resources; Research, education, training and awareness-raising; Integrated and coordinated environmental information management; Improved institutional and regulatory framework. Implementation of the PNAE-CI is based on six principles: (i) continuity, (ii) dialogue and participation; (iii) consistency; (iv) concentration (efficiency); (v) coordination and cooperation; and (vi) exchange.

PNAE-CI was then applied to develop the country's Environmental Code (Act No. 96-766 of October 3, 1996 on the Environment Code), which aims to: (i) protect natural resources, including land, natural landscapes and monuments, wildlife, including existing national parks and reserves; (ii) establish the basic principles of environmental management and protection in order to increase the value of natural resources and to combat all kinds of pollution and nuisance; (iii) improve the living conditions of the various populations and promote a balance with the environment; (iv) to define the framework for the rational and sustainable use of natural resources for present and future generations; (v) ensure the restoration of damaged sites.

4.4.2. Institutional framework

The procedure implemented for EIES in Cote d'Ivoire involves several stakeholders, depending on the purpose of the study. For this project, the institutional framework refers to the National Public Institutions, whose types of intervention will be diverse, at all stages of the implementation of the project. These interventions will be in the form of monitoring and verification of environmental compliance, assistance and support in the implementation of

measures to eliminate, reduce and compensate for the harmful effects of the project on the environment. The institutions involved are:

(i) Ministry of Environment and Sustainable Development (MINEDD)

The Directorate General of the Environment includes:

- The Directorate of Ecology and Nature Protection;
- The Directorate for the Quality of the Environment and the Prevention of Risks;
- The Directorate for Infrastructures and Environmental Technologies.

The Directorate General for Sustainable Development:

- The Policy and Strategy Directorate;
- The Directorate of Standards and the Promotion for Sustainable Development;
- The Directorate for the Green Economy and Corporate Social Responsibility.

Under this project, the technical structures under the supervision of the MINEDD are:

(ii) The National Agency for the Environment (ANDE) :

Established by Decree No. 97-393 of July 9, 1997, the mandate of this agency is to coordinate the implementation of environmental development projects, to monitor and evaluate PNAE projects, to set up and manage the portfolio of environmental investment projects, to participate alongside the Ministry of the Economy and Finance in seeking funding, to ensure that environmental concerns are taken into account in projects and programs, to ensure the establishment and management of a national environmental information system, to implement the impact assessment procedure and to assess the environmental impact of macroeconomic policies, to implement the International Conventions in the field of the environment and to establish an ongoing relationship with NGO networks. It includes an Environmental Impact Assessment Office (BEIE), whose powers set out in Article 11 of Decree No. 96-894 of November 8, 1996 include:

- technical assistance to the various structures involved in environmental protection, including the administration, NGOs and all other development partners (consulting firms, private companies, donors, etc.);
- the recording and evaluation of impact statements and environmental and social impact studies for approval or authorization under the seal of the Minister of the Environment;
- audit and monitoring of the measures recommended by the Environmental and Social Impact Assessment;
- the organization of public inquiries, with the relevant administrations;
- the dissemination, where necessary, of information that could objectively inform the assessment of the measures envisaged and of their scope.

(iii) The Ivorian Anti-Pollution Center (CIAPOL)

- Established by Decree No. 91-662 of October 9, 1991. Its mandate is the control and monitoring pollution of the aquatic and atmospheric environments. The activities of CIAPOL focus on the monitoring and quality of inland, lagoon and coastal waters. It runs the National Observation Network (RNO). For some time now, CIAPOL has had its activities extended to pollution control and industrial nuisances through the integration of the Inspection Service for Classified Installations (SIIC).

In addition to the MINEDD whose various administrative structures are inventoried, in the management of the environment, details of all other structures and institutions likely to be concerned are listed in Table 3 below.

Table 2 : Institutions and Structures Involved in Environmental Management

INSTITUTIONS	DESCRIPTION
<p>Minister of State, Ministry of the Interior and Security</p>	<p>The Ministry of State, Ministry of the Interior and Security is responsible for the implementation and monitoring of the government's policy on land administration, decentralization, legal deposit, identification of populations, civil protection, etc.</p> <p>À ce titre, et en liaison avec les autres départements ministériels intéressés, il a l'initiative et la responsabilité des actions suivantes en matière de gestion des produits chimiques :</p> <ul style="list-style-type: none"> • security of property and personnel; • development of civil protection legislation and regulations ; • coordination of the management of major environmental risks, in liaison with the Ministers in charge of Environment and Water and Forests. • ONPC (National Office for Civil Protection) • GSPM (Military Fire Brigade Group).
<p>Ministry of Industry and Mines</p>	<p>As far as the Ministry of Industry and Mines and Industry are concerned, we are interested in the mining sector institutions that are particularly true that the industry covers the mining sector.</p> <p>As part of the Government's vision of positioning Cote d'Ivoire as an emerging nation, the Ministry of Industry and Mines is responsible for proposing and implementing the national development strategy industrial sector, boosting the private sector and developing the mining sector.</p> <p>As such, the actions of the Ministry have the Directorates General. In this document we are more concerned with the tasks of mining branches although the mining sector is an industrial sector by excellence.</p> <p>The Directorates-General are :</p> <ul style="list-style-type: none"> • Directorate-General of industrial Activity ; • Directorate-General for the Promotion of the Private Sector ; • Directorate-General of Mines and Geology. <p>The Directorate -General of Mines and Geology, in addition to coordinating the activities of the Central Directorates under its authority, is responsible for the promotion and development of the mining sector.</p> <p>The Directorate -General of Mines and Geology includes: four Directorates and one connected Service:</p> <ul style="list-style-type: none"> • Directorate of Cartography and Geological Prospecting ; • Directorate of Mining Information and Mining Cadastre ; • Directorate for Mining Development ; • Directorate for Artisanal Mining and Quarrying ; • Technical Controls Department. <p>The Directorate of Cartography and Geological Prospecting includes:</p> <ul style="list-style-type: none"> • Sub-Directorate of Cartography ;

	<ul style="list-style-type: none"> • Sub-Directorate of the Geological Survey. <p>The Directorate of Mining and Mining Cadastre Information includes :</p> <ul style="list-style-type: none"> • Sub-Directorate for Mining Information; • Sub-Directorate for the Mining Cadastre. <p>The Mining Development Department includes: Sub-Directorate for Mining Prospecting and Research ; Sub-Directorate for Industrial Mining.</p> <p>The Directorate of Artisanal and Quarries Operations includes:</p> <ul style="list-style-type: none"> • Sub-Directorate for Quarries; • Sub-Directorate for for Artisanal Mining <p>The Technical Control Service is responsible for:</p> <ul style="list-style-type: none"> • monitoring the application of the legislation and regulation of steam and gas pressure devices, jewelery and precious stones, with the exception of hydrocarbons; • ensuring qualitative and quantitative control of jewelery, stones and precious metals; • evaluating precious stones and metals. <p>The Technical Controls Department is headed by a Manager appointed through decree. He acts as Deputy Director of Central Administration.</p>
Ministry of Agriculture and Rural Development	<p>The Ministry of Agriculture is responsible for the implementation and monitoring of the government policy on agriculture. In this capacity, and in liaison with the relevant departments concerned, it has the initiative and responsibility for the following actions:</p> <ul style="list-style-type: none"> - Manage the rural land property and develop and implement a cadastre in rural areas; - encouraging the promotion of modern agriculture; - organizing and protecting phytosanitary; - training and supervising operators, including providing technical and management advice to farmers. <p>It includes thirteen (13) Departments, three (03) Inspections, one (01) Office and one (01) Inspection. The Ministry of Agriculture supports farmers through the National Agency for Rural Development Support (ANADER), whose main mandate is to contribute to the improvement of rural living conditions through the professionalization of farmers and OPA (Professional Organizations of Farmers) by designing and implementing appropriate tools, adapted programs to ensure sustainable and controlled development.</p> <p>The main mission is to:</p> <ul style="list-style-type: none"> - promote the professionalism of agricultural producers, pastoralists and silviculturists; - increase quality, productivity and income ; - promote agricultural cooperatives and producer associations; - carry out studies of agricultural projects and respond effectively to customer demand ; - carry out any development program or project entrusted to it by the State ; - provide advice for public authorities on issues related to the promotion of the rural world: training, credit, research and development, rural development, tenure security, etc. <p>This Ministry of Agriculture is involved in the project through its General Directorate of Production and Food Security. This Directorate will be involved in the implementation of the Action and Resettlement Plan (PAR) of the populations (farmers) likely to be affected by the project.</p>

<p>Minister reporting to the Prime Minister, responsible for Economy and Finance</p>	<p>The Ministry, together with its General Directorate of Customs, is responsible for the formulation of economic laws and strategies, the economic administration of all public institutions, and enterprises wholly or partly owned by the State. He is also responsible for tax and customs services. This Ministry is therefore involved in this Bauxite project because of the economic issues related to it.</p> <p>CNPS: The National Social Insurance Fund is responsible, in Cote d'Ivoire, to administer the compulsory social security scheme of the private sector. CNPS has been a privately-held private company since 6 August 1999. It is governed by joint authority: the Ministry of Health and combating AIDS and the Ministry of the Economy and Finance. It is deconcentrated in about 20 local agencies scattered throughout Cote d'Ivoire.</p>
<p>Ministry of Economic Infrastructure</p>	<p>The Ministry is responsible for the implementation and monitoring of the Government's policy on infrastructure equipment in the country of works. In this capacity, and in liaison with the departments concerned, it has the initiative and responsibility for the following actions:</p> <ul style="list-style-type: none"> • project management • monitoring of design • and the construction of road network infrastructure, as well as • their maintenance and regulation of their management. <p>The project, during its construction phase, will require the installation of an electrical network for its electricity supply, road infrastructure for the transport of materials. The Directorate of Road Infrastructure (DIR) will be involved in monitoring the design and construction of road network infrastructures.</p>
<p>Ministry of Construction and Urban Planning</p>	<p>The Ministry of Construction and Urban Planning is responsible for the implementation and monitoring of the government's policy on construction and urban planning. In this capacity, and in liaison with the relevant departments, it has the initiative and responsibility for the following actions:</p> <ul style="list-style-type: none"> • to issue the prior planning and planning certificates for building permits; • technical management of urban land ; • to modernize village communities ; • to assist local and regional authorities in planning matters. <p>This Ministry is involved in the project through its Headoffice for Construction and Urbanism.</p>
<p>Ministry of Water and Forests</p>	<p>The Ministry includes the Headoffice of Water and Forests, which includes the following directorates:</p> <ul style="list-style-type: none"> • the Directorate of Reforestation and Forest Cadastre; • the Directorate of Forest Policy and Litigation ; • the Directorate of Wildlife and Hunting Resources. <p>The departments and services related to the office include the General Inspectorate of Water and Forests (IGEF), which groups together</p> <ul style="list-style-type: none"> • the Directorate for Studies, Planning and Evaluation (DEPE) ; • the Directorate for Production and Forest Industries (DPIF) ; • the Directorate of Administrative and Financial Affairs (DAAF) ; • Ivorian Office of Parks and Reserves (OIPR) ; • the Directorate of Information Technology, Statistics and Archives (DISA) ; • the Water Resources Management and Protection Division (DGPRE), • the Communication Service (SERCOM), • the Monitoring and Coordination Unit for the Activities of Trusteeship Structures (CESCAS), as well as the Autonomous Service for Training and Education (SAFE);

	<ul style="list-style-type: none"> the Regional Directorate for Water Resources Management and Protection (DIRGPRES) is involved in the project. Its mandate will be to monitor the watercourse tenure during the construction of projects. <p>Also, this Ministry will monitor deforestation during development activities through the Reforestation and Forest Cadastre Department.</p>
Ministry of Health and Public Hygiene	<p>The Ministry of Health and combating AIDS is responsible for the implementation and monitoring of the Government's policy on health and combating AIDS. Health policy in Cote d'Ivoire is based on Primary Health Care (SSP). It is implemented by the Ministry of Health. In the regions, this policy is put in place by the Regional Directorates and their decentralized structures.</p> <p>The hygiene policy consists in proposing and implementing incentives, encouragement or sanctions for the populations, the officials of the local authorities in carrying out the public hygiene operations.</p> <p>The departments and directorates of the Ministry of Health are:</p> <ul style="list-style-type: none"> The Directorate of Infrastructure, Equipment and Maintenance (DIEM) ; The Directorate General of Health (D.G.S) ; The Directorate of Establishments and Health Professions (DEPS) ; The Directorate of Pharmacy and Medicine (DPM) ; The Directorate General of Public Hygiene (DGHP). <p>The Ministry of Health and Combating AIDS is involved in this project through the Directorate of Hygiene, Environment and Health (DHES), which will be in charge of the control of the provisions taken by the program in order to ensure the health of employees and local residents.</p>
Ministry of Employment and Social Protection	<p>The Ministry of State, Ministry of Employment, Social Affairs and Vocational Training is responsible for the implementation and monitoring of the Government's policy on employment, combating poverty and issues related to social affairs. It is very involved in the economic and social issues presented by the project.</p> <p>In this capacity and in liaison with the other relevant ministerial departments, it has the initiative and responsibility for action in the field of employment and social affairs.</p> <p>This ministerial department is involved in the economic and social issues of the project, such as the creation of jobs for the riparian populations, the improvement of the living environment of the populations.</p>
Minister of State, Ministry of the Interior and Security	<p>The Ministry of State, Ministry of the Interior and Security is responsible for the implementation and monitoring of the government's policy on land administration, decentralization, legal deposit, identification of populations, civil protection, etc.</p> <p>In this capacity, and in liaison with the other relevant ministerial departments, it has the initiative and responsibility for the following actions in the field of chemicals management:</p> <ul style="list-style-type: none"> security of property and personnel ; development of civil protection legislation and regulations ; coordination of the management of major risks in the environment, in liaison with the Ministers in charge of Environment and Water and Forests. ONPC (National Office for Civil Protection) GSPM (Military Fire Brigade Group). Regional Council.
Ministry of Higher Education and	<p>Universities, research centers and institutes, and supervisory laboratories of this ministerial department participate through their teaching and research programs in the sustainable management of the environment. The Ocean Research Center (CRO) participates in the</p>

Scientific Research	collection of information with a view to better understanding the ecosystems in the project area. The Bauxite project of BENENÉ is also of scientific interest for universities, research centers and institutes, sub - tutorial laboratories of this ministerial department.
Minister reporting to the President of the Republic, in charge of Defense	Its role in monitoring the territorial waters and the Exclusive Economic Zone (ZEE) gives the Ministry a watchdog role in combating pollution generated by industrial activities.
Ministry of Petroleum and Energy	The security of Cote d'Ivoire's supplies of hydrocarbons, minerals and energy; Rational and sustainable use of energy and mineral resources; Promotion, guidance, regulation, coordination and control of research, extraction and production of minerals, crude oil, natural gas and other hydrocarbons; Development of the transformation of mineral substances and hydrocarbons into semi-finished products; Management of standards and specifications of petroleum products, quality control of these products and combating fraud; Establishment of an institutional and legal framework to enhance competitiveness and competition for the development of the mining, oil and energy sectors; Regulation and control of the establishment and management of petroleum product security stocks; Collection and dissemination of scientific and technical documentation relating to the mining, oil and energy sectors in Cote d'Ivoire and around the world; Implementation and monitoring of a national total coverage program in electricity; Intensification of actions to implement and monitor energy programs, conventional or otherwise, in favor of the rural world in liaison with the Minister of Agriculture; Regulation, control and guidance of the production, transmission and distribution of conventional and new and renewable energies; Human resources development in sectors, oil and energy; Implementation and monitoring of the Government's policy on energy saving and promotion of renewable energy in liaison with the Minister for the Environment and the Minister for Water and Forests; Increased awareness of the use of gas as a source of domestic energy; Promotion of a policy of energy saving at national level and in particular in public services; Monitoring and evaluation of conventions in the oil and energy sector.
Ministry of Transport	The main task of the Ministry of Transport is to monitor and implement the Government's transport policy with a view to modernizing our transport system. The structures of the Ministry of Transport must achieve the following specific objectives: - improve the institutional, legal and organizational framework of the transport sector - organize transport activities - promote transport development - promote an adequate transport service offer and quality; Improve the accessibility of the socio-professional sectors to transport services; Facilitate access by carriers to bank loans. In line with these specific objectives, which have been defined to address the concerns of the population, the actions and activities of the Ministry of Transport are in line with Strategic Objective 4 of the State-level Government Work Program (PTG): Modernization of the transport system.
Ministry of Commerce	The Minister of Commerce is responsible for the implementation and monitoring of the Government's trade policy. In this capacity, and in liaison with the various relevant ministerial departments, it has the initiative and responsibility for the following actions: I - In terms of Foreign Trade Promotion and organization of the marketing of Ivorian products on the international market; Initiation and coordination of negotiations and monitoring of bilateral trade agreements and agreements, in particular with regard to export commodities; Monitoring of Cote d'Ivoire's

	<p>relations with international and intergovernmental organizations in the field of trade; Periodic information from the Government on the situation of raw materials, finished and semi-finished products for export in conjunction with the Minister of Agriculture; Improving the export environment; Participation in the facilitation of the activities of commercial advisers of the Ivorian embassies and monitoring of the foreign commercial representations in Cote d'Ivoire in liaison with the Minister in charge of Foreign Affairs; Regulations defining and controlling the foreign trade representations; Management of imports of products subject to regulation; Participation in the development and implementation of the tariff and non-tariff policy for entry and exit.</p> <p>II - In terms of Domestic Trade</p> <p>Promotion and organization of the marketing of Ivorian products on the national market; Organization of business activities; Implementation of business location regulations, markets of national or regional interest, retail markets, specialized markets, general stores, hypermarkets and supermarkets; Management of domestic commercial equipment; Improvement of distribution and supply chains in urban and rural centers; Consumer organization; Promotion, encouragement, training and supervision of nationals in the exercise of commercial professions; Participation in the mechanism of distribution and pricing of petroleum products; Promoting loyalty in commercial transactions and consumer protection; Definition and implementation of modern metrology and control of measuring instruments in the trade sector; Implementation and monitoring of competition and prices; Fraud ; Participation, in liaison with the Minister in charge of town planning, in the implementation of regulations on commercial town planning, and in the creation and running of the Commercial Planning Commission; Implementation of a management policy for commercial facilities for national or regional interest.</p>
<p>Ministry of Animal and Fishery Resources</p>	<p>Planning, promotion and development of animal production, aquaculture and fisheries; Regulation and quality control of livestock feeds; • Improvement, control of animal health and health surveillance; • Regulation and control of veterinary medicines, products and materials, in liaison with the Minister of Health and Public Hygiene; • Promotion and control of veterinary medicines, products and materials, in liaison with the Minister of Health and Public Hygiene; • Promotion and control of animal establishments; • Identification and follow-up of the implementation of the pastoral development and the exploitation of the rural area, in liaison with the Minister of Agriculture and the Minister of the Environment and Water and Forests; • Promotion of marketing infrastructures for animal and fishery products, in liaison with the Minister of Commerce; • Development and management of fisheries and aquaculture infrastructures; • Promotion of sea and river-lagoon fishing; • Participation in the control and surveillance of the exclusive economic zone; Promotion, regulation and control of the processing of animal and fishery products in liaison with the Minister of Industry and Private Sector Promotion • Initial and continuing vocational training in the livestock and fisheries sector in conjunction with the Minister of Agriculture, the Minister of the Environment, Water and Forestry; • Promotion of professional livestock, aquaculture and fisheries organizations; • Support for the modernization of farms and animal production and aquaculture structures; • Participation in the development and follow-up of programs for the development of animal production and fisheries resources; • Preparation and monitoring of regulations on public veterinary hygiene and quality, in liaison with the Minister of Health and Public Hygiene; • Monitoring and monitoring the food safety of animal and animal products at the level of production, processing and distribution, in liaison with the Minister of Health and Public Hygiene; • Promotion and control of zootechnical standards; • Negotiations and monitoring of international agreements and conventions in the fields of animal production and fishery</p>

	resources, in liaison with the Minister of Foreign Affairs; • Inspection and veterinary sanitary control at the borders of animal and animal products and fishery products and feed and fish; • Participation in the fight against zoonoses in liaison with the Minister of Health and Public Health.
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4.4.3. Legislative and Regulatory Framework

In order to provide an appropriate legal framework for the protection and sustainable management of the environment, Cote d'Ivoire has drafted several texts. The relevant statutory instruments applicable to this project are set out below:

4.4.4. Regional and International Conventions and Agreements on the Environment

Cote d'Ivoire has signed and ratified some 40 international conventions, agreements and treaties relating to the environment since 1938.

Table 3: A non-exhaustive inventory of international conventions signed by Cote d'Ivoire.

<i>CONVENTION - VENUES AND DATES OF ADOPTION</i>	<i>PURPOSES OF AGREEMENTS AND CONVENTIONS</i>	<i>DATE OF RATIFICATION</i>	<i>ASPECTS RELATED TO PROJECT ACTIVITIES</i>
London Convention for the Conservation of Wild Fauna and Flora (1933)	Relates to the conservation of wildlife and natural flora.	31/05/1938	Aspect for the protection of fauna and flora.
African Convention on Conservation of Nature	The African Convention on the Conservation of Nature and Natural Resources was originally adopted in Algiers in 1968. Thirty-five years later, it was revised by the African Union Conference held in Maputo in 2003. This revision made a profound renovation of the original Convention, giving it a much more extensive and updated normative content.	September 15, 1968	Within the zone of influence of the project there are reserves and animal parks.
UNESCO Convention on World Cultural and Natural Heritage (1972).	To ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage, natural monuments, natural sites, geological and physiographic formations.	1977	
Bonn Convention or CMS Convention on	It aims to conserve terrestrial, marine and avian migratory	23/06/1979 (PE signed in 2003)	Migratory species listed by the Convention as present in

CONVENTION - VENUES AND DATES OF ADOPTION	PURPOSES OF AGREEMENTS AND CONVENTIONS	DATE OF RATIFICATION	ASPECTS RELATED TO PROJECT ACTIVITIES
Migratory Species of Wild Animals; 1979	species that regularly cross international borders, including international waters. All cetaceans and albatross species in the southern hemisphere are listed by CMS.		Cote d'Ivoire. The proponent will consider the requirements of the RAMSAR agreement in the implementation of the project
Abidjan Convention	Covers the marine environment, coastal areas and related continental waters under the jurisdiction of the States of the West and Central African Region, including Mauritania and Namibia, which have become Contracting Parties to the Convention.	15/01/1982	The proponent shall take into account all appropriate measures to prevent, reduce and control pollution in the project area.
MONTREAL Protocol on Substances that Deplete the Ozone Layer (1987)	Protect human health and the environment from adverse effects resulting or likely to result from human activities that alter or are likely to alter the ozone layer.	1992	Emissions of greenhouse gases.
Vienna Convention for the Protection of the Ozone Layer of 1985;	The Convention establishes a framework for cooperation and the formulation of agreed measures to protect human health and the environment from the adverse effects of human activities caused by changes in the ozone layer. Specific obligations relating to the control of the elimination of Ozone Layer (SACO) are stipulated in the Montreal Protocol.	04/05/1993	Possible depletion of the ozone layer.
WASHINGTON Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES (1975).	Ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species to which they belong.	1993	Protection of endangered species of wild fauna and flora.
United Nations Framework	This convention establishes a global agreement on	29/11/1994	Release of carbon monoxide (CO) and carbon dioxide

CONVENTION - VENUES AND DATES OF ADOPTION	PURPOSES OF AGREEMENTS AND CONVENTIONS	DATE OF RATIFICATION	ASPECTS RELATED TO PROJECT ACTIVITIES
Convention on Climate Change (1992).	intergovernmental efforts. It recognizes that the climate system is a common resource whose stability can be affected by emissions of carbon dioxides and other greenhouse gases. Cote d'Ivoire is not listed in Annex I to the Decree; therefore some of the requirements of the Convention do not apply to it.		(CO ₂).
Convention on Biological Diversity, Rio de Janeiro (1992).	Conserve biological diversity, use biological resources in a sustainable manner and share equitably the benefits arising from the use of genetic resources.	1994	Protection of endangered plant species.
Bamako Convention on the Prohibition of the Import into Africa of Hazardous Wastes (1991)	Prohibition of import into Africa of all hazardous wastes for any reason from non-Contracting Parties. Their importation is declared illegal and liable to penal sanctions.	1994	It lays down the principle of absolute prohibition on the importation of waste.
BASEL Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989)	The Convention aims to control the transboundary movements of hazardous recyclable materials and wastes, as well as the promotion of ecological management.	1994	Reduce the transboundary movements of waste subject to the Convention to a minimum compatible with effective and sensible environmental management of such wastes. Minimize the quantity and toxicity of the waste generated and ensure that they are efficiently managed as close to their emission source as possible. Assist Member States in putting in place effective environmental management of the hazardous and other wastes they generate.
RAMSAR Convention on Wetlands of	Concerns the protection of bird nests.	27/06/1996	Aspects of bird protection at the project site.

<i>CONVENTION - VENUES AND DATES OF ADOPTION</i>	<i>PURPOSES OF AGREEMENTS AND CONVENTIONS</i>	<i>DATE OF RATIFICATION</i>	<i>ASPECTS RELATED TO PROJECT ACTIVITIES</i>
International Importance especially as Waterfowl Habitat (1971).			
Stockholm Convention on Persistent Organic Pollutants.	The purpose of this Convention is to protect human health and the environment from persistent organic pollutants.	2003	It prohibits the production and export of the most harmful substances in the extractive industries and adopts measures to reduce or eliminate releases resulting from the production and intentional use of other substances.
Kyoto Protocol to the Convention - United Nations Framework Convention on Climate Change.	The emission reductions from each activity shall be certified by operational entities designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol on the basis of the following criteria: (a) Voluntary participation approved by each Party concerned; (B) Real, measurable and sustainable benefits related to mitigation of climate change; (C) Reductions in emissions in addition to those that would occur in the absence of the certified activity. The "clean development" mechanism helps organize the financing of certified activities as required.	April 23, 2007	Greenhouse gas emissions, responsible for climate change

4.4.5. National legal framework

(i) Law N° 2000-513 of August 1, 2000 on the Constitution of the Republic of Cote d'Ivoire

In particular Articles 19, 28 and 71, paragraph 25 thereof, respectively, provide that "the right to a healthy environment shall be recognized for everybody"; "the protection of the environment and the promotion of the quality of life are a duty for the commune"; "the protection of the environment".

(ii) Law No. 88-651 of July 7, 1988 on the protection of public health and the environment from the effects of toxic and nuclear industrial wastes and harmful substances.

Article 1 stipulates that: "All acts relating to the purchase, sale, import, transit, transport, depot and storage of toxic and nuclear industrial waste and harmful substances are prohibited on the territory of the country". Article 2 stipulates that: "A prison sentence of between fifteen and twenty years and a fine of between one hundred million and five hundred million francs shall be imposed on any person engaged in any of the operations Of Article 1 ". Article 3 stipulates that: "Where the offense is committed in the course of the activity of a legal person, criminal liability shall be borne by any natural or legal person who, by virtue of his or her functions, has the Responsibility for the management, supervision or control of this activity. The legal person concerned shall be jointly and severally liable with the person or persons sentenced to payment of fines, civil remedies, costs and expenses. "

(iii) Framework Law No. 96-766 of October 3, 1996, on the Environment Code.

This Code sets out the general framework of legal and institutional texts relating to the environment. It aims to:

- protect the soil, subsoil, sites, national landscapes and monuments, plant formations, fauna and flora and especially classified estates, national parks and existing reserves;
- establish basic principles for managing, protecting the environment against all forms of degradation in order to develop natural resources, and combat all kinds of pollution and nuisances;
- improve the living conditions of the different types of population while respecting the balance with the surrounding environment;
- create conditions for the rational and sustainable use of natural resources for present and future generations;
- guarantee all citizens an environmentally sound and balanced living environment;
- ensure the restoration of damaged milieu.

Article 22 stipulates that "The competent authority may, under the regulations in force, refuse a building permit if the constructions are such as to affect the character or integrity of the neighboring premises". The general principles of the framework law are:

The Precautionary Principle: "In the planning or execution of any action, preliminary measures shall be taken to avoid or reduce any risk or danger to the environment. Anyone whose activities are likely to have an impact on the environment must, before acting, take into account the interests of third parties, as well as the need to protect the environment. If, in the light of experience or scientific knowledge, an action is deemed capable of causing a risk or danger to the environment, this action shall be taken only after a preliminary assessment indicating there will be no adverse impact on the environment ".

The Substitution Principle: "If the action which may have an adverse impact on the environment can be substituted for another action which presents a lower risk or danger, the latter action is chosen, even if it entails higher costs in relation to the values to be protected ".

The Principle of Preservation of Biological Diversity: "Any action must avoid having a significant detrimental effect on biodiversity".

The Principle of Non-degradation of Natural Resources: " to make sustainable development we should avoid causing damage to natural resources, such as water, air and soil, which in any case are an integral part of the development process and should not be taken into consideration in isolation. Irreversible effects on land should be avoided as far as possible " .

The "Polluter-Pay" principle: "Any natural or legal person whose actions and / or activities cause or are likely to cause damage to the environment is subject to tax and / or royalty. In addition, it shall take all necessary measures to restore it. " .

The Information Principle: "Everyone has the right to be informed of the state of the environment and to participate in the pre-decision-making procedures which may have an adverse effect on the environment".

The Principle of Cooperation: "Public authorities, international institutions, defense associations and individuals contribute to protecting the environment at all possible levels".

Article 39 stipulates that: "Any major project likely to have an impact on the environment must be subject to a prior impact assessment. All projects shall be checked and monitored to verify the adequacy of the forecasts and to adopt the necessary corrective measures " .

Article 40 describes the content of an Environmental Impact Assessment:

- a description of the proposed activity;
- a description of the environment likely to be affected including the specific information needed to identify or assess the effects of the proposed activity on the environment;
- a list of the products used where appropriate;
- a description of the alternatives, where appropriate;
- an assessment of the likely or potential effects of the proposed activity and possible alternatives on the environment, including direct, indirect, cumulative effects in the short, medium and long term;
- the identification and description of measures to mitigate the effects of the proposed activity and possible alternatives to the environment and an assessment of these measures;
- an indication of knowledge gaps and uncertainties in the development of the necessary information;
- an indication of the environmental risks of a neighboring State arising from the proposed activity or other possible solutions;
- a brief summary of the information provided under the previous headings;
- defining the methods for the regular control and monitoring of environmental indicators before (initial), during the construction site, during the operation of the structure or, if necessary, after the end of the operation (Rehabilitation or redevelopment of premises);

- a financial estimate of the measures recommended to prevent, reduce or compensate for the negative effects of the project on the environment, as well as regular monitoring and control measures of relevant environmental indicators.

In Article 41, it is stipulated: "The examination of the environmental impact studies by the Environmental Impact Assessment Office will give rise to the payment of a tax to the National Environment Fund, specified by decree".

Article 75 stipulates that: "The following shall be prohibited: discharges, discharges of all solid substances, of all liquid and gaseous substances, into watercourses and bodies of water and their surroundings; any activity likely to adversely affect the quality of air and water both on and underground".

(iv) Law No. 98-750 of December 23, 1998 on Rural Land Law amended by Law No. 2004-412 of August 14, 2004.

In Cote d'Ivoire, it was this law passed on 23 December, 1998, and amended on 9 July, 2004, on the rural land domain, which laid the foundations for rural land policy, namely (i) the recognition of a customary rural land and the validation of the existing management of this land (ii) the association of Village Authorities and Rural Communities in the management of the rural land and in particular the recognition of customary rights and their turning into real rights.

The right to use land is set out in Article 1 of the Land Law which states: "The Rural Land Sector is made up of all the developed or undeveloped land and whatever the nature of development. It constitutes a national heritage to which any natural or legal person may have access. The State, the territorial authorities and the natural persons may own them". According to the Act, use and enjoyment of land in the national land area requires to be **holder of a title** (the Occupancy Permit, the Provisional lease subject to the rights of third parties, the straight lease, the final lease which the land lease already registered with two types of lease: the long lease (18 to 99 years), the freehold lease, the Land Certificate, the Land Title).

However, occupation and exploitation of undeveloped land for the purpose of providing housing and food for the occupant and his family are not contingent upon possession of an administrative title. The customary rights of users are therefore recognized.

The Ivorian Constitution stipulates in article 15 that no one may be expropriated except for reasons of public utility legally established and subject to a fair and prior compensation. The legal mechanism put in place for expropriation for reasons of public utility is provided for in the **Decree of 25 November 1930, which provides in its article 1: "Expropriation for public utility is carried out in French West Africa by Authority"**.

According to this Decree, the right to property can be infringed only when the public interest so requires. This infringement therefore belongs to the Tribunal which makes a judgment of expropriation and not to the Administration alone.

A Decree on the Declaration of Public Utility of the site assigned to the project is taken before the expropriation. This decree specifies the total area of the site and its decomposition, as well as the conditions of the expropriation below:

- any transaction, even seasonal planting, any new construction even precarious, all work of a nature to change the state of the soil are prohibited;
- Land held in full ownership, leased or granted will be returned to the public land of the State and the beneficiaries will be compensated in accordance with the regulations in force;
- the holders of customary rights, the tenants or their beneficiaries duly recorded and registered, according to the regulations in force in this matter, will receive a fair and prior indemnity.

An interministerial order establishing the Administrative Commission for the purging of customary rights on the site assigned to the project is also taken. This Order sets forth the composition and functioning of the Commission. The role of the Commission is to:

- follow an adversarial investigation, to identify the land within the scope of the proposed operation which is subject to customary law and to the census of the holders of such rights;
- determine the indemnity and compensation which are proposed to the holders of customary rights in accordance with the provisions of Article 4 of Decree No. 96-884 of October 28, 1996;
- draw up a statement listing the lands to be purged, the holders of customary rights on those lands, proposed indemnity and compensation, registered agreements and disagreements. This statement shall be the subject of a report drawn up by the Secretary of the Commission and signed by each member of the Commission.

(v) Law No. 98-755 of December 23, 1998 on the Water Code

It defines the mechanisms for sustainable management of this renewable resource. It establishes the concept of management by hydrographic basin, strengthens the institutional framework of the water sector and places particular emphasis on planning and cooperation in the management of the resource. The objectives of this Code are: preservation of aquatic ecosystems; protection against all forms of pollution; protection, mobilization and management of water resources; the valorization of water as an economic resource and its distribution in order to comply with or reconcile all the different uses, activities or works and the coherent planning of the use of water resources at the hydrological catchment level as well as at the national level.

Article 1 stipulates: "Discharges, deposits of wastes of any kind or radioactive effluents that may cause or increase pollution of water resources shall be prohibited".

Article 49 stipulates: "Any discharge of waste water into the receiving environment shall comply with the standards in force".

Article 50 states: "The use of explosives, drugs, toxic substances as bait in surface waters likely to impair the quality of the aquatic environment is prohibited".

Article 51 stipulates: "It shall be prohibited to discharge into the sea, watercourses, lakes, lagoons, ponds, canals, groundwater, on their banks and in alluvial aquifers, any fermentable residue of vegetable or animal origin, any solid or liquid substance, toxic or inflammable substance which may constitute a danger or cause unhealthy conditions, cause a fire or explosion".

(vi) Law n ° 99-477 of August 2, 1999 on the Code of Social Security amended by Ordinance No. 2012-03 of January 11, 2013

Article 1 stipulates that: "The public service of social welfare is intended to provide services in order to mitigate the financial consequences of certain risks or situations in the following areas: accidents at work and occupational diseases; retirement, disability and death; family allowances". Any employer, who employs salaried workers, as defined in Article 2 of the Labor Code, is compulsorily affiliated to the National Social Welfare Fund. Affiliation takes effect from the first employment of an employed person.

(vii) Law n ° 2002-102 of February 11, 2002, on the creation, management and financing of national parks and nature reserves

Article 2: The general objective of this law is to mark the will of the State of Cote d'Ivoire to act in the parks and reserves sector and to allow the strengthening of the overall nature conservation policy. The specific objectives are to: (i) adapt the public service in charge of parks and reserves to the current requirements of rational management; (ii) give public land ownership of national parks and integral nature reserves in order to make them inalienable; (iii) define the category of establishment best suited to manage parks and reserves; (iv) specify the private contractual arrangements for the management of parks and reserves; and (v) define a long-term funding mechanism for parks and reserves.

(viii) Law No. 2003-208 of July 07, 2003 on transferring and distributing the powers of the State to local and regional authorities

Article 1 stipulates that: "Local and regional authorities shall co-operate with the State in the economic, social, health, educational, cultural and scientific development of populations and, in general, in the continuous improvement of their living environment. To this end, they have a general competence and special competences assigned by laws and regulations. "

Article 2 stipulates that: "Competences other than those provided for by the provisions of this Act may be transferred, where necessary, from the State to local authorities by law."

Article 7 stipulates that: "The realization of equipment in the territory of a local authority may not be undertaken by the State or by another local authority without prior consultation of the relevant community concerned".

(ix) Law No. 2014-138 of March 24, 2014 on the Mining Code

The Mining Code sets out the general provisions of the law, which apply without prejudice to those that relate specifically to the specific areas governed by the laws relating to: rural land tenure, water law, nuclear safety and protection against ionizing radiation, Public Health Code (Article 2). The Mining Code states in its Article 28 and subparagraph (e) concerning the Feasibility Study, the preparation of the Environmental and Social Impact Statement in accordance with the Environment Code and its subsequent texts.

Chapter II: Exploitation permits and Article 28, subparagraphs (e), (f), (g) and (h), respectively: "the socio-economic impact assessment of the project"; "The study of the impact of the project on the environment (land, water, air, fauna, flora and human settlements) with appropriate recommendations in accordance with the Environment Code and its subsequent texts"; "Community development plan".

Chapter III: Provisions common to mining titles and Article 43 stipulates that the withdrawal shall be effected following a sixty (60) day notice of default, in particular in the following cases: Subparagraph k "breaches of obligations relating to the conservation of forest patrimony, the protection of the environment and the rehabilitation of exploited sites have been established".

Title VIII: Prohibited Areas and Protective Areas and Articles 113 and 114 stipulate in paragraphs 1 and 2 that "spaces within a radius of one hundred (100) meters shall be classified as prohibited areas: closed properties; walls or of an equivalent device; protected areas; wells; religious buildings; places of burial or places considered sacred".

"Are also considered as interdiction zone, the surroundings, for a distance of 100 meters: communication channels; pipes and water points; all works of public utility; works of art and public land dependencies".

Article 114 stipulates that prospecting, research and exploitation in prohibited areas shall be subject to the prior consent of the owners, occupiers or communities concerned and the approval of the Minister of Mines. The terms of this authorization shall be determined by decree".

In Chapter I: Adherence to the principles of good governance, Articles 117, 118 and 20 stipulate respectively: "Every mining title holder undertakes to apply the principles and criteria of good governance, in particular Ecuador Principles and those Of the ITIE "; "Any holder of mining title has the obligation to comply with the principles and requirements of the ITIE standard. In particular, the holder of the mining title must, in the context of preparing the ITIE reports, make declarations based on the data which are subject to audit by the competent bodies in this matter ", and "child labor is prohibited in all activities governed by this Act".

Chapter III: Relationship with Soil Occupants; Article 127 stipulates that: "The occupation of these lands also entitles them to just compensation for the benefit of the occupier and the lawful occupant of the land. The terms of this compensation are set by decree. "

Chapter V: Safety, hygiene and measures to be taken in the event of an accident; Article 137 stipulates that "any natural or legal person carrying out research or exploitation of mineral substances shall be required to perform them in accordance with sound engineering practice so as to ensure the safety of persons and property" .

Chapter VI: Environmental protection, Articles 140 and 141 respectively state that "activities governed by this Act shall be conducted in such a way as to ensure the protection of the quality of the environment, the rehabilitation of exploited sites and the conservation of the forest heritage in accordance with the conditions and procedures established by the regulations in force "; "Every applicant for an operating license or for an industrial or semi-industrial exploitation permit, before undertaking any type of work, is obliged to carry out and submit to the approval of the Mines Administration, Environmental Administration and all other services provided for in the mining regulations, the Environmental and Social Impact Study, abbreviated EIES in paragraph 2, EIES must include an Environmental Management Plan and paragraph 6 in the case of non-standard pollution, the inspection fee, subsequent verification and the related fines shall be charged to the holder of the operating license or to the beneficiary of the authorization Operation, in accordance with the procedures specified by decree ".

(x) Law No. 2014-427 of July 14, 2014 establishing the Forest Code

Article 1 stipulates that "Forests shall be considered to be plantations whose exclusive or principal fruits are wood for cabinet making, industry and service, firewood and coal, and which, incidentally, can produce other materials such as bamboo, bark, latex, resins, gums, seeds and fruits."

Article 1 stipulates that: "The following shall be regarded as protective perimeters: i) Mountain slopes protected from erosion by their vegetation cover; ii) Where dangerous ravines and landslides could occur and iii) The watersheds of the springs. "

Article 3 stipulates that: "Reforestations are considered to be land planted with human hands in species that do not produce agricultural products, as well as natural forests artificially enriched with timber by planting or silviculture".

Article 4 stipulates that: "The plant formations defined in Articles 1, 2 and 3 shall constitute the forest estate. The forest domain includes: The forest estate of the State. The forest estate of individuals and communities ".

(xi) Law No. 2015-532 of July 20, 2015, establishing the Labor Code.

Article 1 stipulates: "This Labor Code is applicable throughout the territory of the Republic of Cote d'Ivoire. It governs relations between employers and workers resulting from contracts

concluded for execution in the territory of the Republic of Cote d'Ivoire. It also governs the occasional performance, on the territory of the Republic of Cote d'Ivoire, of an employment contract concluded for execution in another State. However, this latter provision shall not apply to workers displaced for a temporary mission not exceeding three months ".

Table 4: The main points are set out below.

Order	Actions provided for by the Decree of November 25,1930
1	"An Act to authorize transactions", Art. 3, al. 1
2	"An Act which expressly declares the public interest", Art. 3, al. 2
3	"Investigation of commodo and incommodo", Art. 6
4	Transferability Order, Art. 5. This Order designates the properties to which Expropriation is applicable. The release and the deadline are defined in Articles 7 and 8.
5	Appearance before the Administrative Commission of Expropriation (Article 9) to reach an amicable agreement on compensation. The agreement is the subject of a report of compensation.
6	Payment of the indemnity (Article 9) if amicable agreement. This payment constitutes the right of entry into possession of the immovable by the Administration, Art. 24.
7	If no amicable settlement, communication of the file to the Court of First Instance establishing the compensation for expropriation on the basis of an expert opinion, Art. 12-16.
8	Delivery of the judgment: the latter is enforceable by provision notwithstanding appeal and upon payment of the indemnity, Art. 17.

(xii) Decree No. 71-74 of February 16, 1971 relating to State and Land Proceedings

Article 1 stipulates that: "All real estate transactions, all subdivisions, all plots of land and, as a general rule, all agreements relating to immovable property rights, remain subject to a compulsory State or land procedure. Any land occupation to be legal must be justified:

- for rural land, possession of a provisional or final concession title issued by the Minister of Agriculture or a precarious and revocable occupation permit issued by the Minister of the Interior or his representative . This authorization may give rise to a definitive concession or an emphyteutic lease;
- for urban land, by the possession of a provisional or final concession title issued by the Minister of Construction and Town Planning, who may delegate his powers to the prefects. "

Article 2 stipulates that: "Land-use rights, so-called customary rights, are personal to those who exercise them and can not be transferred in any capacity whatsoever.

No person may assume the said rights over the whole territory of the Republic. "

(xiii) Decree No. 95-815 of September 29, 1995 laying down the rules for compensation for the destruction of crops.

Article 2 stipulates: "The compensation must be fair, that is to say, allow full compensation for the damage caused by the loss of property. It must in no case constitute speculation for the victim. "

Article 6 stipulates: "The fixing of the scale of rates of compensation and the organization of the assessment of compensation shall be established by a Joint Order of the Ministry in charge of Agriculture and of the Ministry of Agriculture, Economy and Finance."

(xiv) Decree No. 96-206 of March 7, 1996 concerning the Committee on Hygiene, Safety and Working Conditions

Article 1 states: "In accordance with the provisions of Article 42.1 of the Labor Code, in all establishments or companies usually employing more than fifty employees, the employer shall establish a health and safety committee and working conditions ".

(xv) Decree No. 96-894 of November 1996 determining the rules and procedures applicable to Environmental Impact Studies of development projects.

This Decree defines the provisions relating to the carrying out of studies on the Impact of a project on the environment.

Article 2 states: "Projects located on or near hazardous or environmentally sensitive areas (Appendix III to the Decree) are subject to the Environmental Impact Assessment (EIE)."

Article 12 describes the content of an EIE, an EIE model is attached as appendix IV to the Decree.

Article 16 states: "The project submitted to EIES shall be the subject of a public inquiry. The EIES is disclosed to the public in the course of the investigation and forms part of the file ".

In its appendices, this Decree also specifies the particularities related to environmental studies.

- Appendix 1: gives the categories of projects submitted to the Environmental Impact Assessment;
- Appendix 2: gives the categories of projects submitted to the Environmental Impact Statement;
- Appendix 3: identifies the sites on which any project is subject to an Environmental Impact Assessment;
- Appendix 4 : specifies an indicative EIE report template.

(xvi) Decree No. 98-40 of January 28, 1998 concerning the Technical Advisory Committee on the Study of Issues of Occupational Safety and Health

Article 1 stipulates that: "The Advisory Technical Committee for the Study of Issues Concerning the Hygiene and Safety of workers set up in Article 92-1 of the Labor Code shall be responsible for issuing opinions, to formulate proposals and resolutions on all matters concerning the health and safety of workers."

Article 6 stipulates: "The Secretariat of the Technical Advisory Committee shall be provided by an official of the Directorate of the Medical Labor Inspectorate."

- Each meeting of the Committee or subcommittee shall be followed by minutes.
- Any member of the Committee or of a subcommittee may request the inclusion in the minutes of the declarations made by him and the annexation to the minutes of the notes drawn up and filed before the end of the meeting.
- The minutes shall be communicated to the members of the Advisory Technical Committee within a maximum period of one month. These records are kept in the archives of the Medical Labor Inspectorate.

(xvii) Decree 98-43 of January 28, 1998 on Classified Installations for the Protection of the Environment.

Article 1 stipulates: "The provisions of this Decree shall apply to factories, depots, sites, quarries, underground storage, shops, workshops and, in general, installations operated or held by any natural or moral person, public or private, which may present dangers or inconvenience to the convenience of the neighborhood, health, safety, public health, agriculture, nature and environmental protection".

(xviii) Decree n ° 2005-03 of January 06, 2005 on Environmental Audit aims at assessing periodically the impact that all or part of the activities, operating procedures or the existence of an organization or structure is directly or indirectly, to generate on the environment.

Article 3 stipulates that "every three (3) years shall be subject to the Environmental Audit, companies, industries and works, or part or combination thereof, whether public or private, sources of pollution, which have their own functional and administrative structure". Article 6 states: "The Environmental Audit shall enable the Ministry responsible for the environment to ensure compliance with standards, to require preventive, mitigating and remedial measures or to impose sanctions in the deliberate non-compliance or recidivism".

(xix) Decree No. 2014-25 of January 22, 2014 amending Decree No. 2013-224 of March 22, 2013 regulating the purging of customary rights on land for general interest

In Article 1, it is stipulated that:

"Customary land rights in urban areas and their deferred land use areas relate to the use of these soils. They are personal to those who exercise them and can not be transferred in any capacity whatsoever. No person may assume the said rights over the whole national territory"

Article 2 stipulates that: "The purging of customary rights on the above-mentioned soils may be exercised only by the State acting for its own account or for that of the communes. It is carried out administratively. "

(xx) Decree No. 2014-397 of June 25, 2014 determining the terms of application of Law No. 2014-138 of March 24, 2014 on the Mining Code

(xxi) Order No. 0462 / MLCVE / SIIC of May 13, 1998, relating to the nomenclature of Classified Installations.

It makes it possible to distinguish the installations subject to authorization from those subject to declaration according to the severity of the hazards or inconveniences that the activities may present.

(xxii) Order n ° 00996 of October 28, 2007 amending Order No. 556 of February 27, 2002 establishing a unit for the detection and punishment of infringements of the regulations on the protection of the marine, lagoon and coastal environment, and establishing a police unit for the control of pollution of receiving environments (soil-water-air) called "UNIPOL".

(xxiii) Interministerial Order No. 247 / MINAGRI / MPMEF / MPMB of June 17, 2014 setting the scale of compensation for crops.

Article 1 stipulates that: 'The rates of compensation for the destruction of crops shall be determined in accordance with the calculation formulas in Appendix 1. Appendices 1, 2 and 3 shall have the same legal force as this Decree'. **Article 3** states that 'Crops not listed in the attached table shall be evaluated on the basis of data obtained from the competent supervisory structures'. **Article 4** stipulates that "Calculation of allowances shall be made by the competent departments of the Ministry in charge of Agriculture, on the basis of this Order and after observations made by them in accordance with **Article 5** of this Order. **Article 5** stipulates that the minutes of the findings shall be drawn up by the sworn agents of the Ministry in charge of Agriculture in the presence of the victims and the person responsible for the destruction or his representative. "

Through these Laws, Decrees, Orders and Orders, the State of Cote d'Ivoire wants to ensure the protection of the environment against the harmful consequences on the environment that may result from the realization of development projects.

4.5. GUINEA

4.5.1. Environmental Policy Framework

The Ministry of Environment is responsible for the design, development and coordination of the implementation of government policy in the areas of environmental protection, sound management of natural resources and Improvement of the quality of life. The most appropriate national and / or sectoral strategies and programs for the environment and for the management of natural resources are: (i) the National Environmental Action Plan (PNAE), which is the basis for the Environmental policy and includes three general framework programs: management of natural resources, society and the environment, pollution and nuisance; (ii) Guinea's National Adaptation Plan for Climate Change (NAPA); (iii) the National Forestry Action Plan (PAFN -Guinea).

4.5.2. Institutional Framework for the Environment

In accordance with Decree 065 / PRG / SGG / 2004 of October 04 the Ministry of the Environment, amended by Decree 047 of 2011 on the Ministry of the Environment to the

Minister of State for Energy and Energy, Environment, the Ministry for the Environment is composed of:

- **Minister's office**
- **General Secretariat**
- **Support services** (General inspection ; Strategy and Planning Office ; Financial Affairs Division ; Human Resources Division ; Financial Control Division)
- **National Directorates** (Environment Directorate ; Directorate of Sanitation and Living Environment ; Directorate of Water and Forests)
- **Advisory bodies** (National Council for the Environment (CNE); Regional Environmental Councils (CRE); National Commission for Sustainable Development (CNDD).)
- **Customized organizations** (Guinean Office for Biological Diversity and Protected Areas; Guinean Office of Impact Studies and Environmental Assessment (BGEIEE); Environmental Observation, Monitoring and Information Center ; Environmental Safeguards Fund ; National Forest Fund; Forestry Center of Nzérékoré)
- **Related Services** (Climate Unit ; Guinean Office for Wood ; Center for the Protection of the Marine Environment and Coastal Areas ; Disaster Management and Environmental Emergencies Service ; Thematic Mapping and Remote Sensing Bureau; Botanical Garden; Regional department for the development and restoration of the Fouta Djallon massif; Center for Rural Forestry and Promotion of Community and Private Forests)
- **Environment and Water and Forest Programs and Projects**
- **Deconcentrated services** (Regional Inspectorates for Environment and Water and Forests; Prefectural departments for Environment and Water and Forests and Municipal departments for Environment and Water and Forests)

4.5.3. Environmental legal framework

a) Environmental and social impact assessment procedures in Guinea

In Guinea, ÉIE procedure has its legal basis in: (i) Ordinance 045 / PRG / 87 of May 28, 1987 on the Code for the Protection and Development of the Environment; (ii) Decree 199 / PRG / SGG / 89 of November 8, 1989 codifying impact studies; (iii) Order No. 990 / MRNE / SGG / 90 of April 31, 1990 on the content, methodology and procedure of the environmental impact assessment. The Guinean administrative procedure has four phases:

- the guideline phase, which includes the stages of project notifications and preparation of terms of reference (TORs). This phase begins with the submission of the project notice, during which the promoter sends a correspondence to the Minister in charge of the environment to express his wish to carry out a development project or program. The National Environmental Assessment Service (SNÉE) provides a form for this purpose. The proponent must also submit a technical pre-feasibility study to the SNÉE, which will enable the proponent to know, in particular, the various sources of impacts on the receiving environment and possible solutions. SNÉE then proceeds to a site visit. On the basis of the information contained in the pre-feasibility study and

obtained during the field visit, it prepares SNÉE TOR as required. It shall forward the TORs to the proponent who may retain the approved design office of its choice. The development of the TORs can be carried out by the proponent or its representative (design office); the document produced is validated in this case by SNÉE.

- the environmental and social impact assessment, which is the responsibility of the proponent, is carried out: (i) the interim report; (ii) the technical analysis of the interim impact study report; (iii) the public hearing; (iv) and the drafting of the final report. Throughout the process, SNÉE remains available to participate in meetings with the proponent or its proxy. ÉIE is done in two stages: provisional (but complete) studies and final studies. The proponent submits an interim but complete report to SNÉE, which undertakes an admissibility analysis in consultation with other relevant departments. An Internal Validation Committee (ICA), composed of the executives of SNÉE and those of the technical departments concerned with the issues related to the project, is set up for this purpose. Comments and observations from the CIA are forwarded to the proponent and its consultant for inclusion in the final report. The proponent then receives a list of questions for further study. When the proponent has completed the report by updating the data, if necessary, the proponent files the final report with the Minister, who forwards it to SNÉE for analysis and recommendations. The preparation and organization of the public hearing is the responsibility of the SNÉE, which appoints an investigating Commissioner to conduct the hearing. A news release in the media announces the availability of the report to SNÉE and public places in the project area for consultation and informs the public about a public hearing. This hearing is open to the public in general and particularly to the populations of the project's localities and their nationals. The investigating commissioner draws up a report (minutes) recording the commitments of the parties involved.
- the decision-making phase under the responsibility of the Minister for the Environment is based on the final ÉIE report, the recommendations of SNÉE and the minutes of the Investigating Commissioner. The study will receive the label receivable or non-responsive. When the study is admissible and all the requirements resulting from the analysis of the interim study are satisfied, the Minister authorizes through letter the execution of the project by issuing a certificate of compliance;
- the supervision, monitoring and control phase, as appropriate, for different entities. Thus, the promoter is responsible for carrying out supervision and environmental monitoring. The proponent is responsible for the implementation of mitigation or compensation measures for negative impacts, enhanced benefits and the implementation of the Environmental and Social Management Plan (ESMF). Monitoring of compliance with the provisions of the laws and standards during construction supervision and compliance with the promoter's commitments (recorded in the monitoring program) are the responsibility of SNÉE.

b) International environmental legislation

Guinea has signed a number of international environmental treaties, including those relating to biodiversity, climate change, desertification, endangered species, dispersal of hazardous

products, the law of the sea, protection of the ozone layer to wetlands. Table 5 below summarizes those for the PIDACC / BN program.

Table 5: Summary of Conventions

Title	Regulated area
Convention concerning the Protection of Workers against Ionizing Radiation	Ionizing Radiation
Convention on the prevention and control of occupational hazards caused by carcinogenic substances and agents Cartagena Protocol on Biosafety	Carcinogenic substances and agents Use of biotechnology
Convention concerning the Protection of Workers against Occupational Hazards arising from Air Pollution, Noise and Vibration at Work Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Bonn Convention	Occupational risks Preservation of endangered flora, Management of migratory species
Convention on the Protection of the World Cultural and Natural Heritage African Convention for the Conservation of Nature and Natural Resources	Natural Heritage, African Natural Resources
Vienna Convention on the Protection of the Ozone Layer Montreal Protocol on Substances that Deplete the Ozone Layer	Air pollution
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal Bamako Convention on the Prohibition of the Import into Africa of Hazardous Wastes, the Control of Transboundary Movements and the Management of Hazardous Wastes Produced in Africa United Nations Framework Convention on Climate Change Kyoto Protocol to the United Nations Framework Convention on Climate Change	Cross-border movement of hazardous waste Management and adaptation to climate change
International Union for the Conservation of Nature and Natural Resources Convention on Biological Diversity	Environmental Protection, Biological Resources
Convention on Persistent Organic Pollutants (POPs)	Management of products constituting POPs

c) Other legal texts relevant to the Project

Other relevant legal texts for the Project are:

(i) Law L / 98 n ° 017/98 on the Urban Planning and Building Code;

(ii) Ordinance No. 019 / PRG / SGG / 92 of March 30,1992 on the Land and Property Code;

(iii) Law L / 95/23 / CTRN of June 12, 1995 establishing the Merchant Shipping Code;

- (iv) Ordinance No. 038 / PRG / 85 of February 23, 1985 on the Code of Maritime Fishing;*
- (v) Law L / 96/007 / of July 22, 1996 on the Organization of Inland Fishing;*
- (vi) Law L95 / 036 / CTRN of June 30, 1995 on the Mining Code;*
- (vii) Law L / 2006 / AN of May 15, 2006 on the Local Government Code.*

4.6. MALI

4.6.1. Environmental and Social Policy Framework of Mali

The project's environmental and social policy framework addresses a number of national strategy papers, the most relevant of which are the following:

a) Poverty Reduction Strategy Paper

The Strategic Framework for Growth and Poverty Reduction (CSCR, 2007-2011) represents the single medium-term reference framework for Mali's development policy and the main reference for all TFPs in their support to the country. Its central objective is to "promote redistributive growth and poverty reduction through the revitalization of productive sectors and consolidation of public sector reforms". More specifically, CSCR aims to accelerate economic growth at a rate of 7% per year (2007-2011) and to improve the welfare of Malian populations.

CSCR proposes three strategic guidances: (i) infrastructure and productive sector development; (ii) the pursuit and consolidation of structural reforms (relating to the structure and functioning of the State and its institutions, and (iii) strengthening the social sector. One of the main lines of action of CSCR is the management of the environment and natural resources. To this end, the National Policy for the Protection of the Environment (PNPE) seeks to integrate environmental protection into all decisions affecting the design, planning and implementation of policies and programs.

b) National Policy for the Protection of the Environment (PNPE)

The aim of the national environmental policy is to "ensure a healthy environment and sustainable development by taking the environmental issue into account when deciding on the design, planning and implementation of policies, programs and Development activities, by empowering all actors".

It provides the framework for effective and sustainable environmental management and planning. This framework will enable Mali to address and manage all environmental issues. Environmental issues will be solved through the implementation of the action programs at national (national action plans), regional (regional action programs) and local (local action programs), legislative, legal and regulatory reforms and appropriate institutional reforms.

The approach adopted in environmental policy has the particularity of defining the guidelines in this field, not as a set of sectoral measures disconnected from other sectors of activity but rather as transversal lines of action bringing synergy, to integrate the various national policies

and programs into a comprehensive and coherent framework for action, with a view to achieving sustainable development.

c) National Strategy for the Conservation of Biodiversity

The first element to cite in terms of biodiversity in Mali is that of its wealth. Its natural heritage is marked by the existence of: 1,730 species of woody plants; about 640 species of birds; 130 species of terrestrial fauna; more than 140 fish species (including 24 endemic species, Sources). The National Biodiversity Strategy and its Action Plan aim, inter alia, to: (i) have a directory of areas of particular interest to flora, fauna and ecosystems; (ii) improve knowledge on the functioning of ecosystems and on animal and plant species of ecological or economic interest; (iii) improve knowledge of the national genetic heritage of crops, wild relatives, domestic animal breeds and wildlife; (iv) promoting the sustainable use of fauna and flora; (v) ensure in situ conservation of cultivated local plants and endangered breeds of animals.

d) National Program of Action for Adaptation to the Adverse Effects of Climate Change

The National Program of Action for Adaptation to the Adverse Effects of Climate Change (NAPA) was finalized and validated in July 2007 under the guidance of the National Meteorological Department (DNM) related to the Ministry of Equipment and transport. Its development was carried out by a group of experts and in a broadly participatory manner. The Program identifies nineteen priority adaptation options presented in the form of project sheets.

e) Strategic Investment Framework for GDT in Mali

The Strategic Investment Framework for GDT in Mali is an original national intersectoral initiative bringing together the main government sectors involved in land management and whose activities have an impact on the environment and rural populations. The overall objective is to reverse long-term trends in land degradation with the involvement of all actors. Specific objectives are: (i) to enhance good GDT practices to combat land degradation and loss of biodiversity and to adapt to climate change; (ii) to strengthen the technical and financial institutional capacities of the actors concerned with a view to integrating GDT into the country's development policies.

f) National Health and Environment Policy

It aims to promote and maintain a health-friendly environment for sustainable development by 2020 through (i) drinking water supply; (ii) the management of solid and liquid wastes; (iii) control of water quality; (iv) control of exposure to environmental contaminants. It is in keeping with the spirit of certain international agreements and conventions, including: (a) the International Decade for Drinking Water and Sanitation; (b) the Convention on the Rights of the Child in its component Water - Hygiene Sanitation; (c) the Stockholm Convention on Persistent Organic Pollutants (POPs); etc. In addition, there are deconcentrated technical services in the field of water, hygiene and sanitation and the existence of training modules in this field.

g) National Forest Policy

The national forest policy is intended to contribute to the achievement of the broad objectives of economic growth, food self-sufficiency, income growth and environmental protection) in its area of competence, namely forest resource management, wildlife and fisheries. It is based on three specific options for forestry, wildlife and fisheries resources: a social option aimed at empowering rural people for sustainable management of resources by recognizing their capacity to manage these resources rationally, they will need; an economic option which aims to promote land investment by co-financing the State if necessary and by providing guarantees of land tenure security; an ecological option that aims to conserve genetic diversity, diversity of production and biological diversity.

Forestry policy is implemented through several programs and projects, including the decentralized forest management program (GEDEFOR), the main objective of which is to "contribute to the decentralized management of forest resources and increase the incomes of disadvantaged rural populations (men and women) to ensure the sustainability of these resources".

GEDEFOR program aims at the rational, decentralized (and inter-communal as far as possible) management of forest resources at the level of 100 selected communes in forest areas. GEDEFOR focuses on: the development of natural resources in general and forest resources in particular by organized rural populations; the transfer of the management of forest resources from the State to local and regional authorities in accordance with the laws and regulations of decentralization; the deconcentration of State structures responsible for advising CTs in relation to the DNCT; the emergence of communal forest services, which will ultimately have to assume a close control of forestry operations with the support of the decentralized departments of the National Department for Nature Conservation. " PGRN-CC - CC will have to establish Synergies with GEDEFOR to capitalize on experiences and avoid duplications.

h) Decentralization Policy

The general process of decentralization, began independently but timidly. In 1991, it led to the creation of more than 703 communes throughout the country. The Rural Commune serves as an intermediary between the communities that want to manage a forest and the technical services to be mobilized. This prerogative is provided to it by decree n ° 96-0484 / P-RM determining the conditions and the modalities of making available to the Local Authorities of the deconcentrated services of the State.

The guidelines on decentralization are provided in Act No. 93-008 of February 11, 1993. This law defines the conditions for the free administration of local and regional authorities; it is the transfer of a number of powers and means from the "State to local authorities by making the latter more autonomous and more accountable for their own actions.

Henceforth, the state's tutelage over the communities changed in nature: the community left the context of subordination and placed itself in that of the ex post control of the acts of the local executive.

The Regions, Districts, Communes are the territorial communities. They are endowed with legal personality and financial autonomy. The District of Bamako enjoys a special status.

The Municipal Council, elected by the population and including the Mayor and his deputies, manages the affairs, property and staff of the Commune. This type of organization is found at the level of the District and the Region.

i) Policy on Decentralization and Territorial Development

The aim of the decentralization policy is to strengthen the process of democratization of society, to adapt the missions and the organization of the State to the need to promote local initiatives. It aims to establish a framework for the development and organization of space compatible with the powers transferred to local and regional authorities in the design, programming and implementation of economic, social and cultural development activities for regional and local interest. The operational framework for implementing decentralization is set out in the outline of the spatial planning scheme (ESAT, 1995) and the preliminary draft regional planning and development plans (AP-SRAD, 1997).

The main objective of these tools is to give economic development planning a territorial dimension, within the framework of an organization of space taking into account the requirements arising from decentralization. The strategic guidelines identified in ESAT are structured around four main axes: (i) rebalancing the urban development process by promoting secondary support centers that could hamper the expansion of large cities; (ii) concentration of industrial activities in a limited number of urban centers, with a view to promoting better control of pollution phenomena; (iii) strengthening the regional integration process through the establishment of linking infrastructures and the interconnection of regional urban systems; (iv) safeguarding the natural environment and threatened ecosystems.

j) Agricultural Development Policy of Mali

In December 2005, the Malian government adopted the Agricultural Guidance Law, which determines and drives Mali's agricultural development policy in the long term. Its aim is to promote sustainable, modern family farming and farming through the creation of an environment conducive to the development of a structured agricultural sector. The general objectives of Mali's agricultural development policy are to contribute to: (i) the economic and social promotion of rural populations; (ii) food sovereignty of the country; (iii) reduction of rural poverty; (iv) modernization of family farming and development of agro-industry, (v) environmental protection and sustainable management of natural resources, (vi) increasing the contribution of the rural sector to (vii) balanced and coherent agricultural development in the territory.

k) National Water Policy (PNE)

The current water resources management framework is politically marked by the existence of a national water policy adopted in 2006 with the overall objective of contributing to the socio-economic development of the country by providing appropriate solutions related to water, while complying with the sustainable management of water resources. Its specific objectives include: (i) meeting the water needs, in quantity and quality of the growing population, ensuring respect for aquatic ecosystems and preserving the needs of future generations; (ii) to contribute to the development of agro - sylvo - pastoral activities by their security against climatic hazards, (iii) to protect human beings and property against the aggressive actions of water and to ensure the protection of water resources against various pollution. PNE provides strategic guidelines that should serve as a framework for sustainable management of the country's water resources while respecting the balance of the physical environment and aquatic ecosystems. One of the instruments of implementation for this policy is the National Program of Hydraulic Development.

l) National Policy for Livestock Development (PNDE)

The national livestock development policy strategies (developed in May 2003) are in line with the guidelines set out in the Poverty Reduction Strategy Paper and the Rural Development Sector Master Plan. In its main strategic areas, PNDE advocates :(i) a better exploitation of pastoral resources; (ii) rational and sustainable management of pastures and water points; (iii) establishment of pastoral management schemes; (iii) the restoration of degraded lands and glacis; (iv) the development of monitoring of pastoral ecosystems; (v) control of bush fires; (vi) the regeneration and enrichment of pastoral trails.

4.6.2. Legislative and Regulatory Framework

The legal framework having a direct and / or indirect relationship with the project involves several laws and regulations at national level as well as international agreements, treaties and conventions ratified by Mali.

m) International legal framework

Mali has ratified a number of international conventions on the environment, reflecting the country's acceptance of national legal instruments to implement into its own legislation the spirit and fundamental principles of those conventions.

The international conventions to which Mali has subscribed and whose program could contribute to the implementation through the various activities identified are the following:

- The United Nations Convention on Biological Diversity (June 1994);
- United Nations Framework Convention on Climate Change (1992);
- The United Nations Convention to Combat Desertification (CCD) (1994);
- The African Convention on the Management of Fauna and Flora in its Habitat;
- The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979);
- Convention for the Protection of the World Cultural and Natural Heritage (1972) ;
- The Ramsar Convention on Wetlands and Bird Species living there (1971) ;
- The African Convention for the Conservation of Nature and Natural Resources.

- The International Convention on Trade in Endangered Species of Animal and Plant Species (CITES) (1973).

Through sub-regional integration, Mali is committed to the Common Environment Improvement Policies of ECOWAS and WAEMU. The implementation of the WAEMU Regional Biosafety Program has helped to elaborate the draft texts of application for law enforcement on biosafety in Mali. As regards international waters, the Government of Mali has been actively involved in the development of a shared vision of the resources of the Niger River under the leadership of the NBA.

At the continental level, Mali has taken part in three (3) major initiatives: (i) the preparation of the Great Green Wall project; (ii) the development of the NEPAD Environmental Initiative; and (iii) a common vision on combating climate change under the auspices of the African Ministerial Conference on Environment (CMAE).

n) National Environmental Legislation

The institutional environment framework is under the responsibility of the Ministry of Environment, Water and Sanitation (MEEA), which relies on the National Directorate for the Control of Pollution and Nuisance (DNACPN), the National Directorate of Water and Forests (DNEF) and the National Directorate of Hydraulics (DNH). A range of agencies is assisting MEEA in its work. These include the Agency for Environment and Sustainable Development (AEDD), the Niger River Basin Agency (ABFN) and the National Agency for the Management of Mali's Wastewater Treatment Plants (ANGESEM). The National Commission on the Environment (CNE) integrates civil society and makes recommendations related to the preservation of the environment while the National Committee on Climate Change supports the government in formulating its policy.

The National Legal Framework includes constitutional provisions and various legislative and regulatory texts for better governance of the environment.

(i) The Constitution

The Constitution of February 25, 1992 is based on a number of democratic principles. Its preamble states that "the sovereign people of Mali undertake to ensure the improvement of the quality of life, the protection of the environment". Similarly, Article 15 states that "Everyone has the right to a healthy environment. The protection of the environment, the defense and the promotion of the quality of life are a duty for all and for the State".

(ii) Legislative and regulatory texts

They are numerous and varied and relate to the life environment, the management of forest, wildlife, pastoral and fishery resources, water, land, sound pollution, solid waste, waste water and sludge, atmospheric pollutants, environmental and social impact assessments, classified facilities for environmental protection, safety in biotechnology, etc. The main laws and regulations promulgated in the field of environment and natural resources management are:

Legal Texts

- (i) *Ordinance No. 045 / PRG / 87 of May 28, 1987 on the Environment Code;*
- (ii) *Law L / 99/013 / AN on the Forest Code ;*
- (iii) *Law L / 97/038 / AN of December 09, 1997 on the Code for the Protection of Wild Animals and Regulation of Hunting;*
- (iv) *Law L / 97/020 / AN 97 on the Code of Public Health;*
- (v) *Law L / 96/012 of July 22, 1996, amending and supplementing Ordinance No. 022 / PRG / 89 of March 10, 1989 on penalties under the Environment Code*
- (vi) *Law L / 96/010 / AN / of July 22, 1996 on the regulation of pollution taxes applicable to classified establishments;*
- (vii) *Law L / 96/009 of July 22, 1996 on the management of natural and man-made disasters;*
- (viii) *Law L / 95/46 / AN / of August 29, 1995, establishing the Code of Livestock and Animal Products.*
- (ix) *Law L / 95/51 / AN / of August 29, 1995 on the Pastoral Code ;*
- (x) *Law L / 95/036 / CTRN establishing the Mining Code of June 30, 1995;*
- (xi) *Law L / 94/005 / CTRN of February 14, 1994 on the Water Code ;*

Regulatory texts

- (i) *Decree No. 199 / PRG / SGG / 89 of November 8, 1989 codifying impact studies;*
- (ii) *Decree D / 97/287 / PRG / SGG of December 24, 1997 regulating the management and control of harmful and hazardous chemicals;*
- (iii) *Decree D / 97/286 / PRG / SGG of December 24, 1997 on the organization and modality of operation of the Environmental Fund;*
- (iv) *Decree D / 93/149 / PRG / SGG of August 20, 1993 on the allocation, composition and functioning of the National Environment Council, amended and supplemented by Decree D / 97/241 / PRG / SGG of October 16, 1997;*
- (v) *Decree No. 200 / PRG / SGG / 89 of November 8, 1989 on the legal system of installations classified for the protection of the environment;*
- (vi) *Decree No. 201 / PRG / SGG 89 of November 8, 1989 on the preservation of the marine environment against all forms of pollution;*
- (vii) *Order No. 8993 / SGG / of October 11, 1993 establishing the technical nomenclature of classified installations;*
- (viii) *Order No. 990 / MRNE / SGG / 90 of April 31, 1990 on the content, methodology and procedure of the environmental impact assessment.*

o) Legislation specific to the study of environmental impacts

The obligation to carry out the environmental assessment is regulated by the provisions of Decree N08 of June 25, 2008 laying down the rules and procedures relating to the Environmental and Social Impact Assessment. This Decree on EIE provides a significant step forward and constitutes an important legislative instrument for the protection of the environment applicable to the various sectors of activity affecting the environment: natural

resources and urban environment, industrial and artisanal activities, mining and agricultural activities, electric transport, etc.

The decree insists on the obligation to carry out the environmental impact assessment and the compliance with the procedure for all the projects, whether public or private, the realization of which is likely to harm the biophysical and human environments. In addition, the implementing provisions of legislation on environmental and social impact assessment are based on the following principles:

- the environmental assessment is an integral part of the projects and programs and the results of the impact assessment are presented in the approval document for obtaining the administrative authorization;
- the proponent is responsible for conducting the study, preparing ÉIE file and ensuring the cost;
- the proponent also ensures the implementation of measures to correct, reduce and / or compensate for the negative impacts of the project as well as the internal monitoring / control according to the required standards.

The Decree specifies the important elements concerning the scope of impact assessments, the procedural requirements for certain types of projects, the content of the reports, the obligation of public consultation, the development of the Environmental and Social Management Plan (ESMFS), including the costs of mitigation measures, the role of stakeholders and implementation timelines. For all projects subject to EIE, the execution of the works is subject to obtaining an environmental permit issued by the Minister for the Environment. The decree classifies development projects into three (3) categories;

- Category A Projects: Projects that can have very negative, generally irreversible, unprecedented impacts, most often felt in a wider area than the sites under study;
- Category B projects: Projects whose negative impacts on the environment and on populations are less severe than those of category A projects. These impacts are of a defined nature and are rarely irreversible.
- Category C projects: Projects where the negative impacts are not significant on the environment.

Projects in categories A and B are subject to the Environmental and Social Impact Assessment (EIES). Projects in category C are subject to a simplified impact assessment, endorsed by an environmental and social impact statement. Policies, strategies and programs are subject to a strategic environmental assessment. At the regulatory level, the new decree regulating EIEs is a significant step forward in the field of procedures, but still has limitations in terms of project classification process.

p) National legislation and cross-cutting legislation

Other texts may relate to the activities PGRN:

- (i) *Act No. 85-40 / AN-RM of July 26, 1985, on the protection and promotion of the national cultural heritage;*

- (ii) Decree No. 99-0321 / P-RM of October 04, 1999, laying down the procedures for classifying and decommissioning wildlife reserves, sanctuaries and areas of hunting interests. The decommissioning of any part of the classified land of the State requires a compensatory classification of land with an area equivalent to that decommissioned;
- (iii) Decree N ° 00-022 / P-RM of January 19, 2000, laying down the procedures for classifying and decommissioning forests, reforestation areas and protection perimeters in the forest land of the State;
- (iv) Decree N ° 01-394 / P-RM of September 06, 2001 which defines the purpose of solid waste management and the concepts related to this form of pollution;
- (v) Decree N ° 01-397 / P-RM of September 6, 2001, which defines the purpose of the management of atmospheric pollutants and the concepts related to this form of pollution;
- (vi) Decree N ° 01-396 / P-RM of September 06, 2001 which defines the object of the management of noise nuisance, the concepts related to this form of nuisance;
- (vii) Law N ° 92-013 / AN-RM of September 17, 1991, establishing a national system of standardization and quality control which aims to ensure: the preservation of health and the protection of life; safeguarding the safety of human and property; improving the quality of goods and services; environmental protection ; the elimination of technical barriers to trade;
- (viii) Decree N ° 90-355 / P-RM of August 08, 1990, laying down the list of toxic waste and implementing provisions of Law N ° 89-61 / AN-RM;
- (ix) Ordinance No. 99-032 / P-RM on Mining Code in the Republic of Mali and its Decrees 99-255 and 99-256.

q) Specific Legislation and Regulation to Land Management

The Domanial and Land Code determines the different types of areas and the conditions and tenure of expropriation. These provisions are supplemented by Law N ° 95-034 of April 12, 1995, on the Code of Territorial Communities in Mali. The essential texts relating to land are given below:

- (i) Law N ° 85-53 / AN-RM of June 21, 1985, establishing administrative constraints on town planning;
- (ii) Act No. 93-008 / AN-RM of February 11, 1993 determining the conditions for the free administration of local and regional authorities, amended by Act No. 96 056 of October 16, 1996 and amended by Act No. 99037 of August 10, 1999;
- (iii) Law n ° 95-034 / AN-RM of April 12, 1995 on the code for local and regional authorities, amended by Act No. 98 010 of June 19, 1998 and amended by Act No. 98 066 of December 30, 1998 ;
- (iv) Law n ° 96/050 of October 16, 1996 on the principle of setting up and managing the land of local and regional authorities ;
- (v) Law n ° 96-059 of November 04, 1996 on the creation of municipalities;
- (vi) Law n ° 035 of August 10, 1999 establishing local and regional authorities for districts and regions;
- (vii) Laws n ° 95-034 of April 12, 1995, 98-010 of June 15, 1998 and 98-066 of December 30, 1998 on the code of local and regional authorities;

- (viii) *Act No. 96-050 of October 16, 1996 on the principles for the establishment and management of the land of local and regional authorities;*
- (ix) *Law N ° 06-40 / AN-RM on the Law of Agricultural Guidance;*
- (x) *Ordinance N ° 00-027 / P-RM of March 22 , 2000 on the Domanial and Land Code, amended and ratified by Law N ° 02-008 of February 12, 2002;*
- (xi) *Decree N ° 01-040 / P-RM of February 02, 2001 determining the forms and conditions for the allocation of land in the private real estate domain of the State;*
- (xii) *Decree N ° 01-041 / P-RM of February 02, 2001 fixing the modalities of the allocation of occupation license;*
- (xiii) *Decree N ° 02-111 / P-RM of March 06, 2002 determining the forms and conditions of management of land in public real estate domains of the State and Territorial Communities;*
- (xiv) *Decree N ° 02-112 / P-RM of March 06, 2002 determining the forms and conditions of allocation of land in the private real estate land of local and regional authorities;*

r) *Legislative and Regulatory Management of Natural Resources*

Among the relevant texts there are:

- (i) *Act No. 95-004 / AN-RM of January 18, 1995, laying down conditions for the management of forest resources; this law lays down the general conditions for the conservation, protection, development and exploitation of the forest resources of the national forest estate*
- (ii) *Law n ° 95-031 / AN-RM of 20/03/1995 laying down the conditions for the management of wild fauna and its habitat, which lays down the general conditions for the conservation, development, exploitation and protection of wildlife and its habitat in the national wildlife area;*
- (iii) *Decree No. 96-050 / P-RM of 14/02/1996 concerning the procedures for classifying wildlife sanctuaries and reserves and areas of hunting interest.*
- (iv) *Law n ° 02-006 / AN-RM of 31/01/2006 relating to the water code. Article 2 of the Water Code sets out rules for the use, conservation, protection and management of water resources.*

s) *Preservation of public health and hygiene and quality standards*

The legislation is mainly in General Decrees Nos. 3564 and 3565 of April 22, 1956, relating to hygiene and safety in mines, quarries and their dependencies; as well as in Law No. 99 / AN-RM of August 03, 1961, on the Penal Code, particularly in its Article 226 specific to domestic hygiene

Law N ° 92-013 / AN-RM of September 17, 1991, establishing a national system of standardization and quality control which aims to ensure: the preservation of health and the protection of life; safeguarding the safety of human beings and property; improving the quality of goods and services; environmental protection and the elimination of technical barriers to trade.

Act No. 01-020 of May 30, 2001 on pollution and nuisance establishes the application of the Polluter-Pay principle, which aims to encourage promoters to implement good environmental practices and to invest in or use cleaner technologies.

t) Labor Code

Work is protected at national level by the code of the same name which defines the nature of the contract of employment (articles 18 and 19) and the conditions required for its conclusion (articles 14 to 17), implement it (article 20), suspend it, (articles 34 to 38) and terminate it (39 to 56). In addition to the rules on the employment contract, it regulates professional institutions and freedom of association (Articles 232 to 279).

4.6.3. Institutional Framework for Environmental Governance

Natural resources constitute, in Mali, the sector of socio-economic development involving a diversity of actors. Their management, mobilization and use appeal to different spheres of the economy. This explains the multiplicity of actors involved in the natural resources sector. Several ministerial departments in charge of the issues of these resources are requested within the limits of their areas of competence. These include: Ministry of the Environment, Sanitation and Sustainable Development; Ministry of Energy and Water; The Ministry of Rural Development; Ministry for Land use Planning and Population; Ministry of Mines; Ministry of Urban Planning and Housing; Ministry of Equipment for Transport and Opening up; Ministry of Higher Education and Scientific Research; Ministry of Employment of Youth and Civic Building; Ministry of Health and Public Hygiene; Ministry of Economy and Finance, etc.

4.7. NIGER

The national environmental policy framework is marked by multilateral agreements, guidance and planning documents, and legislation.

4.7.1. National Policy on Environmental Management

a) *The National Environment Plan for Sustainable Development (PNEDD)*

The PNEDD is the National Agenda 21. It was drafted and adopted by the Government in 1998 by Decree No. 2000-114 (bis) / PRN / PM of 21 April 2000. The purpose of the PNEDD is to broaden development options and sustain them for future generations. Its aim is to create favorable conditions for improving food security, solving the domestic energy crisis, improving sanitary conditions and economic development of the population. To achieve this, the PNEDD pursues four (04) complementary sub-objectives:

- To ensure a more rational management of natural resources in the context of combating desertification by promoting a more systemic approach to the issue;
- To integrate environmental concerns into the definition of policies, programs and projects in each of the main development sectors;
- To foster the involvement, empowerment and participation of people in the management of resources and their living space, thus contributing to the preservation and improvement of their living environment;

- To foster the development of an effective partnership between stakeholders interested in the issue of environment and sustainable development in Niger.

As part of the implementation of the six priority programs of the PNEDD, sector strategies with links to climate change have been developed to support the process of sustainable development in Niger. The six (06) priority programs are:

- the National Action Program for Combatting Desertification and Natural Resource Management;
- the Biological Diversity Management Program;
- The Climate Change and Variability Program;
- The Water and Sustainable Development Program;
- The Urban Environment and Living Framework Program;
- The Energy and Sustainable Development Program.

The strategies developed at the level of these programs are:

- The National Strategy and Action Plan on Renewable Energies (SNPA / ER) adopted in accordance with Decree No. 2004-031 of 30 January 2004, to help Niger to achieve its energy objectives. That decree is revised in 2009 by the Ministry of Mines and Energy, the Renewable Energy Strategy and its Action Plan, take into account new emerging issues at the international level, namely biofuels, waste and climate change;
- The Urban Environment and Living Environment Strategy (SNEU/CV) adopted in September 2001 aims at the following objectives:
 - Better control of urban growth;
 - Improving the living conditions of urban populations;
 - Promote a real change in mentality and attitude towards better use of urban infrastructures and rational management of the urban environment;
 - serve as a tool for mobilizing all resources, particularly at the national level;
 - Establish a pole of exchange of information and experiences.
- Strategy and action plan on Biological diversity that aims to preserve the multiple functions of biological diversity and its components for their sustainable use in order to improve the living conditions of households.
- National strategy for access to modern energy services (SNASEM);
- The overall objective of the National Strategy and Action plan on climate variability and climate change (SNPA/CVC) to contribute to the stabilization of the concentration of greenhouse gases (GES) in the atmosphere at a level that prevents harmful anthropogenic disturbance of the climate system.

Specific Objectives

- To develop a national policy to protect the climate system against human-induced change and ensure its implementation;
- To improve the system for collecting greenhouse gas data;
- To streamline greenhouse gas emissions through the implementation of mitigation measures in major emission sectors;

- To protect the most vulnerable socio-economic sectors and consider adaptation measures to climate change;
- To promote the generation and transfer of reliable alternative technologies that mitigate GHG emissions in the most emitting sectors;
- To develop and implement a conscious information and training program on climate change;
- To promote regional and international scientific and technical cooperation in the field of climate change.

b) *The National Action Program for Combatting Desertification (PAN/LCD-GRN)*

The improvement and sustainability of productive capital (soil, water, etc.) on the one hand, and that of the living environment on the other hand, are the main issues of the (LCD-GRN) in Niger. We see today that the productive capital of the country is no longer able to meet our basic needs, let alone give up an investment. Thus, by making the sustainability of this capital the main issue, the (PAN/LCD-GRN) aims at those objectives defined below, in order to allow a happy mutation in the strategies implemented for sustainable management of the environment. It is basically:

- to identify the factors contributing to desertification and the concrete measures to be taken to combat it and mitigate the effects of drought;
- to create favorable conditions for improving food security, solving the domestic energy crisis, economic development of the population and empowering the latter to manage natural resources.

To achieve these overall goals, the (PAN/LCD-GRN) has set the following specific objectives:

- analyze and monitor factors contributing to drought and desertification;
- promote sustainable management of the natural resources of the terroirs (organize, train and involve people in the sustainable management of natural resources);
- improve the production and living conditions of rural communities through, inter alia, the adoption of more appropriate technical routes;
- ensure adequate funding for activities under the various sub-programs.

c) *National action Program for Climate Change adaptation (NAPA)*

The development of PANA is within the framework of the implementation of the National Strategy and Action Plan for Climate Change and Variability (SN/PACVC), which was drafted in April 2003 and adopted in March 2004. This Strategy is part of the Climate Change and Variability Program, one of the six priority programs of the National Environment Plan for Sustainable Development (PNEDD).

The development and implementation of PANA in Niger is also part of the implementation of the United Nations Framework Convention on Climate Change CCNUCC, which Niger signed and ratified on 11 June 1992 and 25 July 1995 respectively. The overall objective of PANA is to contribute to mitigating the adverse effects of climate

variability and change on the most vulnerable populations in the context of sustainable development. It provides an overview of the content of priority activities to address urgent and immediate needs and concerns for adaptation to the adverse impacts of climate change.

The specific objectives set by the PANA are:

- to identify priority actions based on urgent and immediate needs for adapting to the adverse effects of climate variability and change
- to ensure a wide dissemination of adaptation activities to partners, stakeholders and beneficiaries;
- to strengthen the coping capacities of communities affected in vulnerable areas;
- to develop synergies between the different strategic frameworks for adaptation to climate variability and change;
- to contribute to the preparation of Niger's Second National Communication on Climate Change.

4.7.2. Legislative and regulatory framework

Several texts of laws taking into account the principle of EIE have been adopted by Niger. These include multilateral environmental agreements and the national legal corpus.

a) Multilateral Environmental Agreements

In Niger, variability and climate change contribute to the accentuation of desertification and the degradation of natural resources, making all sectors of national socio-economic life vulnerable. This vulnerability poses itself in terms of enormous challenges to be faced by the political authorities, namely:

- The search for food security in the most unfavorable climatic conditions;
- The search for a rational management of natural resources;
- Combating the effects of drought;
- Combating poverty and the low level of productivity in agro-sylvo-pastoral sectors.

To overcome these challenges and ensure sustainable development, Niger has signed and ratified international conventions and agreements, the implementation of which has resulted in the development of a number of national strategies, plans and programs.

In the area of climate variability and change, Niger has signed and ratified several Multilateral Environmental Agreements whose compliance with the provisions remains a requirement for the PAC-RC.

b) The National Legal Corpus

- (i) ***The 25 November, 2010's Constitution***, which states in Article 34 (Title II) that "Everyone has the right to a healthy environment. The State has an obligation to protect

the environment for the benefit of present and future generations. Everyone is obliged to contribute to the preservation and improvement for the environment in which s/ he lives”.

- (ii) **Law n ° 98-56 of 29 December, 1998**, laying down the framework law on environmental management, constitutes the overall legal framework for the management of environmental issues through measures relating to the protection of the atmosphere, water, soil and human settlements, waste management, hazardous or harmful chemicals, noise and odor nuisance, industrial and natural hazards, combating desertification and mitigating the effects of drought. Article 55 of the Environmental Code stipulating: “The Minister in charge of Agriculture, in consultation with the Ministries concerned, shall draw up a list of fertilizers, pesticides and other chemical substances authorized for Agricultural purposes. It shall also determine the permissible quantities and the methods of use compatible with the maintenance of soil quality or other receiving media and with the preservation of the ecological balance and human health”. Article 31 of the framework law provides that development activities, projects and programs which, because of their size or their impact on the natural and human environment, may be detrimental to the latter, are subject to the prior authorization of the Minister Responsible for the environment. This authorization shall be granted on the basis of an assessment of activity consequences, project or program updated by an environmental impact assessment (EIE) prepared by the proponent and approved by the Minister responsible for the environment. Article 52 of the Act provides that soil, subsoil and wealth contained therein, as limited renewable or non-renewable resources, shall be protected from all forms of degradation and managed in a rational manner. Finally, Articles 53, 56, 57, 58 and 62, deal with other aspects of the protection of soil, flora and fauna. Articles 78 to 85 deal with the management of natural resources;
- (iii) **Law No. 2008-37 of 10 July, 2008**, amending and supplementing Law No. 61-37 of 24 November 1961 regulates expropriation for public utility and temporary occupation, in relation to the displacement of populations in context of an operation implementation. According to article 1 of Law 2008-37 of 10 July 2008 " Expropriation is the procedure whereby the State may, for a public purpose and subject to a fair and prior indemnity, compel any person to assign to it the ownership of an immovable property". Paragraph 3 provides that when the expropriation entails a displacement of the population, the expropriating party is obliged to set up a plan for the resettlement of the populations affected by the operation.
- (iv) **Law n ° 2004-040 of June 8, 2004, laying down forestry law**: This law lays down rules for the protection of natural resources and makes forest resources a national asset and, as such, everyone is required to respect and contribute to their conservation and regeneration.
- (v) **Law No. 2001-032 of 31 December, 2001, setting out the policy for regional planning**. This law, which establishes the legal framework for all interventions by the State and other actors having the effect of structuring, occupying and using the national territory and its resources, provides in Article 34, “The State ensures that the environmental dimension

is taken into account when formulating programs and projects, including environmental impact assessments that integrate biological, socio-economic and cultural aspects. It also ensures compliance with international conventions in this field by all development actors.”

- (vi) **Law No. 61-37 of 24 November 1961 on the regulation of expropriation on account of public utilities and the temporary occupation amended and supplemented by Law n° 2008-37 of 10 July 2008**, relating to involuntary displacement and Resettlement of the population, provides an evidence of public utility and payment of a fair and prior compensation;
- (vii) **Ordinance N° 2010-09 of 1 April 2010 on the Water Code in Niger**. This Ordinance recognizes that every citizen has the fundamental right of access to water (Article 4), and in Article 6 declares that water is an ecological, social and economic good whose preservation is of general interest and of which use in any form requires that one contributes to the effort of the community and/or the State to ensure its conservation and protection. Sections 43 and 45 of the same order shall submit to authorization, declaration or concession of use of water, hydraulic fittings, and in general, the installations, works and activities carried out by any natural or legal person, public or private.
- (viii) **Ordinance 2010-029 of 20 May 2010 on pastoralism**, which states in Article 4 that: “Livestock breeders have the obligation to monitor and control their animals. The exercise of pastoral rights is subject to the obligation of the environment preservation, in accordance with the requirements of the laws in force ”; Article 5 provides, “Further to compliance with the provisions of this Ordinance, any form of exclusive appropriation of the space in the public domain of the State or local authorities is prohibited. In particular, no rural land lease can be granted if it has the effect of hindering the mobility of pastoralists and herds and their free access to pastoral resources. In all cases, an environmental and social impact assessment, accompanied by an environmental and social management plan approved by the competent authorities, shall be used
- (ix) **Ordinance No. 99-50 of 22 November 1999, fixing the rates of alienation and occupation of State lands in Niger**;
- (x) **Ordinance No. 97-001 of 10 January 1997 on the institutionalization of impact assessments "in the legal framework, as this Ordinance is still in force.**
- (xi) **Ordinance 93-015 of 2 March 1993 laying down guidelines for the rural code**. This Ordinance sets out the policy framework for the State's land policy. It defines the rules for accessibility, the use of natural resources, and sets out the rules that must prevail to achieve an agro-economic performance level ensuring equity in access to natural resources and social peace. The law defined the framework for access to a resource following the content of different rights held on the resource such as: (right of use, right of access, withdrawal, management, control rights). Access is secured by the possibility of

listing these rights by specifying their origin (inherited, acquired by clearing, borrowing, purchase, family, customary or state concession).

As from 2000, a series of implementing texts relating to EIE have been adopted by the Government of Niger. These include:

- (xii) **Decree No. 2010-540 / PCSRD / MEE / LCD of 08 July 2010** on the organization and operation of the Environmental Assessment and Impact Studies Bureau and determining the responsibilities of the Director.
- (xiii) **Decree No. 2000-398 / PRN / ME / LCD of 20 October 2000**, establishing the list of activities, works and planning documents subject to EIE;
- (xiv) **Decree No. 2000-397 / PRN / ME / LCD of 20 October 2000**, laying down the Administrative Procedure for the Assessment and Review of Environmental Impacts.

4.7.1. Institutional framework for environmental management

The ministry responsible for the environment is supported in its mission to develop, implement and control environmental policies by a national consultation body whose functions and organization are set by decree.

Article 35 of Law No. 98-56 of 29 December 1998 laying down the framework law on environmental management provides that "It is hereby established, under the auspices of the Ministry responsible for the environment, an environmental assessment and impact studies office bringing together the various specialists necessary for a proper assessment of the impact assessment report and the consequences of a project on all aspects of the environment". The main ministries and / or institutions that have competence in the implementation of the PIDACC/BN are, inter alia:

The Ministry of the Environment and Sustainable Development, in collaboration with the relevant ministries, is responsible for the design, development and implementation of the policies defined by the Government in the field of water, Sanitation, the environment and combating desertification.

The Ministry of Hydraulics and Sanitation is responsible, in relation to the Ministers concerned, for the design, development, implementation, monitoring and evaluation of national Water and Sanitation policy, in accordance with the guidelines laid down by the Government ". As such, it designs, develops, implements and evaluates development policies, strategies, projects and programs in the fields of water, hygiene and water sanitation.

The Ministry of Public Health, with the Directorate of Public Hygiene and education for health, is responsible for the protection of water points, the control of the quality and the treatment of water, etc. Deconcentrated services are key structures that will be sought in the context of the implementation of health, hygiene and sanitation aspects.

The Ministry of Territorial Development and Community Development, responsible for the implementation of the national policy on spatial planning and community development through its various Directorates concerned.

The Ministry of Agriculture and Livestock, responsible for the implementation of the national policy in the fields of agriculture and livestock in Niger through its various directorates.

The Ministry of Mines and Industrial Development, responsible for the implementation of the policy in the field of classified establishments through the Directorate of classified Establishments.

The Ministry of Energy and Oil is responsible, in connection with the other ministers concerned, of the design, the development, implementation, monitoring and evaluation of energy and hydrocarbon policies and strategies, in accordance with the guidelines set by the Government, including the creation of the necessary conditions for the mobilization of investments for the development of energy potentials, oil and gas companies in the country by promoting them to investors and development partners;

The Ministry of Equipment, responsible for implementing the policy in the field of equipment and infrastructure through the Directorates concerned.

The missions of these different technical ministries are relayed on the ground by the various deconcentrated technical services from the State (regional directorates: hydraulic, environment and combating desertification, regional Office for Environmental Assessment and impact study, health, land use, planning and community development, livestock, etc.) set up at the level of the regions, departments and municipalities of the country.

The Environmental Assessment Office and Impact Studies BEEEEI: Created by Ordinance n ° 97-001 of 10 January 1997 on the institutionalization of IEI in Niger, the BEEEEI is the structure responsible for the administrative procedure for the evaluation and assessment of the environmental impacts of a project. The organization and operation of the BEEEEI as well as the responsibilities of the Director of the BEEEEI, are defined in Ordinance No. 00099 / MESU / DD / SG / BEEEEI / DL of 5 August 2015. It is a decision-support body in the area of environmental assessment. It has competence at national level, on all activities, projects, programs or development plans for which an EIE is mandatory or necessary in accordance with the provisions of Law No. 98-56 of 29 December 1998. The BEEEEI is endowed with members from different specialties in several areas of the environment who are responsible for the proper assessment of the various EIES reports. It is represented in the regions by regional environmental assessment offices and impact studies (BREEEI) housed within the regional Directorate of environment and desertification control. The BEEEEI as part of this study will be the chief organizer with the support of the project proponent, of the public hearings on the environment and the evaluation workshop of the report as well as the environmental and social monitoring of the project's implementation impacts.

The National Council of the Environment for Sustainable Development CNEDD: is responsible for monitoring the implementation of international conventions. Placed under the supervision of the Prime Minister's Office, this council is composed of representatives of the State and the Civil Society. It is responsible for coordinating and monitoring the national policy on sustainable environmental development. It was created by Decree No. 96-004 / PM of 9/01/1996, amended and supplemented by Decree No. 2000-272 / PRN / PM of 4 August 2000 in accordance with chapters 8 and 38 of Agenda 21 , Asking each country that has acceded to the Rio de Janeiro agreements and the Rio Declaration on Environment and Development to establish a coordinating body. Recently, on 27 January 2011, a decree amending and supplementing Decree 2000-272 / PRN / PM of 4 August 2000 was signed by the President of the Supreme Council for the Restoration of Democracy. The purpose of this amendment is to enable the CNEDD to fulfill its mission as a national political focal point for the Rio conventions, including those on climate change, ensuring the integration of the climate change dimension and adaptation into development policies, strategies and programs, as well as the mobilization of the financial resources necessary to implement climate change activities. It is an important body for the implementation of the PAC-CR, because it is in charge of the first component of this project;

Civil Society and Socio-Professional Organizations Active in the Field of Protection Of The Environment And Climate Change: The implementation of PIDACC/BN will involve other non-governmental actors and associations active in the field of the environment and in the defense of consumer rights. Indeed, it should be noted that civil society, represented by individuals and NGOs and associations have a very important role to play in the implementation of the program's activities at the local level. These actors, who justify a proximity presence at the grassroots need to be taken into account for the success of the program's activities. One example is the Nigerian association of Professionals in environmental impact studies.

4.8. NIGERIA

4.8.1. Political framework

Nigeria has developed a National Environmental Action Plan that provides a framework for analyzing, assessing and discussing the interdependence between the environment and the economy in Nigeria. It also assesses the country's environmental priorities and identifies options for mitigating the impact of environmental degradation on the country. All 36 states also have State Environmental Action Plans (Nigeria National Report on Implementation of the UNCCD, 1999).

4.8.2. Nigeria's Environmental Legislative Framework

a) Legal texts for environmental assessment

Decree 86 of 1992 mandates environmental impact assessments for all major new projects. Environmental impact assessment is mandatory for all agricultural projects covering 50

hectares or more. For projects with fewer hectares, the nominator must go through the FEPA (now NESREA) for the selection of the project in order to ensure the level of EIE required or the non-need to proceed with the EIE. For this purpose, sector guides have been developed by the former FEPA to assist project developers in the development of environmental impact assessments with particular emphasis on the meanings and potential impacts of such projects. These guides include procedures for minimizing, eliminating or avoiding adverse impacts as well as monitoring programs to be implemented. The National Environment Act, 1999 and the National Environmental Protection (effluent limitation) Regulations, 1991, are also to be noted; etc. Projects are categorized on a scale from 1 up to 3:

- **1:** very sensitive to the environment or from the point of view of new products; this type of project requires a full environmental assessment and stakeholder consultation.
- **2:** EIE is not mandatory for impact less than for 1, except within environmentally sensitive areas; this type of project is not subject to public consultation.
- **3:** weak impact requires only an internal review at departmental level.

b) Other Environmental Texts Covered By PPAAO

These include: The Land Use Act; The Solid and Hazardous Waste Management Act, 1991; Decree No. 42 of 1988 on hazardous chemical wastes; National Water Quality Procedures and Standards, 1999 and the National Procedures for Environmental Management Systems, 1999.

4.8.3. Institutional framework in Nigeria

a) Institutions responsible for EIES

FEPA was the supreme body for environmental management and conservation of natural resources in Nigeria under Decree 58 of 1988 and Decree No. 59 of 1992. It is now replaced by the National Environmental Standards and Regulations Enforcement Agency (NESREA), which issues approval to consultants and evaluators. Only the research institutions and a limited number of consulting firms of recognized competence are certified. The approved projects are forwarded to the Monitoring Unit, which looks at and monitors the impacts in the field as well as the application of mitigation measures.

b) National Environmental Standards and Regulations Enforcement Agency (NESREA)

It is under the supervision of the Ministry of the Environment. It is the authority responsible for drafting regulations on environmental and social impact assessments on the whole territory of Nigeria, through the Department of Environmental Assessment. The environmental impacts guidelines for assessing exist and are accessible. The department has the technical expertise to do its job but mostly lacks the means to enforce the procedures provided by the laws and regulations in force. It should also be pointed out that there is an environmental protection agency in each state.

The NESRA is responsible for enforcing all laws, guidelines, policies, standards and environmental regulations in Nigeria. It is also responsible for the implementation of all international environmental agreements, protocols, conventions and treaties in Nigeria. The vision of the agency is to ensure a cleaner and healthier environment for all Nigerians, while

the mission is to inspire personal and collective responsibility in building an aware society for the environment, achieving sustainable development in Nigeria.

4.9. CHAD

4.9.1. Political framework

(i) Environnemental framework

The country's environmental policy is implemented mainly through the National Environmental Action Plan (PNAE) which defines the strategy of national environmental policy towards sustainable development. The PNAE is divided into action programs, first of all: the National Action Program to Combat Desertification (PAN/LD), the National Adaptation Program for Climate Change (PNACC), the National Sustainable Development Strategy of Chad (SNDDT), the National Biodiversity Strategy; Chad's national profile on chemicals management.

(ii) Socio-Economic and Health Policy

The National Development Plan PND 2013-2015: The PND thus places strategic planning at the heart of public action and capitalizes on the achievements of the Poverty Reduction Strategy (SNRP). It takes into account the new strengths arising from the peace that Chad has encountered in recent years and the potential sources of its growth on the one hand and the bottlenecks noted for the achievement of the Millennium Development Goals MDGs main goals.

The National Strategy of Good Governance: In order to achieve its strategic objectives of economic and social development of the state, the Government adopted a National Strategy for Good Governance in August 2002, the overall objective of which is the improvement of public affairs' management. This overall objective is divided into five specific objectives: (i) fiscal consolidation; (ii) continued administrative reform; (iii) improving the priority sectors' management; (iv) strengthening partnership with civil society organizations; (v) improving goods and people's safety.

The National Health Policy (PNS). The **PNS** aims to improve the health status of the population by providing them with a coherent, efficient and accessible health system, oriented towards primary health care and supported by an efficient hospital system. The **PNS** objective is "to ensure access to quality basic health services for the population to accelerate the reduction of mortality and morbidity in order to contribute to the achievement of the MDGs by 2015"

4.9.2. National legal environmental management framework for the project

a) National texts

The main legislative and regulatory texts that govern the management of the environment in Chad and that are applicable to the project are:

- The Constitution of the Republic of Chad of 31 March 1996, revised by Constitutional Law No. 08 / PR / 2005 of 15 July 2005, which states that "Everyone has the right to a

healthy environment" (Article 47) and the decentralized communities must ensure the protection of the environment "(Article 48).

- The Code of Hygiene: Law 14 of 28/02/11 on the hygiene and environmental sanitation code, which focuses on food hygiene and solid urban waste management.
- The Water Code: Law No. 16 / PR / 99 of 18 August 1999 on the Water Code, whose provisions concern the management of river waters, lakes or groundwater and the operation of hydraulic works (that could likely alter the quality of the surface or groundwater which is subject to the regulation of prior authorization and must be the subject of an environmental impact assessment).
- The Law on the Protection of the Environment:

- **Law 14 / PR / 98 of 17 August 1998 on the general principles of environmental protection** constitute the basis of the national policy for the protection of the environment. The law was the subject of an implementing decree (n ° 904 / PR / PM / MERH / 2009 regulating environmental pollution and nuisances. This decree applies to installations classified for the protection of the environment (ICPE), waste, liquid and gaseous effluents, harmful or hazardous chemicals, auditory and olfactory nuisances Slaughterhouses and slaughtering areas are part of the ICPE's subject to authorization and declaration respectively.

(B) Texts on Land:

Laws Nos. 23, 24 and 25 of 22 July 1967 and their implementing decrees Nos. 186, 187 and 188 of 1 August 1967 governing land rights.

- In the field of environmental and social assessments, two texts are promulgated: Decree No. 630 / PR / PM / MEERH / 2010 on the regulation of environmental impact assessments. This text lays down the detailed rules for the implementation of the EIE procedure. The categorization of projects (A: projects that may have diverse and significant effects on the environment, requiring detailed investigations, these projects are subject to EIA, B: projects that can have easily identifiable and limited effects on the environment And the means of mitigating them are generally known and are subject to the implementation of an Environmental Impact Statement (NIE), C: projects that do not have a significant effect on the environment , For which neither an EIE nor an impact statement is required).
- Order No. 039 / PR / PM / MERH / SG / DGE / DEELCPN / 2012, providing general guidance for conducting an EIA; the text indicates the procedure to be followed for carrying out an EIE or a NIE.
- The international environmental conventions applicable to the project

Chad has acceded to several international conventions and agreements, including:

- The Stockholm Convention on POPs, signed in 2002 and ratified in 2004;
- The United Nations Convention to Combat Desertification (CID) (1994);
- The United Nations Convention on Biological Diversity (1992);
- United Nations Framework Convention on Climate Change (1992);

- The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (1989);
- The Convention on the Protection of the Ozone Layer and the Montreal Protocol (1987);
- The Vienna Convention on Substances that Deplete the Ozone Layer.

4.9.3. Institutional framework for environmental and social management of the project

Several structures working in the field of environment are involved in the implementation of the project. These are mainly:

(i) The Ministry of Environment and Fishery Resources

Chad's environmental policy is implemented by the Ministry of Environment and Fisheries Resources (MERH) is the operational manager for environmental and natural resource management. Within the MERH, the Environmental Assessment and Control of Pollution and Nuisances Directorate (DEELCPN) is responsible for the conduct of environmental and social assessments. This Directorate includes competent EIES staff, but their number and means of intervention are relatively limited.

(ii) Other Institutions Involved In Environmental Management of The Project

Structures for coordination and implementation of the program. The program implementation will be coordinated by the Ministry of Pastoral Development and Animal Production, through (i) a Steering Committee and (ii) a Project Coordination Unit (UCP), which will also be Environmental and social management of project activities. The Committee provides regional steering and monitoring and evaluation of all project activities. It includes all the services involved in the project: Ministry of Economy, Finance and Planning (Presidency); Ministry of Pastoral Development and Animal Production; The Ministry of Environment; The Project Management Unit (UCP); Organizations of butchers; etc. It should be noted that (MERH) is a member of the Steering Committee.

(iii) The Ministry of Public Health MSP

The MSP is responsible for the development and implementation of the health policy. Within the MSP, Environmental Health and Sanitation Division DHMA are responsible for hospital hygiene issues and have hygiene and sanitation agents in all health districts and in all hospitals. However, its ability to intervene is relatively limited.

(iv) The Municipalities of the Targeted Areas by the Project

The Ordances establishment and organization of local authorities and administrative districts confer competences on municipalities in the management of their environment. Nevertheless, it is necessary to address the weakness of the intervention capacity of these communities, in particular in terms of monitoring the implementation of projects that run in their territory. The boroughs have technical services, with environmental health workers and veterinary agents, but their technical capacities and financial resources are relatively limited in order to carry out large-scale actions in hygiene and sanitation in the livestock sector. These local communities have an important role to play in the prevention of the environment, the measures of

proximity control, the monitoring of the implementation, but also in the awareness and mobilization of the affected populations.

(v) Non-Governmental Organizations and Community-Based Organizations

The implementation of action programs drawn up in consultation with populations and civil society is based in large part on the mobilization and involvement of non-governmental actors, among which associations / groups (civil society) and National NGOs. Civil society, represented by grass-roots community associations (in the environmental sector, waste management, etc.), has a very important role to play in protecting the environment at local level. These associations could constitute important instruments for mobilizing actors to promote a more vigorous dynamic in the environmental and social management of the project. These local structures can play an important role in monitoring the implementation of project activities.

THE AfDB INTEGRATED SAFEGUARDS SYSTEM (ISS)

The Rosso Bridge construction project must also comply with AfDB environmental and social policies, guidelines and strategies and any other policies that apply to the program, namely the Integrated Safeguards System (ISS) including the following operational safeguards:

- Operational Safeguarding 1 – Environmental and Social Assessment
- Operational safeguarding 2 – Involuntary resettlement: Land acquisition, population displacement and compensation
- Operational safeguarding 3 - Biodiversity, renewable resources and ecosystem services
- Operational Safeguarding 4 - Pollution Prevention and Control, Hazardous Materials and Efficient Use of Resources
- Operational safeguarding 5 - Working conditions, health and safety

The environmental and social safeguards of the African Development Bank are the cornerstone of its support for inclusive economic growth and environmental sustainability in Africa. In order to better articulate its safeguard policies while improving their clarity and consistency, the Bank has developed an Integrated Safeguard System. This system is based on the two previous safeguard policies on involuntary resettlement (2003) and the environment (2004), as well as on cross-cutting policies and strategies, including gender (2001), risk management strategy, Climate Change (2009) and Adaptation (2009), and the Civil Society Engagement Framework (2012). It is also based on the Bank's sectoral policies: health (1996), integrated water resources management (2000), agriculture and rural development (2000, 2010) and poverty reduction (2004).

It brings these policies and strategies together within a consolidated policy framework that improves efficiency and relevance. In doing so, the Integrated Safeguarding System also aims to: (i) Better harmonize safeguards with the Bank's new policies and strategies, including the Bank's new ten-year strategy (2013-2022); (ii) Adopting international best practices, including on climate change; (iii) Adapting the implementation of policies to an evolving

range of innovative loan products and financing modalities; (iv) Work towards better harmonization of safeguarding practices among multilateral financial institutions; (v) Adapt backup methods to different clients with different capabilities; (vi) Improve internal processes and resource allocation.

The Integrated Safeguarding System has four interrelated components:

- ***The Integrated Safeguard Policy Statement.*** The Integrated Safeguard Policy Statement describes the common objectives of the BAD safeguards, sets out policy principles, and describes the safeguard policy implementation process. It is designed to apply to current and future lending terms and takes into account the different capacities and needs of different (PMR) and the public and private sectors.
- ***Operational safeguards.*** It is a set of five specific safeguards criteria that Bank clients are required to meet when addressing environmental and social impacts and risks. During the due diligence, review and oversight process, Bank staff ensure that clients comply with these requirements during the preparation and implementation of the project. Over time, the BAD may adopt additional safeguard requirements or update existing safeguards to improve their effectiveness, respond to changing needs, and reflect changes in best practices.
- ***Environmental and Social Assessment Procedures (PEES).*** The PEES provide guidance on specific procedures that the Bank and its borrowers or clients should adopt to ensure that Bank operations at each stage of the Bank's project cycle meet SO requirements.
- ***Guidelines of integrated environmental and social impacts Assessment (EIIES).*** The EIIES guidelines provide borrowers or clients with technical guidance on standards related to sectoral issues - for example, roads and railways, hydropower or fisheries - or methodological approaches that clients or borrowers should adopt in order to comply with the safeguards. The Integrated Safeguard Policy Statement sets out the key principles underlying the Bank's safeguard approach. Consequently, the Bank adopted five SO, thus limiting their number to the minimum required to achieve its objectives and to ensure the optimal functioning of the ISS:
 - ***Operational Safeguard 1: Environmental and Social Assessment.*** This primary SO governs the process of determining the environmental and social category of a project and the resulting environmental and social assessment requirements.
 - ***Operational Safeguard 2: Involuntary relocation - land acquisition, movement and compensation of populations.*** This SO consolidates the political conditions and commitments set out in the Bank's policy on involuntary resettlement and incorporates a number of improvements to increase the operational effectiveness of these conditions.
 - ***Operational safeguard 3: Biodiversity and ecosystem services.*** This SO sets out the objectives for conserving biological diversity and promoting the sustainable use of

natural resources. It also reflects the policy commitments contained in the Bank's integrated water resources management policy and operational requirements.

- **Operational Safeguard 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Efficient Use of Resources** This SO covers the full range of impacts related to pollution, waste and key hazardous substances, for which there are international as well as industry- or regional-specific comprehensive standards, which are applied by other (BMD), including the greenhouse gas inventory.
- **Operational safeguard 5: Working conditions, health and safety.** This SO defines the Bank's requirements to its borrowers or clients regarding workers' conditions, rights and protection from abuse or exploitation. It also ensures better harmonization with most other multilateral development banks. The system is based on inclusive stakeholder participation and consultation and effective communication.

The Bank's Integrated Safeguards System covers the full range of public and private sector lending instruments at the same time as it specifies the use of the Strategic Environmental and Social Assessment for political loans and the Environmental and Social Impact Assessment (EIES) for operations. The system is based on inclusive stakeholder participation and consultation and effective communication.

Categorization of projects

Categorization follows the principle of using the types and levels of environmental and social assessment for the type of operation.

Category 1: Bank operations likely to cause significant environmental and social impacts

Category 1 projects are likely to bring about significant or irreversible environmental and / or social impacts, or to significantly affect environmental or social components that the Bank or the borrowing country considers to be sensitive. Some program-based operations or other regional and sectoral program loans that may present significant environmental or social risks must be classified as Category 1. Program-based operations or other loans related to regional and sectoral programs Category 1 require EESS, and investment projects require an EIES, both of which lead to the development of a ESMF. When a project requires the development of a full PAR, and when there are no other aspects that need to be assessed, the EIES may be limited to the social assessment required for the preparation of the full PAR.

Category 2: Bank operations likely to cause less adverse environmental and social effects than Category 1

Category 2 projects are likely to have site-specific negative environmental or social impacts, but these are less important than those of Category 1 projects. The likely impacts are few, site-related, largely reversible and easy to minimize through the application of appropriate management and mitigation measures or through the integration of internationally recognized design standards and criteria. Any transaction may be classified as category 2 if it involves a relocation activity for which an abbreviated (PAR) is required under the PEES. Category 2 projects require an appropriate level of environmental and social assessment (EESS for program operations, investment plans and some business loans, or (EIES) for investment

projects) tailored to the environmental and social risk projected, so that the borrower can prepare and implement a ESMF) (in the case of an investment project, or a (CGES) in the case of program operations) to manage the environmental and social risks of the subprojects in accordance with Safeguards of the Bank.

Category 3: Bank operations with negligible environmental and social risks

Category 3 projects do not adversely affect the environment either directly or indirectly and are unlikely to cause negative social impacts. Therefore, they do not require an environmental and social assessment. Beyond categorization, no action is required. Nevertheless, the correct design of a category 3 project may require specific analyzes of gender, institutional considerations or other specific studies of social aspects essential for anticipating and managing unpredictable impacts on communities concerned.

Category 4: Bank operations involving loans to financial intermediaries (FIs)

Category 4 projects are loans granted by the Bank to financial intermediaries who re-loan or invest in sub-projects that may have negative environmental and social effects. Financial intermediaries include banks, insurance companies, reinsurance and leasing companies, microfinance providers and private equity funds that use the Bank's funds to make loans or capital to their clients. Financial intermediaries also include private or public sector enterprises that receive corporate loans or loans for investment plans from the Bank and use them to finance a set of subprojects. The sub-projects of the financial intermediaries corresponding to Category 1 and Category 2 will comply with the applicable requirements of the SO.

Other AfDB policies applicable to the project

AfDB Group Policy for Private Sector Development. The Bank Group Policy Update on the Private Sector in May 2013 is based on the Vision of a Stable, Integrated Continent, benefiting from a competitive, diversified and growing economy in a sustainable manner. In this context, the private sector is seen as a powerful engine for economic development and well-being on the continent by creating decent jobs and increasing incomes. The bank supports private initiatives, in particular by promoting the development of companies. It is within this framework that a 10-year Strategy covering the period 2013-2022 has been adopted, complemented by a Private Sector Development Strategy 2013-2017 which makes private sector development one of its main operational priorities to make the continent a global growth hub with a vibrant private sector. Therefore, the project coordination should take note of the Handbook for Consultation and Participation of Stakeholders in BAD Operations (2000).

Environmental Review Procedures for BAD Private Sector Operations. This procedure, adopted in May 2000, aims to improve decision-making and ensure that the private sector project in the Bank is environmentally and socially viable. It is in this sense that the environmental and social consequences must be determined from the beginning of the project cycle and taken into account in selection, leasing, planning and design. Environmental and

social assessment is the responsibility of the project proponent, who must comply, inter alia, with the Bank's environmental policy, the Environmental Assessment Guidelines, and the Policy on Resettlement of Populations.

Integrated Water Resources Management Policy. The Policy adopted in April 2000 ensures that Bank-financed activities in the water sector adopt the principles of integrated approach, the lending policy of the institution encourages borrowers to monitor and Implement an integrated approach to water resources management. The Policy aims to streamline and strengthen the Bank Group's interventions in this area, encourage borrowers, in accordance with the lending policy, to develop policies and undertake lending operations on the basis of a comprehensive framework. The management of water resources must be carried out within a framework characterized by three interrelated objectives - social, economic and environmental- and try to meet and seek to satisfy, in a balanced way, the corresponding needs. The policy is based on the following principles: (i) water should be considered an economic, social and environmental good; (ii) policies and options guiding water resources management should be analyzed within a comprehensive framework. It should enable effective, equitable and sustainable development through integrated water resources management. The project should be in line with this water policy.

Guidelines for Integrated Environmental and Social Impact Assessment. The main objective of the 2003 (EIES) Guidelines is to help adequately address the Bank's priority cross-cutting themes during the preparation and evaluation phases. The Guidelines contain information that provides a better understanding of the tasks to be performed at each stage of an environmental and social impact assessment (EIES):

- Appendix 2 of the (PEES), which present the main environmental and social components to be taken into consideration when describing the environment of a project.
- Part A of Appendix 10 of the PEES contains the terms of reference for carrying out an environmental and social impact assessment
- Part B of Appendix 10 of the (PEES) deals with the typical content of a (EIES) report for Category 1 projects.
- Appendix 11 of the PEES presents the characteristic content of an Environmental and Social Management Plan (ESMF) required for Category 1 and 2 projects.

The Guidelines address cross-cutting issues such as health, environment and poverty. Finally, taking account of cross-cutting considerations must make it possible to highlight the potential impacts and the measures of improvement or mitigation that must be proposed.

Policy on dissemination and accessibility of information. The Bank Group's Disclosure and Accessibility Policy 2005 was revised in May 2012 to further reaffirm its commitment to the principles of good governance, in particular Transparency, Accountability and, Exchange of information in its operations. The information is thus more accessible to the external public. The Policy includes an appendix 1 that addresses the types of documents to be disseminated proactively, including environmental and social assessments: Environmental and Social Impact Assessment (EIES) and Environmental analysis; EIES Summaries and Environmental

and Social Management Plan. Therefore, the project will have to comply with the requirements of this policy, in particular by circulating this EIES.

Gender Policy. The BAD's gender policy was formulated in 2001 to support this commitment and provide a supportive framework to implement gender mainstreaming in the Bank's policies and operations. This policy was developed through two action plans on gender. - The first Gender Plan of Action (GPOA 2004-2007), aimed to institutionalize and operationalize the Bank's strategy that had been formulated three years earlier. The first (GPOA) Action Plan was followed by the "Gender Integration Action Plan" (PAIG, revised in 2009-2011), which was designed to support economic growth and Poverty reduction in the Bank's regional member countries, with the specific objective of promoting equitable and sustained economic empowerment for men and women. The Plan of Action places particular emphasis on investing in activities aimed at promoting the economic empowerment of women in all operational sectors of the Bank, such as agriculture. Also, the project will have to comply with the requirements of this policy

The Poverty Reduction Policy (2000), which reaffirms the Bank's commitment to the overarching goal of poverty reduction through measures to promote national ownership, participation and accountability as part of its efforts to improve the living conditions of the poor in Africa. Agriculture and rural development is a priority and the engine of favorable growth.

The Bank's Population Policy and Implementation Strategy (2002) the overarching objective of which is to assist countries in the development and implementation of integrated population policies and programs within their actions of fight against poverty in particular by helping countries to achieve the objectives of the population in other social sectors, which lead to a better quality of life.

V. ANALYSIS OF THE INITIAL STATE OF THE BIOPHYSICAL AND HUMAN ENVIRONMENTS

5.1. BIOPHYSICAL CHARACTERICS

5.1.1. Limits of the study area

The Niger basin is located in the heart of West Africa. As a major asset, the Niger River and its tributaries constitute vital links between the nine riparian countries: Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Guinea, Mali, Niger, Nigeria and Chad. Its basin covers an area of nearly 2.2 million km² comprising about 1.5 million km² of hydrologically active basin. Finally, it is the 9th largest river system in the world. More than 80% of its surface area is in three countries: Nigeria, Mali and Niger (21% of the total area of the basin).

Table 6: Area of the basin in the NBA member countries

country	Total area of the country (km ²)	Area national portion of the basin (km ²)%	% of the national portion in relation to the national area	% of the national portion in relation to the total area of the basin
Benin	114, 763	46, 384	40	2
Burkina Faso	274, 000	83, 442	30	4
Cameroon	475, 650	87,900	18	4
Cote d'Ivoire	322, 462	23, 770	7	1
Guinea	245, 857	97, 168	40	5
Mali	1, 241, 000	578, 850	47	29
Niger	1, 267, 000	427, 323	34	21
Nigeria	923, 768	629, 545	68	32
Chad	1, 284, 000	20, 020	2	1
Total	6, 148, 500	1, 994, 402		100

Source: National Multisectoral Study Reports

In Benin, the area of the active watershed of the Niger River that is the subject of this study is located in the northern part of the Republic of Benin. It consists of ten (10) Communes (Banikoara, Bembereke, Gogounou, Kalale, Karimama, Kandi, Malanville, Nikki, Segbana and Sinende) covering an area of 43,313 km². Administratively, the theoretical catchment area straddles three (3) departments: Alibori, Atacora and Borgou. It regroups 12 administrative districts or Communes that are the ten Communes cited above in addition to Kerou and Pehunco; An area of 44,395 km² equivalent to about 38.7% of the national territory. However, for the convenience of the study, administrative data are mainly used. Thus, the study area is administratively limited to the north by the Republic of Niger, the east by the Republic of Nigeria, the Communes of N'Dali and Perere in the departments of Borgou, Kouande and Natitingou in the department of Atacora, and finally to the west by the Republic of Niger and Burkina Faso.

In Burkina Faso, The PIDACC concerns the eastern, central-eastern, central Plateau, north-central, Sahel and Hauts-Bassins regions, covering 78 communes in 15 provinces located in the part of the national portion of the Basin Of Niger. In the Eastern Region there are: Gnagna, Komondjari, Gourma, Tapoa; in the Central East Region: Kouritenga and Koulpelogo; in the Central Plateau Region: Ganzourgou; in the Central North Region: Namentenga and Sanmatenga; in the Sahel region: Seno, Soum, Ouadalan and Yagha and in the Hauts Bassins Region: Houet and Kenedougou. These project areas in the six regions are characterized by the constant degradation of natural resources. As a result, the development of socio-economic infrastructures and the protection of the resources and ecosystems of the Niger basin is a major concern.

In Cameroon, the Niger Basin extends over 5 of the 10 regions of the country; it comprises two sub - basins: One in the Sudano - Sahelian and tropical zone, covering part of the extreme north region, 4/5 of the northern region and the western fringe of the Adamaoua region; It is drained by the Benue; and extends over 75,000 km² for a population estimated at 2,500,000 inhabitants, ie 18% of the area and 16% of the population of Cameroon.

This sub-basin supplies about 21.3 billion m³ of water per year to the Niger basin through the Benue and its tributaries. Another in the sub - equatorial area of 2,900 Km², which extends over the whole of the North - West region and a fringe of the South - West region with an estimated population of 1,963,000, or 13% of Population of Cameroon. It supplies nearly 20.3 billion m³ annually to the Niger Basin, through Donga Ala, Menchum, Katsina Ala and Moan. With an outlet at the border between Cameroon and Nigeria, the northern basin of the Benue extends between longitude 11 ° 47 'and 15 ° 48' East and latitude 6 ° 49 'and 10 ° 51' North. It has a total area of 95,000 km² with 75,000 km² for the Cameroonian territory (78.95%). The study area covers six departments covered by the program, namely the departments of Benoue, Mayo Louti, Mayo Rey, Faro in the Northern Region, Mayo Tsanaga in the Far North Region and Department of Faro and Deo in the Adamaoua Region.

In Cote d'Ivoire, the portion of the catchment area is located in the north-west of the country and covers an area of 31,633 km² (9.8% of the national territory). The distribution of the area of the Basin by administrative region according to the new division of 2011 gives 37% in the region of Bagoue, 37% in Kabadougou and finally 29% in Folon. The Ivorian portion of the basin can be divided into two sub-basins: the sub-basin of the Bagoie which integrates Kankelaba and covers the departments of Tengrela, Boundiali and Madinani covers an area of 13,682 km² (59.9% of the basin); And the Baoule sub-basin incorporates Kouroukele and covers the departments of Odiene and Minignan; Its area is 9,162 km² (40.1% of the basin).

In Guinea, the watershed of the Niger River and its tributaries covers an area of 98,3500 km²; or about 40% of the national territory. It consists essentially of a plateau area sloping gradually towards the northeast and into which the Niger River and its tributaries have found their way. The basin is spread over the territories of nine (9) Prefectures of the country: Beyla, Dabola, Dinguiraye, Faranah, Kankan, Kerouane, Kissidougou, Kouroussa and Siguiriri. The program area is located in the five sub-basins of the Niger River:

- the Niger Sub-Basin, consisting of the Niger and the Mafou: Prefectures of Faranah, Siguiri and Kouroussa 29,367 km²
- the Tinkisso Sub- basin: Dinguiraye and Dabola prefectures 19,230 km²
- the Niandan Sub- Basin: Kissidougou Prefectures 12,802 km²
- the Milo Sub-Basin: Prefectures of Kankan and Kerouane 13.036 km²
- Sub-Basin of Sankarani and Fie : Prefectures of Mandiana and Beyla : 22.665 km²

In Mali, the study area is located at the level of the six basins (Upper Niger, Bani, “Delta Vif”, “Delta occidental mort”, Lakeshore zone and Niger Loop). The activities of the PIDACC will be carried out in the national portion of the Niger basin in general and in particular in the regions of Koulikoro, Segou, Mopti, Timbuktu and Gao, which are located respectively in the Upper Niger, “Delta mort”, “Delta Vif”, the Lakes Zone and the Niger Loop. This area of intervention includes the river valley and that part of its watershed that interacts actively with the river at the level of biophysical and human environments.

In Niger, the Niger basin covers an area of 427,300 km² (34% of the total area of the basin) and concerns seven (7) of the eight (8) Regions of the country and totally covers the Tillabery Regions 22% Of the national basin), Tahoua (26.5%), Maradi (9.8%), Dosso (7.9%) and the Niamey urban community (0.06%); And partly the regions of Agadez (department of Tchirozerine, Urban Community of Agadez with 32.9%) and the region of Zinder (the upper Tarka basin in the department of Tanout).

In Nigeria, PIDACC / BN will be implemented in Nigeria in the Nigerian portion of the Niger basin in the north and south-east of the country. It covers five states: Abuja (FCT), Upper Niger River Basin, Sokoto Rima River Basin, Upper Benue River Basin and Anambra-Imo River Basin. Nigeria is subdivided into eight hydrological and hydrogeological zones. The hydrological zones (HA) are the following: Niger North (HA1), Niger Central (HA2), Upper-Benue (HA3), Lower-Benue (HA4), Niger South (HA5), Littoral West (HA6), Littoral East (HA7) and Lake Chad (HA8). Five of these hydrological zones are in the basin and they are from HA1 to HA5. Within each HA there are a number of major sub-basins that represent the drainage system of the river system, that is, the main stream and its tributaries. The Nigerian segment of the Niger basin covers an area of about 584,193 km², or about 63.2 per cent of the total area of the country.

In Tchad, The project area in Chad is geographically located in the southern part of the Republic of Chad, in the Mayo-Kebbi natural region, in the north-south part between the localities Domo (9 ° 56'N, 15 ° 28 ') and Massang (8 ° 58'N; 14 ° 60'E) and from East to West between the localities of Leo (9 ° 45'N 15 ° 45'E) and Gegou to the east of Lere (9 ° 36'N, 14 ° 05'E). Administratively, it covers the entire Mayo-Kebbi-West Region and the Departments of Mount Illi and Kabbia in the Mayo-Kebbi-East Region and has a border in the North, South and West with Cameroon. The area of intervention is limited to the north by Chari Baguirmi,

to the east by the region of Tandjile, to the South by the region of the Western Logone, it is bordered in all its western part by Cameroon.

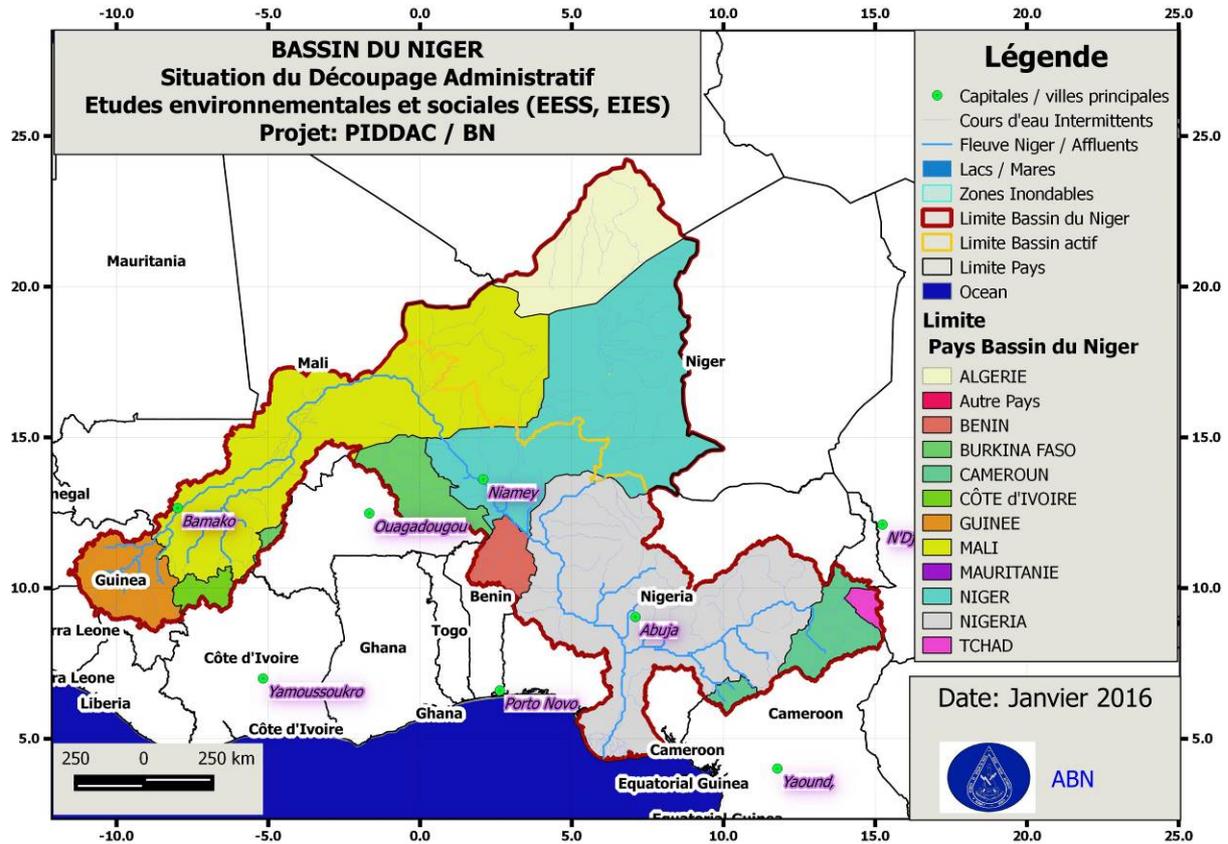


Figure 2: Location of the PIDAACC intervention area PIDAACC
Source: IDES Sahel Design (from the NBA database)

5.1.2. Climatology

The Niger basin is located in four distinct climatic zones crossed by the Niger River and its tributaries; they are: (i) the Guinean zone (wet to very wet), (ii) the Sudano-Guinean (semi-humid) zone, (iii) the Sahelian (semi-arid) zone and (iv) and the sub-desert (arid) zone.

These climatic regions are based on annual and monthly mean values of temperature and rainfall. The basin crosses successively several distinct rain-climatic zones which give it a particular and complex dynamics. These main climatic zones are in East-West bands, approximately parallel as illustrated in Figure 3.

Benin throughout the country, the climate is Sudanian with a rainy season of five (05) months (mid-May to mid-October) and a dry season of seven (07) months (mid-October to mid-May). The average annual rainfall ranges from 700 to 1000 mm over approximately 75 days. Temperatures are generally high in the study area. The average annual temperature of 27.5 ° C conceals large disparities between extreme temperatures whose maximum reaches and exceeds 38 ° C in the shade (April) and whose minimum falls below 16 ° C (December). Data

from the Kandi synoptic station show that average monthly temperatures vary with a bimodal regime with two (2) maxima in April (31.6 ° C) and October 27.6 ° C and two (2) August (25.6 ° C) and December (24.7 ° C). Daily thermal amplitudes are high and can fluctuate between 20 ° C and 6 ° C depending on the time of year. The highest gradient is observed during the dry months and the lowest during rainy months.

The average monthly insolation values in hours per day and as a percentage of the theoretical duration of the day range from 6.54 in August to 9.64 in February, with an average of 8.71 a percentage ranging from 54% to 83%, which means that the study area has the highest sunshine durations during all months of the year. The Benin basin of the Niger River has the lowest relative humidity values outside of the high rainfall months of July, August and September, apart from the northwestern mountainous region of the country. The winds generally blow in the east or north-east direction from November to March and in the south-east or south-west direction during other months of the year. On average, speeds are low (0-50 km / h) throughout the year and the distribution is uniform. The harmattan blows during the dry season, while the Benin portion of the Niger River Basin is under the influence of the wet monsoon during the rainy season.

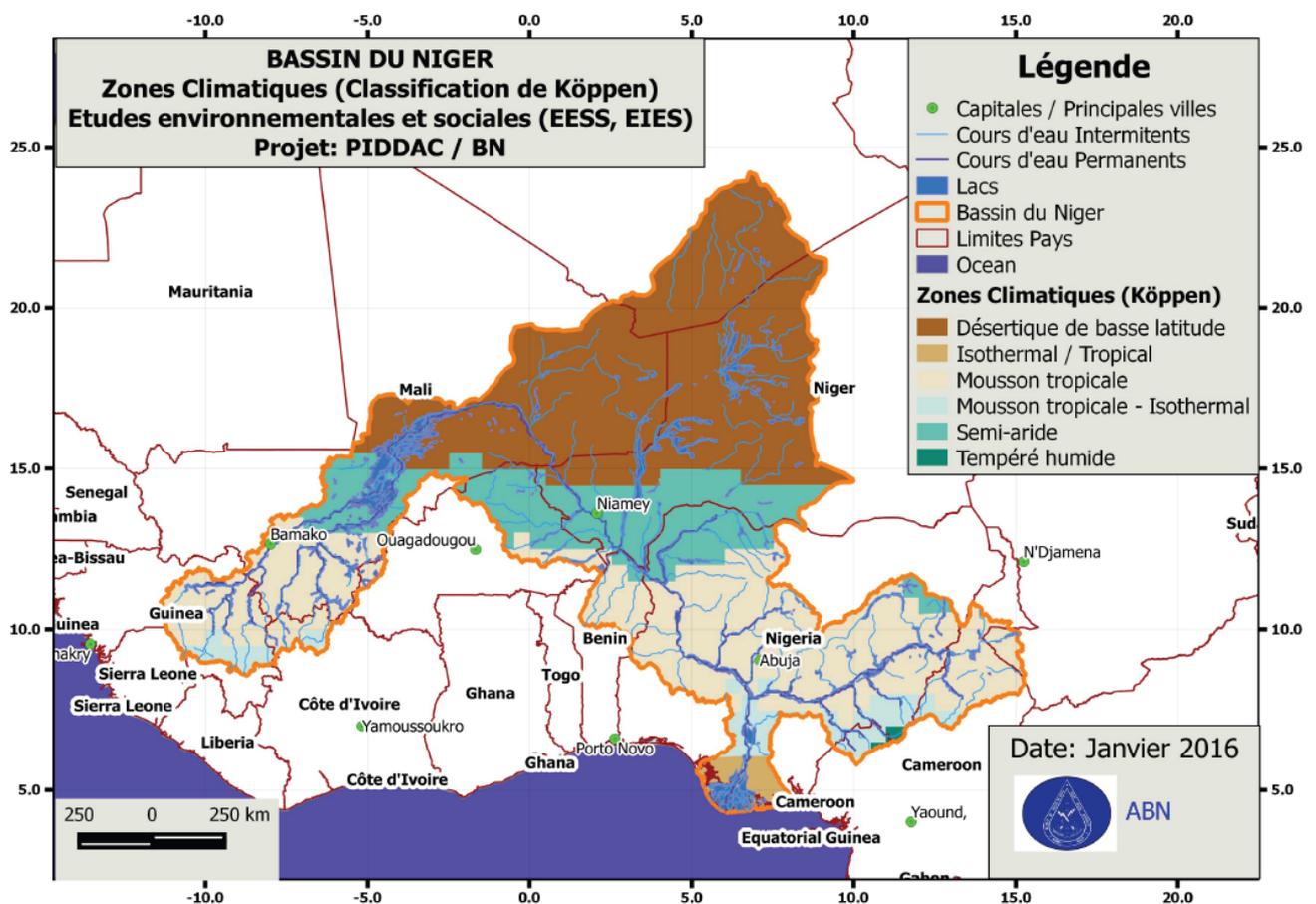


Figure 3: Climate zones in the Niger Basin
 Source: IDES Sahel Design (from the NBA database)

In Burkina Faso, two climatic zones are traditionally distinguished in the area of the Niger basin. The northern zone covers the northern and northeastern sub-basins of the Niger River in Burkina Faso territory. It consists of the sub-basins of Beli, Gourouol, Dargol and Faga. In this Sahelian zone, the rainfall is marked by a spatiotemporal variation with an annual average varying between 400 and 600 mm. The rainy season lasts between 3 and 4 months with more than 80% of the rainfall between July and August. The showers of the beginning and end of the season (June and September) are violent rains accompanied by sand storms.

These showers have considerable erosion potential. The eastern zone covers the whole of the sub-basins of Sirba, Bonsoaga, Diamongou and Tapoa-Mekrou. The climate here is of the North Sudanian type with a rainy season that lasts between 4 and 5 months. The rainfall is also marked by a spatiotemporal variation with an annual average varying between 600 and 800 mm. The same phenomenon has been observed for the decline in rainfall since the 1970s with a minimum never equaled in the 1980s (minimum recorded in 1984). The following figure illustrates this phenomenon. The highest temperatures range between 39 ° and 45 ° C and are between March and May, while the lowest temperatures (13 ° to 19 ° C) are reached in December and February. Annual precipitation ranges from 500 to 800 mm with an average of about 708 mm and are regularly characterized by poor spatio - temporal distribution. The rainiest months are usually July and August (DRED, 2007).

In Cameroon, the project area is located between two climatic zones, namely the Sudano-Sahelian climate in the Mayo Tsanaga department and the Sudano-Guinean climate a little further south. In the Sudano-Sahelian zone, precipitation ranges from 400 to 1200 mm per year. They are somewhat more abundant in the Sudano-Guinean zone with an annual rainfall of up to 1500 mm in the department of Faro and Deo. The beginning of the rainy season is the most critical period for agricultural activities, as it is the time for planting. Average temperatures vary between 26 ° C and 32 ° C with a high heat exceeding 44 ° C in March. Table 1 gives the monthly distribution of precipitation and temperature in the Garoua locality (10-year data), the chief town of the Northern Region. Average wind speed is around 3 m / s in the northeast direction during the dry season and in the southwest during the rainy season. The prevailing winds blow in the NE and NW directions. There are also dust winds, especially during the dry season. During these months, the harmattan reigns, accompanied by dry haze which reduces the visibility to less than 500 m.

In Cote d'Ivoire, the climate characteristic of the study area is the Sudanian tropical climate (26 ° C to 27 ° C), with precipitation from 1150 to 1350 mm / year, Humidity from 40 to 50%.

Sudano-Guinean zone (19 percent of the country) is a transition zone between the forest zone and the north. It is characterized by four seasons: a large dry season (November to February), a major rainy season (March to June), a small dry season (July to August) and a small rainy season (September to October). Precipitation ranges from 1,200 to 1,500 mm, but are erratic. The Sudanian zone (31 per cent of the country) is located further north. It is a savanna region

with a tropical climate of Sudano-Guinean type with only one rainy season. Precipitation between 900 and 1200 mm. In the savannas of the North, the climate is more tropical. Depending on variations in climatic and vegetation factors, the savannas of northern Cote d'Ivoire have been subdivided into three zones:

- Zone A: Sudanian savanna beyond the northern limit of zone B. The climate is Sudanian with two seasons;
- Zone B: sub-Sudanian savannah with the northern limit, the line passing at the level of the departments of Odiene, Boundiali, Ferkessedougou and Bouna. The climate is of the Sudano-Guinean type with two seasons;
- Zone C: Guinean savannah comprising the V baoule and having for north limit, the line passing at the level of the departments of Touba, Katiola and Bondoukou. It is a region of climatic transition that sometimes swings in the sub-tropical four season climate (two dry seasons alternating with two rainy seasons) and sometimes in the humid tropical climate when the small dry season of July-August fails to assert itself.

In Guinea, the climate of the basin is characterized by the alternation of the two seasons (one dry season and one rainy season) under the action of two winds: the harmattan and the monsoon. This effect of the winds is superimposed on the effect of altitude and proximity to the sea and can be subdivided into three climatic zones:

- Kissian zone: this zone is characterized by a high annual rainfall of between 1,800 and 2,200 mm, a rainy season that lasts 7-9 months, and average monthly temperatures between 22 and 27 ° C with daily intervals between mini And a maximum of 10 to 15 ° C;
- Guinean Soudano zone: it is characterized by a rainfall that varies between 1,600 and 1,800 mm, a rainy season of 6 months and average monthly temperatures between 25 ° C and 30 ° C with very important daily differences in the dry season (15°C à 20°C) ;
- Typical Soudano Zone: it is characterized by a weaker annual rainfall, between 1,200 and 1,600 mm, with a rainy season of less than 6 months, average monthly temperatures vary between 25 and 30°C with very important differences in the dry season (15°C à 20°C).

Because of its geographical position, Haute Guinee straddles two major climatic zones: the Guinean zone to the south of Siguiri, a humid zone, and the relatively more drought-prone north-eastern Malian zone. Its climate is Sudanian, with two very contrasting seasons: a dry season with about 2% of annual precipitation, and a wet season. The average rainfall is about 1600 mm / year in the Kouroussa-Kankan region.

In Mali, the area of intervention is geographically located in a hyper-arid to arid climatic zone characterized by sudden climatic variations, prolonged and recurrent droughts, and irregular floods leading to poor moistening of floodplains. The reduction in rainfall predetermines the aridity of the climate in general. Rainfall is irregular throughout the area and rainfall follows a north-south gradient ranging from 100 mm in Timbuktu to 250-300 mm south of Ansongo and 1000 mm in Upper Niger (Koulikoro). They promote the development of the negative factors that condition desertification. Temperatures are high, with great

differences between night and day and between the cool season and the dry season. Average temperatures vary between 15 and 30 ° C in December and January at 30-45 ° C in May and June¹. The year is divided into three seasons: (i) the dry and warm season (March to June) characterized by dry harmattan winds blowing from the northeast to the southwest. The temperature varies between 36 ° C and slightly over 40 ° C in this period in some localities (ii) cold dry season (from November to February) also characterized by harmattan and high thermal amplitude. Minimum temperatures vary between 10 ° C and 15 ° C and (iii) the rainy season from July to October and characterized by the monsoon that blows from the southwest to the northeast. With a climatic aridity index of less than 0.25, both regions are considered ecologically dry. The mean annual evapotranspiration is greater than 2,750 mm; it reaches 3,140 mm / year in Timbuktu and 2,500 mm in Gao. Since evaporation is considerably superior to rainfall (less than 300 mm / year in Timbuktu and Gao), it can be concluded that throughout the northern part of the area of intervention, rainfall efficiency is almost zero.

In Niger, the areas characterizing the climatic zones in the basin are as follows:

- Sub-desert or Saharan (Rain <200mm): 209,269km² or 49.0% of the basin;
- Sahelian corresponding to the upper basin (200 <Rain <400mm): 138,060km² or 32% of the basin. It mainly concerns the Tillabery Region. The climate is characterized by two distinctly separate seasons: the rainy season between May and September is relatively short compared to the dry season which lasts almost eight (8) months (October-May). The average annual temperature is 29.2 ° C. The mini is reached in December - January with 16.2 ° C and the maximum in April May with 41.1 ° C on average. Variable rainfall. Ainsi, du Nord au Sud on trouve des zones du climat Sud Saharien (moins de 150 mm de pluies par an), Nord Sahelien (150 à 350 mm) et Sud Sahelien (350 à 600 mm). Thus, from north to south there are zones of the South Saharan climate (less than 150 mm of rain per year), North Sahelian (150 to 350 mm) and South Sahelian (350 to 600 mm).
- Sudano-Sahelian corresponding to the Inner Delta, Niger loop and Middle Niger (400 <Rain <600mm): 66,730km² or 15.6% of the basin. The rainfall is between 400 and 600 mm. This climate zone currently covers the Dosso Region. The annual mean precipitation ranges from 250 mm in the North to 500 mm in the extreme South. They are generally characterized throughout the region by their poor distribution in time and space with a decrease in their quantity from year to year.
- Sudanian (P> 600mm): 13,264km² or 3.1% of the basin. The rainy season extends over 4 months (June to September). It should be noted that rainfall has fallen sharply in recent decades, as it is everywhere in the Sahel. We thus observe a migration towards the south of the isohyets, which causes a great precariousness of the rainfed crops and the appearance of ecological conditions characteristic of the pastoral zone.

In Nigeria, the study area climate is of two types: Sudanian in the north with a rainy season of five (05) months (May to September) and a dry season of seven (07) months (October to

¹ National Directorate of Meteorology, Mali 2002

April) Sub-equatorial season in the southeast with a rainy season of seven months (April to October) and a dry season of five (05) months (November to March). In the North, precipitation is generally low. The average annual rainfall for 35 years is around 470mm.

Much of the rain falls between the months of May to September, while the months without rain are October to April. The hottest months from April to May are periods of stronger evaporation. Relative humidity is low most of the year and only increases during the wet seasons from June to September. In the Southeast, the annual precipitation received in this region is very high, typically between 2,000 and 3,000 mm of rain per year above the 2000 rainfall totals for the equatorial climate around the world. Rains are often violent with thunderstorms, heavy flooding causing soil erosion and gulying with rapid infiltration of groundwater. Relative humidity ranges from 65% to 80% with the highest in the rainy season.

In Tchad, the climate of the PIDACC / BN intervention zone is of Sudano-Guinean type in the department of Lere with a dry season which lasts from November to March and a rainy season which occurs in the months of April to October. The annual average rainfall is between 1,000 and 1,200 mm year, favoring the development and maintenance of abundant vegetation. This climate has sometimes Sahelian characteristics with random seasonal precipitation, frequent and increasingly long seasonal droughts, very irregular amounts, a number of rainy days per year that goes down to 45, a constantly high temperature where the maxima sometimes exceed 42 ° C in April and a high evaporation rate: more than 2,300 mm per year. The average annual maximum temperature is 34 °C, the minimum annual average is 21 °C. Minimum temperatures are observed in December and January and maxima are in March and April. From July to September they are softened by the rains before rising again in October, sometimes in November, thanks to the end of the rains. The annual thermal amplitude is 27 ° C. Relative humidity follows the trend of rainfall, ie, it is maximum in rainy season and minimal in the dry season. A minimum in February-March (23% and 26%) before the first rains and a maximum (82%) in August linked to maximum precipitation. Daily evaporation is maximum in March with 12.2 mm. It is minimal in August-September with 1.7 and 1.8 mm. The annual value is 2,147.6 mm.

5.1.3. Rainfall

Two climatic regimes currently characterize the study area with a north-south rainfall gradient of the order of -138 mm / 100 km on average (Figure 4). Studies on climate change over the study area as a whole and the information provided by the various national reports show a significant decline in annual rainfall volume and length of the rainy season. For example, the shortening of the wet season from a maximum of 4 months during the 1930-1960² period to a minimum of one month.

The aridification is not without influence on the natural resources, support of the human activities. For example, in Niger, rainfall has fallen sharply over the last two decades, as is the case everywhere in the Sahel. The rainfall deficit observed since 1968 is reflected as across the national territory by a shift of the isohyets over 75 to 100 km towards the South, proof of a

² Source, PNEDD, 1998

marked deterioration of the climatic conditions following the extension of the desert zones. This deficient rainfall situation even in the forest or coastal regions of the basin from 1970 onwards has created a profound hydro-ecological imbalance which is characterized by: (i) a reduction in surface runoff of about 20-50%, as shown in the following graphs with sometimes severe downward flows, as far as stopping flows as was the case, for example, of the Niger in Niamey in 1985 and (ii) the lowering of groundwater levels and the emergence of environmental phenomena, such as silting of the bed, colonization of water bodies by floating plants, water and wind erosion, pollution of various origins.

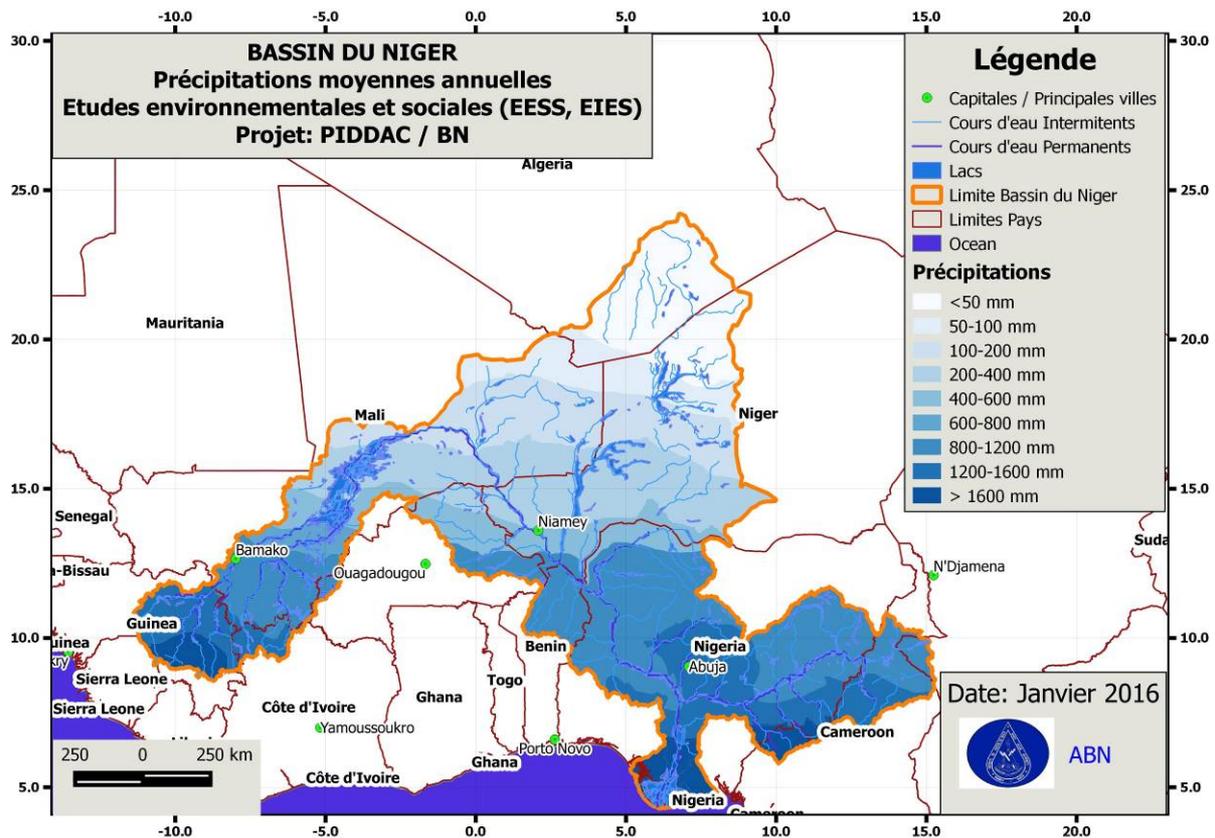


Figure 4: Rainfall in the Niger Basin
 Source: IDES Sahel Design (from the NBA database)

In some cases, these threats are extremely worrying. Invasive aquatic plants (water hyacinth, water lettuce, floating grass and water fern) are increasingly a serious threat to socio-economic activities such as fishing and river transport, water distribution and health, hydroelectric power generation and rice farming in irrigated areas. In large quantities, these plants become harmful because they interfere with the use of water bodies: obstruction of tracks, decreased flows of irrigation canals, occupation of bourgou fields, limitation of access to banks etc. Evaporation of The water covered by the hyacinth is 7 to 8 times greater than that of a surface of open water leading to the rapid drying up of infested water bodies. Thick layers of vegetation are also suitable for breeding disease vectors such as malaria and bilharziasis.



Picture 1: Water Hyacinth Infestation at Kandadji (Source: Kandadji Archive)

5.1.4. Temperature

The average temperature decreases from North to South. The monthly average is very high in April / May in the North of Upper Niger, in the Inner Delta and in the Middle Niger and in March in the Lower Niger (Lokoja in Nigeria). In the Sahelian and semi-desert zones (Inner Delta and Middle Niger), the maximum temperatures observed from April to June can sometimes be around 50 ° C. For example, 42 ° C in April / May in Niamey and 43 ° C in Gao (Mali). Temperatures are low in August in almost all areas of the basin due to the rainy season. Relative dampness goes to a maximum during rainy season and becomes a minimum during dry season. Dampness rate oscillates between an inferior minimum to 20% and a maximum from 50 to 60% in the Interior Delta and middle Niger, for instance, and the maximal rate reaches 70% in the south and more than 90% at the river mouth.

The annual evaporation varies on average between 1, 400/1, 500 mm in the gulf of Guinea to 1, 900/2, 200 mm in the loop of Niger in Sahel area. In Mali for instance, the annual average of evapotranspiration in PIDACC intervention area is superior to 2, 750 mm; it reaches 3,140 mm/year in Timbuktu and 2, 500 mm in Gao. Evaporation is considerably superior to rainfall (less than 300 mm/year in Timbuktu and Gao). One can conclude that in all the northern part of the intervention area, the effectiveness of rainfall is almost nil.

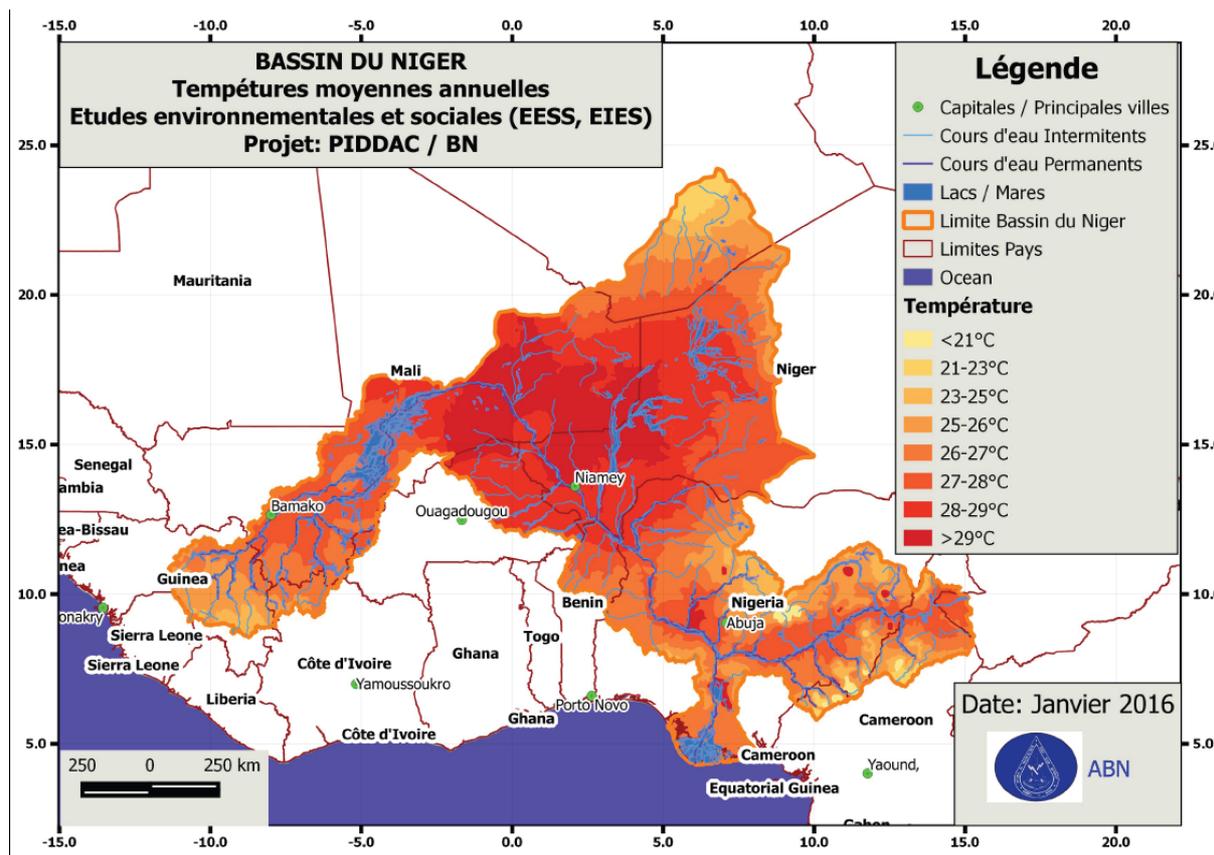


Figure 5: Average temperature change in the Niger Basin
Source: IDES Sahel Design (from the NBA database)

5.1.5. Vegetation

The Niger River crosses several areas of natural vegetation formation whose succession is overall traced on the north-south climatic terracing (figure 6). In tropical marshlands, one finds northern fringes of damp dense forest. It is a poorly represented area in the basin, but rather a transitional forest between dense rainforest and light forest in the form of a mosaic of forest and secondary grassland. This type of formation is found in the upper part of the Guinean basin and in a large part of Nigeria: Southern Plateau of Jos and Yoruba Plateau, confluence of Niger-Benoue, Western Adamaoua and Sonkwala Mountains. In this area, there are galleries or "closed" forests: they have vegetation strictly limited to the proximity of the water stream. Their structure is similar to that of a rainforest, although it is generally less elevated. Several species are made up of trees more than 15 to 18 m height, often defoliated during dry season. The groups of Annonaceae, Sapindaceae, Apocynaceae, Myrtaceae and Rubiaceae are well represented. The vegetation that occupies the banks in direct contact with water consists of exclusive species such as: *Carapa procera*, *Alchornea cordifolia*, *Pterocarpus santalinoides*, *Syzigium guineensis*, *Treculia africana*. In the Sudanese tropical area, there are clear forests in *Isobertia*, particularly in the lower part of the Guinean basin and Bani / Djoliba basin, as well as in the Borgou and northern Yoruba Plateau and in the northern Jos.

In Benin, it emerges from these studies of which the main conclusions are reproduced in the report that the Benin basin of the Niger River is full of important floristic potential. The ecological maps of the vegetation cover established by CENATEL indicate the existence in the Benin basin of the Niger River of a multitude of vegetation formations which are closely linked to the hydro-rainfall and edaphic characteristics of the area. According to the classification of the Center, the results of which are being finalized, the most representative plant formations are: arborous savannah and shrub savannah, savannah trees and shrubs, with agricultural right-of-way, dense dry forest or semi-deciduous forest and clear forest and wooded savannah. The results of the aforementioned studies coupled with this classification of CENATEL led to the summary table opposite which summarizes the knowledge available on the flora of the study area. In the Benin part of the Niger River Basin, vegetation formations of the Sudanese savannah area, where there is a decrease in the height of woody species and a change in the floristic composition of the different formations. Tree and shrub savannahs occupy most of the Benin basin of the Niger River. They may be saxicolous, usually under agricultural influence on soils, battleships, gravel, stony or rocky. The grass stratum is usually dense enough to favor violent fires. *Commiphora africana* is quite common.

In the Guinean portion of the basin, it is common to distinguish: (i) herbaceous savannahs (not or few shrubs), (ii) shrub savannahs, (iii) arborous savannahs (trees 6-8m high) and (iv) wooded savannahs (trees 8 to 13 m high). In Burkina Faso, vegetation in the eastern region is phyto-geographical as a transitional area between the Sudanese area in the south and the Sahel area in the north. It is crossed by savannah tree and shrub, with forest galleries along streams, and a steppe. From province to province there are some peculiarities. In the north of the Komandjari, there is a vegetation of the southern type (Sahelian, dominated by a shrub savannah whose dominant woody species are: *Combretum nigicans*, *combretum micranthum*, *Acacia seyal*, *Acacia gourmaensis*, grasses are mostly annual *loudetia togoensis*) including some perennials in depressions fed with water: *Andropogon gayanus*. In the south of Komandjari, Gourma, Tapoa and Kompienga, vegetation and flora are of South Sudanese type characterized by abundant woody species which testify dense tree and shrub savannah.

The Sudano-Zambezi phyto-geographical region is included in the Central-East Region. However, in the corridors of water streams, there is an intrusion of the Guinean-Congolese flora, a phyto-geographical territory contiguous to the first mentioned. In recent years, there has been an invasion of the area by the sub-Sahel and Sahel flora, characterized by Mimosaceae, in particular the genus *Acacia* spp.

In Benin, the ecological maps of the vegetation cover established by the CENATEL report indicate existence of a multitude of plant formations which are in close connection with the hydro rainfall and edaphic characteristics of the area. The most representative plant formations include: the treed savanna and the shrub savanna, the treed savannah and the saxicolous shrub, the treed and shrub savanna in agricultural hold, forest gallery, dry dense forest or semi-deciduous forest and clear forest and wooded savannah

In the Benin part of the basin of the Niger River the plant formations in the Sudanian Savannah,

one notes the decrease of the height of the woody species and a change of the floristic composition of the different formations. The tree and shrub savannas occupy most of the Benin basin of the Niger River. They can be saxicolous usually under agricultural control or on soils, battleships, gravillonneux, stony or Rocky. The Graminéenne stratum is generally dense enough to promote violent fires. *Commiphora africana* is quite common. In the Guinean portion of the basin, it is common to distinguish: (i) herbaceous savannas (not or few shrubs), (ii) shrub savannas, (iii) treed savannas (trees 6 to 8m high) and (iv) wooded savanna (trees 8 to 13m tall).
Top of the form

In the Sahel region, the vegetation of the Region consists of steppe, riparian forests and relics of tiger bush. The steppe is composed of thorny shrubs and annual grasses dominated by *Balanites aegyptiaca*, *Guiera senegalensis*, *Acacia albida*, *Acacia seyal*, *Acacia laeta*, *Acacia nilotica*, *Acacia raddiana*, *Pterocarpus lucens* and *Ziziphus mauritiana*. Most of these species are useful species for humans. Species such as *Prosopis juliflora*, *Eucalyptus camaldulensis* and *Azadirachta indica*... are exotic species introduced as part of reforestation activities and are used for firewood, service wood and for livestock's food. The herbaceous carpet consists namely of: *Cenchrus biflorus*, *Andropogon gayanus*, *Panicum laetum*, *Pennisetum paniculatum*, *Zornia glochidiata*, *Bourgou*.

In Cameroon, in the northern basin of the Benoue, the following plant formations are mainly found: the Sudano - Guinean shrub savannah of Adamaoua; Wooded Sudanese savannas and dry Sudanese dry forests; the Sudanese highland formations and the Yaeres. Shrub savannas are vast grassy savannas often of anthropogenic origin or grass meadows sprinkled with trees and shrubs. They concern the south of the northern basin of the Benoue, Faro and Deo basins, the mountains of Poli. The wooded Sudanese savannas occupy the basin of the Benoue. In the Upper Benoue valley, the density of the trees is sufficient to form a clear forest. The Sudanese formations are found in the Mandara Mountains. Tiny terraces overlay the millet. The woody vegetation of uncultivated areas or fallow lands is of the Sudanese type. In the northern basin of the Benoue, the Yaeres are vast meadows at *Hyparrhenia* and *Vetveria nigriflora*. It is a vegetation formation which takes place when the waters recede from the plains bordering the Logone between Mayo Kebi and Lake Chad. The national parks of Benoue, Faro and Boubouba Djida are also present.

The vegetation of the north and far north is rather rich. There are about 569 plant species in 265 genera and 85 botanical families. The group of legumes (Fabaceae, Caesalpiniaceae and Mimosaceae) represents 95 plant species. The Poaceae group is also very well represented and is an important source of fodder for wild and domestic animals. Overall, it is a plant formation characterized by species that resist drought with particular morphological characteristics. These species include: *Isobertinia doka*, *Isobertinia tomentosa*, *Pterocarpus terminalia avicennioides*, *Panicum pansum*, *Pennisetum* sp, *Terminalia* spp. And *Lophira lanceolata*, *Sterculia setigera*, *Pseudocedrela kotschyi*, *Azalia africana*, *Anogeissus leiocarpus*, *Diospyros mespiliformis*, *Andropogon* spp., *Schizachyrum* spp., *Hyparrhenia* spp., *Pennisetum purpureum*, *Oxytenanthera abyssinica*, *Phacelurus congoensis*, *Kiguelia africana*.

All of these species are threatened by climate change and anthropogenic activities, some of which have even disappeared or become scarce in the northern region.

In Cote d'Ivoire, part of the study areas mostly located in the north is covered with savannahs, characterized by large areas of grassland and sparse trees, especially near the Sahel in the north. Only areas close to water streams have dense forests and rich vegetation. The region of Kabadougou, belongs to the sub-Sudanese sector of the Sudanese domain (Guillaumet 1967). There are clear forests or wooded savannahs, savannahs derived from them (arborous savannahs, shrubs), grassy savannahs, gallery forests and very locally islands of dry dense forest. The gallery forests contain species such as *Sarindeia juglandifolia*, *Saba thompsonii*, *Pararistolochia goldieana* and locally *Elais guineensis*. The dense dry forests are characterized by *Anogeissus leiocarpus*, *Cola cordifolia*, *Antiaris africana*, *Chlorophora excelsa*, *Blighia sapida*, their undergrowth is devoid of savannah grasses. In the light forests and wooded savannahs, the woody stratum is at *Isobertia doka*, *Daniellia oliveri*, *Terminalia glaucescens*, *Parkia biglobosa*, *Pterocarpus erinaceus* ... The grassy stratum is at *Andropogon tectorum*, *Beckeriopsis unisetata*, *Aframomum unisetata*, etc. In wooded savannahs and shrub savannahs, the ligneous population is sparser and less elevated, and presents the same composition as that of the clear forest; the grassy layer is at *Panicum phragmitoides*, *Digitaria uniglumis*, *Elionurus euchaetus*, *Ctenium canescens*, *Cymbopogon proximus*, and *Andropogon ivorensis*. The grassy savannahs located on the alluvial flood plains (Kourou-Kelle, Baoule ...) are characterized by *Vetiveria nigrita*.

The region of Folon, chief town Minignan, belongs to the same sub-Sudanese sector of the Sudanese domain (Guillaumet 1967). There are clear forests or wooded savannahs, savannahs (tree savannas, shrubs), grassy savannahs, forests galleries. In Guinea, these light forests are characterized by medium to light-colored woody vegetation; whose crowns are more or less contiguous (80%) but largely filter out the light. The undergrowth is usually discontinuous and widely open or nil. Grasses are scarce. The very low level of trees in the light forest is due to both the edaphic and climatic conditions of the environment and the passage of fires. They often consist of a stratum of fire-resistant savannah trees (*Pterocarpus erinaceus*, *Hymenocardia acida*, *Lannea* spp., *Crossopteryx febrifuga*) mixed with fire-sensitive trees (*Albizia zygia*, *Phyllanthus discoideus*, *Sterculia tragacantha*, etc.). These formations exist in Upper Guinea and in southern Mali. Due to human pressure, they have often been destroyed in savannahs of various types. The formation is less specific (residual islands of *Isobertia doka*) south of the inner Delta basin, south of Liptako and north of Borgou, south of the Dallols and Koris, in the Sokoto on the Bauchi plateau and In the Maroua region.

In Guinea, species of these formations typically belong to the groups of *Caesalpiniaceae*, *Combretaceae*, *Euphorbiaceae* and *Mimosaceae*. Several species are of Sudanese origin: *Anogeissus leiocarpus*, *Combretum glutinosum*, *Strychnos spinosa*, *Adansonia digitata*, etc. In Mali, the sub-Saharan steppe area between ishyetes 150 to 250 mm has vegetation located in wadis and gullies. This contracted vegetation is formed by an herbaceous carpet of short-year annuals (*Aristida hordeacea*, *Morettia philaeana*, *Farsetia stylosa* ...) and a loose woody layer of *Acacia ehrenbergiana*, *Acacia tortilis*, *Balanites aegyptiaca*, *Maerua crassifolia*

Leptadenia pyrotechnica etc. It can be abundant in the depressions and plains corresponding to the bed of the wadis as in the Adrar, or to the spreading areas of the floods (Adrar, Tilemsi, and Tamesna). These areas carry pastures to *Aristida* sp. *Schouwia thebaica*, whose productivity varies according to the height of the rains and the nature of the soils from 1,000 to 2,000 kg DM / ha. On sandhill cords and sandy reliefs dominate the *Aristida* (*A. mutabilis*, *A. pallida*, *A. papposa*) and *Panicum turgidum*. These herbs are associated with woody plants. In the Saharan zone, there are semi-desert grassy and shrub steppes of the northern Sahel, which are arid area formations (rainfall less than 400 mm / year) found in the interior delta and in the north, and desert formations of the Sahara. On lateral cuirass (bowal) grows an annual grassy steppe associated with some perennial plants and stunted shrubs. In Mali, for example, the Sahelian steppe is between 250 and 550 mm of rain. Its vegetation is on sandhills in the northeast of the xerophilic steppe type. Its grassy component is dominated by *Cenchrus biflorus*, *Aristida mutabilis* and *Schoenefeldia gracilis*, while the woody stratum includes woody trees such as *Acacia senegalensis*, *Acacia laeta*, *Acacia tortilis*, *Balanites aegyptiaca*, *Leptadenia pyrotechnica*. This vegetation is open on sandhills with low water retention capacity and on high runoff slopes.

In Niger, the Niger basin has different plant formations. Thus, in the Tillaberi region, the vegetation is characterized by a predominance of tiger bushes to combretaceae and one; Savannah is certainly a relic of sudden dense dry forest formations. The intermediate zone and the agricultural zone contain most of the forest resources. A shrub cover with annual herbaceous perennials dominates in the north. Coverage density remains loose. About 30% of the region has a fairly extensive vegetation cover with endangered species found in the W National Park. Classified forests are also well represented in the Kollo and Say Departments which still retain Relics of wooded areas. Some forest reserves are found in the departments of Filingue and Tera. In the Dosso region, plant formations cover a total area of 2267500 ha, or 16% of the country's natural formations. The vegetation consists of 17,000 hectares of forests and a savannah dotted by species with certain economic interests (*Acacia albida* on the northern plateaus, shea and kapokier on the South plateaus, acacia and doum palm trees in the Dallols). The region also contains the most important reserve of the country's forests. The floristic composition and the density of this vegetation vary from one zone to another. In the south, vegetation is dominated by *Pterocarpus erinaceus*; *Parkia biglobosa*; *Bombax costatum* and *Andansonia digitata*. Along the temporary waterstreams, these species are replaced by *Khaya Senegalese*; *Daniella oliveri* and *Diospiros mespilliformis*. In the center on the glacial plateaus of the zigui and Fakara. There are mainly combretaceae: *Combretum nigrican*; *Combretum micranthum* and *Guiera senegalensis*. To the north, on the plateaus of the Loga department of North Douthi and North Boboye, one encounters *Guiera senegalensis*; *Glutinosum*; *Combretum micranthum* and *Piliostigma reticulatum*. In the Tahoua region, vegetation is function of this rainfall. We can distinguish up to 350 mm isohyet the steppe sported which has many thorny, some palm and euphorbia; To 200 m isohyet the steppe shrub with annual grasses and beyond, in the southern Saharan zone, perennial grass steppe then the almost total absence of vegetation in the extreme north. In the region of Niamey, along the river and the Koris, there is a natural flora composed of *Hyphaene thebaica*, *Borassus aethiopicum*, *Acacia albida*, *Balanites*, *Prosopis africana* and several species of Combretaceae.

On the battleship plateaus, the species planted during the restoration of the land are mainly *Acacia* spp. (*A. seyal*, *A. Senegal*, *A. raddiana*, *A. nilotica*, etc.) and *Prosopis* spp. (*P. juliflora*, *P. chilensis*). The main types of forest or agroforestry management are: reforestation trenches on slopes, agro - sylvo - pastoral benches (on glaciers and plateaus), windbreaks in valleys, linear plantations on the banks of Koris and the roads.

In Nigeria, plant formations in the northern part of the study area are the preferred area of the Sudanian savannah characterized by stunted and thorny shrubs, invariably *Acacia* species. In the south-east, we have mangrove and rainforest. The species encountered are: Mahogany, oil palm, Baobab and Tamarinier. In the Sahelian zone, there are the savannah trees, shrubs and grasslands in *Acacia*: upstream part of the Inland Delta, Gourma and Zarma Ganda, north of the Dallols and koris. The lake zone of the Inner Delta is a mosaic of edaphic grasslands and semi-aquatic vegetation intersecting the zonal plant formations. Several factors play a role in the distribution of plant formations, including altitudinal and latitudinal variations, climatic variations, the nature of soils and the presence of groundwater near the surface. In recent decades, successive droughts have played an important role in the evolution of the spatial distribution of Mayo-Kebbi vegetation cover. It is thus that we meet today, species specific to the Sahel landscape in the southern zones with Sudano-Guinean climate. The physiognomic aspect of the vegetation also changes according to the edaphic conditions (flooded areas) and the action of man (degradation of vegetation by fire, crops, and pastoral activities).

In Chad, the plant formations characteristic of Sudano-Sahel and Sudano-Guinean climates (light forest, wooded savannah, shrub savannah and grassland savannah of the flood plains) are distinguished in the study area and "intermediate" formations characterized by a strong predominance of the mosaics of different plant formations. The forest savannah commonly known as light forest is normally found in the Sudanese zone where precipitation exceeds 1,200 mm. This type of vegetation is particularly found in areas spared from cultivation and sparsely populated. The trees to the south of the study area form flattened domes with some very narrow valleys. They are sparsely populated outside these valleys. The clear forests and wooded savannahs with predominantly colecomics are widely represented in the Lere-Fianga-Pala triangle. The most typical formation is that with the joint dominance of *Anogeissus leiocarpus* and *Boswellia dalzielii*, *Sterculia setigera* are also well represented.

The wooded savannah contains many average trees characteristic of the little-exploited land of Mayo-Kebbi. It is close to the forest savannah clear. This plant formation is found on the piedmonts of the koros (tropical ferruginous soils ...). It is characterized by the dominance of the Combretaceae. The woody species mostly encountered are: *Anogeissus leiocarpus*, *Combretum glutinosum*, *Terminalia avicennoides*, *Khaya senegalensis*, and *Sterculia seigera*, for trees. The *Detarium microcarpum*, *Ziziphus mauritiaca*, *Bauhinia reticulata* and *Hymenocardia acida* are dominant shrubs.

The wooded savannah is a formation in which the trees are scattered within a blanket of shrubs and herbaceous. Tree cover is about 20% and can sometimes reach 25% for all trees. The upper stage is often composed of species spared by man during clearing such as *Parkia*

biglobosa, Tamarindus indica, Vitellaria paradoxa and Acacia albida. But in a "natural" environment, the dominant species are Terminalia macroptera and Daniellia oliveri;

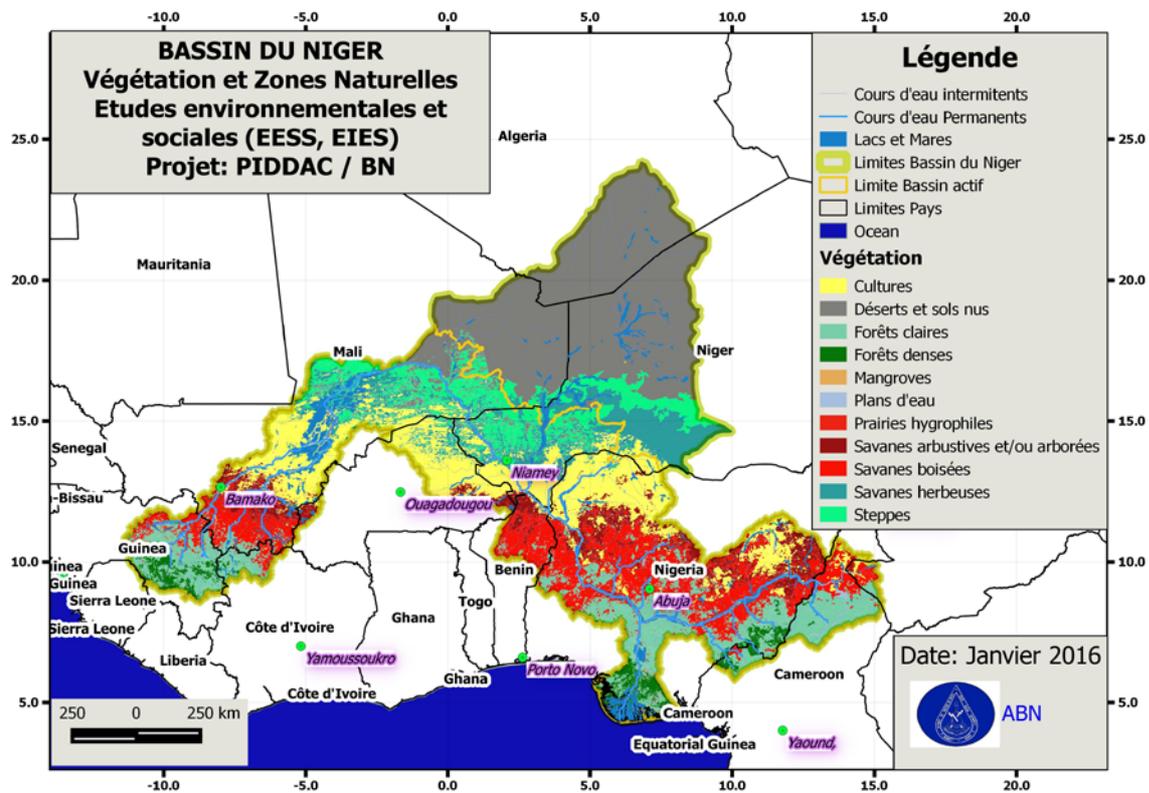


Figure 6: Vegetation map in the Niger Basin
Source: IDES Sahel Design (from the NBA database)

The shrub savannah consists of a grass carpet with a cover of shrubs not exceeding 20% of the area. Generally, it is formed of low vegetation of small trees or shrubs. The easily penetrable complex occupies hydromorphic soils, poorly leached tropical ferruginous soils, brown or subarid-brown soils. This formation is found in all fallows of the Mayo-Kebbi. The grass stratum is highly developed with a height of 2 m. It covers the entire densely populated area between the koros and the flooded plains. Some trees such as *Butyrospermum*, *Kaya senegalensis*, *Tamarindus indica*, *Borassus aethiopicum*, *Hyphaene thebaïca* and in *Acacia albida* villages are deliberately preserved there. The dominant species are: *Acacia senegalensis*, *Detarium microcarpum*, *Anona senegalensis*, *Hymenocardia acida*, *Terminalia avicennoides*, *Combretum* sp., *Bauhinia reticulata*, and *Vitex madiensis*. The dense herbaceous stratum comprises grasses, *Boreria radiata*, and *Cochlospermum tinctorium*. The main species are *Acacia seyal*, *Balanites aegyptiaca* and *Lannea humilis*, while the herbaceous stratum consists mainly of *Aristides*, *Ctenium elegans* and *Schoenfeldia gracilis*.

The pseudo-steppe is an open plant formation composed of annual grasses (0.5 to 1 m) and a few low woody species dominated by thorny and hard-leaved species. This vegetation is characteristic of the Sahel domain with a dry season of 7 to 8 months and a rainfall varying between 205 and 500 mm per year. This plant formation occurs in the north of our study area when soil conditions are unfavorable.

The sparse savannah of the floodplains is the vegetation of the plains which pushes the vegetation back towards the land that has been exposed or weakly flooded. The density of the tree stand is a function of the depth of the flood plot. Beyond 1 m of water, the only remaining vegetation is the marshy-type meadow. The few species that dot the plains from time to time are refugees on the few mounds; the termite mites escape the water table. In flood zones, the tree stratum disappears and the grass carpet becomes higher and denser. The degradation of vegetation cover is closely linked to human presence and results in the presence of stunted and scattered shrubs. Shea butter (*Vitellaria paradoxa*) and Doum palm (*Hyphaene thebaïca*) are two very common species in the vicinity of villages and lakes.

Table 7: Land use statistics on the active Niger basin in 2000.

Class Vegetation	Area in km ²	% of area
Cultures	9 099,5	0,6%
Cultures (Sahelo-Sudanian)	12 401,5	0,8%
Deserts and bare floors	44 734,6	3,0%
Dunes (Sand) / sparse meadows	113 327,2	7,6%
Forest (Soudano-guinean)	218 059,4	14,6%
Degraded forests	5 306,4	0,4%
Dense forests (Sudano-Guinean)	67 391,4	4,5%
Dense Tropical Forests (Plain)	14 177,0	0,9%
Mangroves	6 072,9	0,4%
Mosaic of forests and savannas	56 324,9	3,8%
Water places	2 373,9	0,2%
Sparse Prairies (Sahelian)	72 413,7	4,8%
Hygrophilous prairies	614,4	0,0%
Flooded meadows	1 937,3	0,1%
Very sparse meadows (Sahelian)	167 147,4	11,2%
Pseudo Steppes (North)	97 915,4	6,6%
Pseudo Steppes (Sparsy vegetation)	27 841,2	1,9%
Shrub and / or tree-lined savannas	1 585,5	0,1%
Closed shrub and / or tree-lined savannas (Sahelo-soudanian)	153 332,1	10,3%
Closed shrub and / or tree-lined savannas (Sudanian)	298 079,8	20,0%
Open shrub and / or tree savannas (Sahelian)	112 268,3	7,5%
Stone / rock surfaces	11 109,4	0,7%
Total	1 493 513,2	100,0%

Source: NBA_Global Land Cover, 2000

One quarter of the area of the basin is covered by crops, that is to say, by soils cleared for the most part. To this, must be added a large part of the areas which are covered mainly by natural plant formations (more than 55%), but which are interspersed with clearings cultivated at a level that can be estimated on average on the basin, to almost half of the surfaces. In total, therefore, about 50% of the active area of the Niger Basin is occupied by crops and where soils remain exposed for at least a large part of the year. This is a situation that has been on the rise for decades because of the increase in population.

Vegetation cover is the best protection against soil degradation due to raindrops and the initiation of the erosive process leading to land degradation and desertification in arid, semi-arid and dry sub-humid areas. It is directly threatened by overexploitation caused by human activities (agriculture, livestock, and energy) and remains a determining factor in the functioning of the watershed.

According to the FAO (2010³), among the Niger Basin countries with a net estimated loss of forest area of 1 per cent or more per year, Nigeria with the highest net annual loss for the period 2000-2010 Nigeria (-3.7 per cent), followed by Cameroun (1, 07%), du Benin (1,06%), Burkina Faso (1,03%) ; Niger (1%). In Cameroon (1,07%), Benin (1,06%), Burkina Faso (1,03%); Niger (1%). Mali and Guinea account for 0.62% and 0.54%, respectively.

This degradation of forest formations has been accentuated, in particular with the increase of the urban population, which generates a higher demand for wood-fired cities. In addition, clearing land activities exploit 300,000-400,000 ha per year and takes place on more and more marginal lands and in the cotton zone in southern Mali. The rate of increase in cultivated areas is estimated at 7% per year, which results in a direct and indirect degradation rate of 8-12%⁴ on the natural ecosystem area. This situation, while contributing to an accelerated degradation of the forest area, jeopardizes the country's significant biological diversity. By way of illustration, Niger forests, despite their low productivity (varying between 0.1 and 1.5 stère / inbt / year), provide 87% of the estimated energy needs of 1.5 to 2 million tons per year⁵.

It thus appears, generally across the basin, a tendency towards the reduction, fragmentation or even disappearance of habitats. In Benin, for example, comparative analysis of satellite images of the basin portion showed that from 1972 to 2006, the main forest formations, namely the gallery forest, dry dense forest, light forest and wooded savanna, and Savanna and shrub land have substantially decreased. In particular, gallery forests have decreased by 35% in 34 years and by 19% in the last 16 years. Dry dense forests have decreased by 29% in 34 years and by 22% in the last 16 years. The regression rate of light forests and wooded savannas is 38% in 34 years and 26% in the last 16 years. Tree and shrub savannahs have declined by 33% in 34 years compared with 22% in the last 16 years. For floristic diversity, there is a strong threat throughout the basin, the migration and even the disappearance of certain plant species. In Niger, for example, based on findings from direct users of biodiversity, ad hoc surveys and mission reports, some medicinal species such as *Securidaca longepedunculata* have disappeared and others are scarce (*Commiphora Africana*, *Prosopis africana*, etc.).

³ FAO, 2010. Evaluation of World Forest Resources 2010 – main report. FAO survey: Forests N° 163. Rome, Italy. 348p.

⁴ National Councils for the Environment for a Sustainable Development (July 2006) : National Action Program for Climate Change Adaptation 90 Pages.

⁵ National Councils for the Environment for a Sustainable Development (July 2006) : National Action Program for Climate Change Adaptation 90 Pages.

5.1.6. Fauna

In the Niger Basin, there are wild and aquatic fauna. The wild fauna is quite rich and varied. It benefits from a protection regime depending on the degree of threat of the species. Some species are fully protected, especially *Hippopotamus amphibius*, *Trichechus senegalensis*, *Orycteropus afer*, *Loxodonta africana*, *Giraffa camelopardalis*, *Acinonyx jubatus*, *Panthera pardus*, *Gazella dama*, *Crocodylus niloticus*, *Testudo sulcata*, *Python sebae*, *Struthio camelus*, *Balaeniceps rex*, *Comatibiseremita*, *Sagittarius serpentarius*, *Bicornvus abyssinicus*, and other species are partially protected, these are: *Panthera leo*, *Hippotragus equinus*, *Adenota kob*, *Varanus*.

In Benin, in the Niger basin, the fauna is varied and varied. It includes species such as *Syncerus caffer*, *Hippotragus equinus*, *Alcelaphus buselaphus*, *Gazella rufifrons*, *Redunca redunca*, *Sylvicapra rimma*, *Cephalophus rufatus*, *Ourebia ourebia*, *Tragelaphus scriptus*, *Damaliscus korringum*, *Phacochoerus eathiopicus*, *Panthera leo*, *Crocodylus niloticus*, *Python Sebae*, *Struthio camelus*, *Balaeniceps rex*, *Francolinus squamatus*, *Cigonia cigonia*, etc. Some species such as *Diceros bicornis* and *Giraffa camdopardalis* have already disappeared, while others such as *Caninonyx jubatus*, *Damaliscus korringum* and *Trichechus senegalensis* are disappearing. The itchyofauna is rather rich and varied. There are species such as *Clarias lazera*, *Clarias spp*, *Tilapia galilleae*, *Tilapia spp*, *Gymnarchus niloticus*, *Heterobranchus bidorsalis*, *Lates niloticus*, *Alestes spp*, *Hydrocynus brevis*, *Hydrocynus forshkali*, *Citharinus spp.*, *Distichodus rostratus*, *Distichodus spp.*, *Labeo senegalensis*, *Labeo Cowpea*, *Labeo spp*, *Auchenoglanis occidentalis*, *Auchenoglanis spp.*, *Synodontis spp.*, *Polypterus spp*

In Burkina Faso, the area is home to numerous wildlife reserves and a national park covering the provinces of Gourma, Kompienga, Komandjari, and Tapoa. The reserves cover 30.43% of the total area of wildlife areas and contain 80% of wildlife resources at the national level. These are mainly partial reserves of Pama (223, 000 hectares), Arly (119, 000 hectares) and the total reserve of Singou (117, 394 hectares). The reserves occupy 25% of the area of the province of Tapoa (W National Park). The categories of wildlife species encountered are as follows: Large terrestrial mammals; the reptiles; the avifauna (several species of birds).

In the Sahel region, the fauna of the area is relatively large and characterized by small game and birdlife. In the village of Zigberi located 11 km from Markoye, there is a hunting concession of 55 000 ha. The faunal resources of the commune are composed of a large bird fauna and various animals. Animal species are hyenas, jackals, hares and warhogs. Avian wildlife consists mainly of ducks, Francolins of wild guinea fowl and bustards. The scarcity of large animals is largely due to degradation of vegetation cover and anthropogenic actions.

In Cameroon, the Niger Basin still has three major areas of international interest for the conservation of large wildlife. The East-West Benoue zone covered by Sudanian savannah covers an area of 50,000 km² and is still home to abundant and typical wildlife (*Bubale (Acephalusbus elaphus)*, *Eland de Derby (Taurotragus derbianus)*, *Hippotrague (Hippotragus equitus)*, *Elephant (Loxodonta spp)*, *Hippopotamus (Hyppopotamus amphibius)*, etc.). As for birdlife, it consists of more than 306 species and the main birds encountered in the area are

the large-billed Touraco (*Tauracoma crorhynchus*), the Francolin of Cameroon (*Francolinus camerunensis*); Tisserin Gendarme (*Ploceus cucullatus*), Collared Dove (*Streptopelia semitorquata*), etc. In addition, species such as the black stork (*Ciconia nigra*), the African jabiru (*Ephippiorhynchus senegalensis*) and the sacred ibis (*Threskiornis aethiopicus*) are disappearing from the region. The aquatic fauna of the area is rich and diversified but remains dependent on the Benoue and Faro rivers. These rivers provide populations with a variety of fish varieties.

Some of these animal species such as the *Lycaon pictus*, the *Panthera pardus* and the Derby Moose are disappearing in the area, while the Black Rhino (*Diceros bicornis*) has completely disappeared from the area because of poaching. This biological diversity is particularly threatened, particularly by activities such as gold mining (in the case of the Benoue National Park) and large-scale poaching (in the case of Bouba Ndjida National Park, where more than 200 elephants were massacred in 2012).

Three national parks are destined to conserve this great fauna and its habitats. The area of intervention comprises 7 reserves of which 2 partial reserves (Elephants and Giraffes) and 5 Areas of hunting interest totaling 5, 810, 760 ha. The restoration was the enrichment of these forests and their endowment in planning and management plans, having the dual objective of protecting the watershed of Niger and of production of wood are activities inscribed in the programs of Waters and Forests. Concerning the RAMSAR sites, the zone of intervention contains the biggest ones: the Inner Delta of Niger (Debo Lake, Horo Lake and Seri Plain) and the Sourou totaling 4,176, 000 ha.

In Cote d'Ivoire, only four small mammals are strictly endemic in the project area, a species of *Deomys* (*Deomys eburnea*), a rodent, *Malacomys cansdalei*, a white-throated shrew, *Crocidura wimmeri*, and Togo mice *Leimacomys buettneri*). Other endemic and almost endemic mammals are the Mona subspecies of Lowe (Lowe of *Cercopithecus*), the spotted nose monkey (*Cercopithecus petaurista petaurista*), the olive colobus (*Procolobus verus*) Antelope (*Neotragus pygmaeus*). Other quasi-endemic species are small rodents and shrews, including the Kitamps (*Funisciurus substriatus*) root squirrel, the Occidental palm killer (*Epixerus ebi*), the Gambian solar squirrel (*Heliosciurus punctatus*), *Oenomys ornatus* and *Crocidura muricauda*. Most of these endemic species are found only in the eastern and western parts of the Upper Guinea forest. The large carnivores in this ecoregion are the leopard (*Panthera pardus* EN), the golden cat (*Profelis aurata*) and the African civetta (*Civettictis civetta*). These are all rarely mostly due to habitat modification and excessive hunting.

Small populations of forest elephants are found in this eco-region, often isolated in unrelated forest patches. Forest elephants can play a significant role in the influence of forest composition and their possible extinction in this eco-region would affect the forest tree species that depends on them for seed dispersal and regeneration. The role of elephants as seed dispersing agents has been examined in Ghana's forests where there is no immediate evidence of population collapse but *Balanites wilsoniana* is cited as a species that is likely to

suffer if elephants arrive at extinction. *Tieghemella heckelii* was cited as another species that appears to be dependent on forest elephants for regeneration.

The richness of bird species in this eco-region is high but there is no strict endemic species and all endemic species are shared with the western part of the Upper Guinea forest. These two eco-regional forests are considered an endemic area of birds, which contains 15 unique bird species. The western eco-region of the Guinean forest is richer in these endemic species than the eco-region of the Guinean Eastern Forest. Near-endemic species are found in the eastern part of the Guinean forest eco-region including white-breasted guinea fowl (*Agelastes meleagrides*), Ghana cuckoo shrike (*Campephaga lobata*), brown-cheeked hornbill (*Ceratogymna*), The Red-necked Warbler (*Apalis sharpei*), the Red-necked Warbler (*Apalis sharpei*), the Red-necked Warbler (*Apalis sharpei*), the Red-winged Warbler (*Apalis sharpei*), the Red-winged Warbler (*Glaucidium castaneum*), the Red-winged Illadopsis (*Illadopsis rufescens*) and the Sierra Leone prinia (*Prinia leontica*) Black-crowned redhead warbler (*Bathmocercus cerviniventris*), yellow-headed picathartes (*Picathartes gymnocephalus* VU), Ladgen bushshrike (*Malaconotus lagdeni*) and the red fishing nougat (*Scotopelia ussheri* EN). Overall, wildlife resources are under strong pressure to challenge their future. The main pressures identified are poaching, farming, logging, fishing, harvesting of non-timber and secondary wood products, uncontrolled bush fires.

In Mali, the terrestrial fauna of the basin is rich and diversified, although it has declined sharply in recent decades. Its diversity varies according to bioclimatic zones and is linked to the evolution of natural habitats. It is represented by mammals, with 136 species, of which 70 species of large and medium mammals, but whose population is in great regression. As their habitats have been destroyed and in some cases, poaching has led to the disappearance of certain species such as: Oryx, antelope korrigum, addax, derby, Giraffes (the last of which are recorded in the Ansongo-Menaka reserve), elephants (about 500 to 600 heads in the Gourma reserve), chimpanzees.

The avifauna is particularly rich with some 640 listed species of which 15 rare. The Inner Niger Delta, which extends from 20 to 40,000 km², is a very special wetland. It comprises 3 RAMSAR sites (since 2004) of international importance totaling 162 000 ha. These are Walado Debo, Lake Horo and the Plain of Seri, which constitute true sanctuaries recognized as world heritage to be saved. They are home to nearly 350 species of which 108 are migratory. These sites are eco-tourism places

In Guinea, the Guinean Watershed of Niger is an area of high ecosystem and biological importance. The valley of the river, but also that of most of its tributaries (Tinkisso, Sankarani, Fie, Milo), are also wetlands of international importance of which about 4.5 million ha (of which more than 100,000 ha) have been classified under the Ramsar Convention. These wetlands are home to thousands of Palaearctic migratory waterbirds, and some sites such as the Niger / Mafou area (which includes the Upper Niger National Park) or the Sankarani / Fie area (which includes the Kankan) are migration corridors for large mammals, between Guinea and neighboring countries, where water resources are abundant all

year round. The interest of the project area in relation to biodiversity is confirmed by the designation in 2002 of a wetland of international interest integrating part of the courses of the Upper Niger, Milo and Niandan. This is the Niger-Niandan-Milo Ramsar zone. Several species in the area are subject to international protection, the most emblematic of which are certainly the chimpanzee, in the terrestrial environment and the manatee in an aquatic environment. These two species are already exceptionally rare in the project area. In addition, the National Park of Upper Niger (PNHN), in spite of its average mammalian richness (97 species in total), the PNHN constitutes a natural shelter of primary importance for Guinea for the maintenance of the natural equilibriums and the conservation of the biodiversity. Plant characteristics and the disposition of surface water influence the distribution of animal species in the field. The multiplicity of plant formations offers several different habitats to animals. Animals typically belonging to the Sudanese area (bubal, Buffon's cob ...) prefer open environments, while those in the Guinean zone (yellow backed duiker, Maxwell's duiker, etc.) share the different forest formations. The chimpanzee, as well as the leopard, also present in the PNHN, are listed in Annex I of the CITES Convention ratified by Guinea. This Annex includes endangered species whose trade is subject to particularly strict regulations and is only permitted under exceptional circumstances. An estimate of the density of *Pan troglodytes* chimpanzees has been made in the Mafou ZIP of Park by counting nests on transects (Fleury-Brugiere, 2002). The Average density of chimpanzees in the area can be estimated at 0.45 individuals / km² ranging from 3.0 ind./km² in gallery forest to 0.01 ind./km² in clear savanna. Indeed, the abundance of the nests observed varies significantly according to the plant formations: whereas the gallery forests cover only 4% of the sampled area, they account for nearly 38% of the nests observed.

Dry forests, which occupy 21% of the area, also constitute a preferential habitat (40% of the nests) while the savanna formations are used less (20%). This average density appears to be quite high compared to other savannah sites in West Africa. Given the area of the ZIP-Mafou, this area could accommodate a population of about 250 weaned individuals, which confirms the importance of the PNHN for the conservation of the common chimpanzee, both by its population size and by the environments exploited by these animals.

For birds, a total of 323 different species were recorded in two PNHN bird identification studies, 175 of which were in the Kuya forest alone (19). The PNHN avifauna is a good average for West Africa. By way of comparison, the bird life of the W Niger National Park (Benin, Burkina Faso and Niger) totals 337 species. Most of the birds encountered belong to the tree or savannah fauna. Only a few species are significant in forest environments. These include the *Turtur tympanistris*, the green bulbul (*Andropadus virens*), the white-browed Cossyph (Cossypha polioptera), and the Great Cossyph (Cossypha albicapilla).

Wetlands, represented by flood plains, shallows, ponds and marshes, are most affected by the dam lake. The most typical birds of this habitat are the Rhyhchee (affected benghalensis), the Jacana (*Actophilornis africanus*), the Sentinel Lark (*Macronyx croceus*), the Great Mustache Warbler (*Melocichla mentalis*) and some Palearctic migratory species such as the Purple Heron

(*Ardea purpurea*) and the Garzette Egretta (*Egretta garzetta*). None of the region's avifauna species are listed in CITES Appendix I or considered to be threatened by IUCN.

In Niger, major areas of outstanding biodiversity, defined by the clustering of areas favorable to certain taxa (water birds, fish and other vertebrates), and hydrological and ecological processes are described below.

The Ayorou-Tillabéri-Tera triangle, an important biodiversity hub which is one of the most important wetlands in the country (Ramsar Kokorou-Namga site). In addition to the floodplain of the river, a complex of four ponds, Kokorou and Namga (permanent), Zoribi (semi-permanent) and Tida located in the bed of a fossil tributary of the Niger River on its right bank and separated one another by dune cords constitute an important set of diversified habitats for aquatic avifauna. This complex contributes to the maintenance of the biological diversity of the Sahelian region of Niger and has a certain scientific and economic value. More than 50,000 individuals representing 56 species of birds including more than 35,000 widowed dendrocygnes and a significant amount of threatened bird species such as the Crowned Crane live there.

The W Park between Benin, Burkina Faso and Niger, set up as a Trans-border Biosphere Reserve of the W. 52 species of mammals have been recorded including the elephant, the buffalo, the Cob defassa, the Cob redunca, the damalisque, the harpoon, the giraffe, the hippopotamus, the hippotrague, the lion, the cheetah and a diversity of monkeys. Endangered species include cheetah, lycaon, elephant and manatee. Some 360 species of birds of African or Palaeo-arctic origin have been identified. The fauna of the National Park, representative of the Sudanese biome of which it constitutes the northern limit is described as follows (Le Berre, 1995): (i) The fish belong to the fauna of the Niger basin and are represented by 112 species. Among the most representative species are: *Lates niloticus*, *Oreochromis niloticus*, *Clarias* sp, *Bagrus filamentosus*, *Bagrus docmak*; *Schilbe niloticus*; *Hemisynodontis* sp. (ii) Reptiles are represented by terrestrial and aquatic tortoises (*Testudo sulcata*, *Trionyx* sp), lizards such as the Nile varanus (*Varanus niloticus*), snakes (*Python sebae*, *Bits arictane*), and crocodiles (*Crocodylus niloticus*).

The Liptako / Gourma Region, shared by Niger, Mali and Burkina Faso, which is heavily landlocked in the Sahel, with typical dryland ecosystems. The flora of this area is rich, as are its mammalian fauna: elephants, red-fronted gazelles, spotted hyenas, warthogs and its Afrotropical avifauna and Palaeartic migrator. An extension to the Nigerian Liptako and its wetlands rich in afro-tropical and migratory birds is quite possible. A total of 150 species of reptiles and amphibians were counted (Issa, 2002). Birds are represented by 367 species including wild guinea fowl (*Meleagris numida*), gray heron (*Ibis hagedash*), and Gambia goose (*Plectropterus gambensis*). Mammals, more than 70 species, are represented by the large known species of Sudanian fauna among which are the elephant (*Loxodonta africana*), the lion (*Leo leo*), the buffalo (*Syncerus caffer*), the hippotrague *Hypotragus equinus*, damalis (*Damaliscus korrigum*), warthog (*Phacochoerus aethiopicus*), cob defassa (*Kobus defassa*), cheetah (*Acynonix jubatus*), orycterop (*Orycteropus afer*).

Nigeria has a biodiversity rich in fauna and flora. The study area contains more than 60% of Nigeria's national parks. The endemic species are: scorpions, spiders, amphibians, amphisbenes, geckos, snakes, saurians, etc. The study area is also home to the Gashaka Gumpti National Park, which is the largest Nigerian park. Located 200 kilometers southwest of the town of Yola, it includes Mount Chappal Wadi, the highest point in the country at 2,418 meters above sea level. You can see elephants, hippos, buffalo and monkeys. The location is renowned for its excellent bird watching opportunities. There are nearly 7895 species of plants identified in 332 families and 2215 genera. There are 22,000 vertebrate and invertebrate species, including nearly 20,000 insects, 1000 species of birds, 1000 species of fish, 247 mammals and 123 reptiles. Approximately 0.14% of these species are estimated to be at risk and 0.22% are at risk. All these animals and plants are distributed on the natural territory between the coastal mangrove of the south and the Sahelian zone to the north.

In Chad, ecosystems in the national portion of the Niger Basin fall into two groups, one of which is located in the main river system of the watercourse, mayos, shallows and lakes floods during part of the year. The other group is found in the exposed areas.

In flooded areas, there are three types of ecosystems. Those of the steady-state lakes (Lere, Trene, and the three Toupouri lakes), the Mayo-Kebbi floodplain and the edges of the large temporary streams (mayo). The lakes and ponds of Mayo-Kebbi contain large mammals: Lamentin and hippopotamus populations, water turtles, crocodiles and lizards. Lamentin, apparently, does not appear to be threatened in the short term. The hippopotamus population was decimated in the late 1970s during the civil war, but the species seems to be gradually recovering. However, there is uncertainty about water turtles, crocodiles and lizards. As for the avifauna of the lakes, it is very varied. 70 species were recorded. These are migratory species such as Gambia goose, helmeted duck, and various shorebirds (Knights, Herons, Wader). The three islands, located in the middle of Lake Lere attract many species that use them as dormitories (e.g. herons, African openbill...). Lakesides (mud flats, thickets or flood recession meadows) play an important role for many animal species; unfortunately, they are subjected to intense human pressure for vegetable crops and the orchard. Their economic activities cause tons of sand to be poured through the runoff into lakes and streams.

The floodplain of the Mayo-Kebbi River is rich in bird life with more than 50 species listed: Knights, Ibis, Wagtails, Jacanas, Herons, Egrets, Jabiru, Kingfishers, Bee-eaters etc ...). The floodplain appears to be a biotope particularly favorable to some water-related antelopes such as the Fassa Cob or the Redunca, both found in the Mayo-Kebbi valley. In the banks of large temporary streams (Mayos) and ponds, the main tributaries of the Mayo Kebbi are marked by their forest galleries. The most visible are Mayo Dalla, Mayo Ladde and Mayo Tam. These galleries are located on the alluvial ridges, delimiting the minor bed of the watercourse. The latter, entirely sandy, can no longer bear any vegetation. The banks of these Mayos also shelter the *Chloris robusta*. The galleries are the sites of the great Sudanian woody species. These main tributaries of the Mayo Kebbi also have peripheral depressions (major bed) which often carry more or less dense wooded savannas. It is in these situations that one

can observe some ponds conserving water very late in the dry season. These are characterized by meadows and sometimes clear forests. Other pools can be observed in rocky depressions. Some have particular vegetation with dense thickets of *Allophyllus africanus*. The approaches to watercourses are also full of birdlife. 35 species have been found in the galleries, including the Touraco violet, the Green Pigeon, the Youyou, the Parakeet and the Red-throated Barbican. The galleries are also places of predilection for antelopes (Guib harnessed, Cephalophe with red flanks, Cephalopher of Grimm), and by the monkeys (Babouin doguera, green monkey). A panther was observed in the gallery of Mayo Dalla.

Areas exposed to the savannahs of the summits and hills develop a vegetation of savannah on lithic soil (granitic chaos) or on solodized soils. Hippotragus is the best represented antelope species in these ecosystems. It is easily visible along the Gauthiot Falls Trail. The Ourebi and the Red-fronted Gazelle share the same space, although the latter seems to be much more linked to the pseudo-steppes of the North of the Binder-Lere wildlife reserve. The sporadic presence of giraffes is probable (traces, testimonies). They prefer the eastern part of the reserve between Gauthiot Falls and the ancient village of Tam. According to the archives, a giraffe was observed by Dejace (1996) during his aerial survey. Doguera baboons are numerous around the Gauthiot Falls and in the hills around Mount Oua Alou. The warthogs are very abundant and the jackals regularly mark the nights by their yelps.

Small carnivores such as Mongoose, Civet, Genette as well as reptiles such as the Palm-rats and Porcupine are also present in the study area. Concerning the avifauna, 87 species were identified: The dense grassy cover attracts the most spectacular species: Outarde, Grand Calao.

Dejections and tracks of ostrich could be noted. Granivorous species occupy open environments, for example, Amaranth, while wooded savannas are used by insectivores such as Coucal. Rock chickens are found around the Gauthiot Falls. The burned areas are used by the Guinea Ganga, Little Bee-eater, and the small red-billed Calao. Depending on the needs, these species presented above can live in the dry season, the environments linked to the hydrographic network and vice versa.

Protected areas: In the national portion of the Niger basin, there are two protected areas: The Yamba Berte classified forest, located south of the Mayo Kebbi in the Kabbia department, has a status as a forest of conservation of the national heritage. This forest of 64 000 ha is conserved for its wealth of wildlife. Despite the protection measures put in place, the forest is threatened by degradation factors such as clearing of cultivated land, logging, grazing and bush fires. This threat has already eroded the east and north along the Pont-Carol axis.

The Wildlife Reserve of Binder Lere was created by the Presidential Decree of 24 May 1974 (Decree 169 / PR / CSPP / RNR). It covers 135 000 ha and encompasses the lakes Lere and Trene. It covers geographically the sub-prefectures of Binder, Lere, Guegou and Lagon. It is rich in avian and terrestrial fauna. The decision to protect this area is linked to the presence of the manatee in Lere and Trene lakes, a rare species to be conserved, to the presence of

hippopotamus and other wildlife and floristic species (especially elephants).

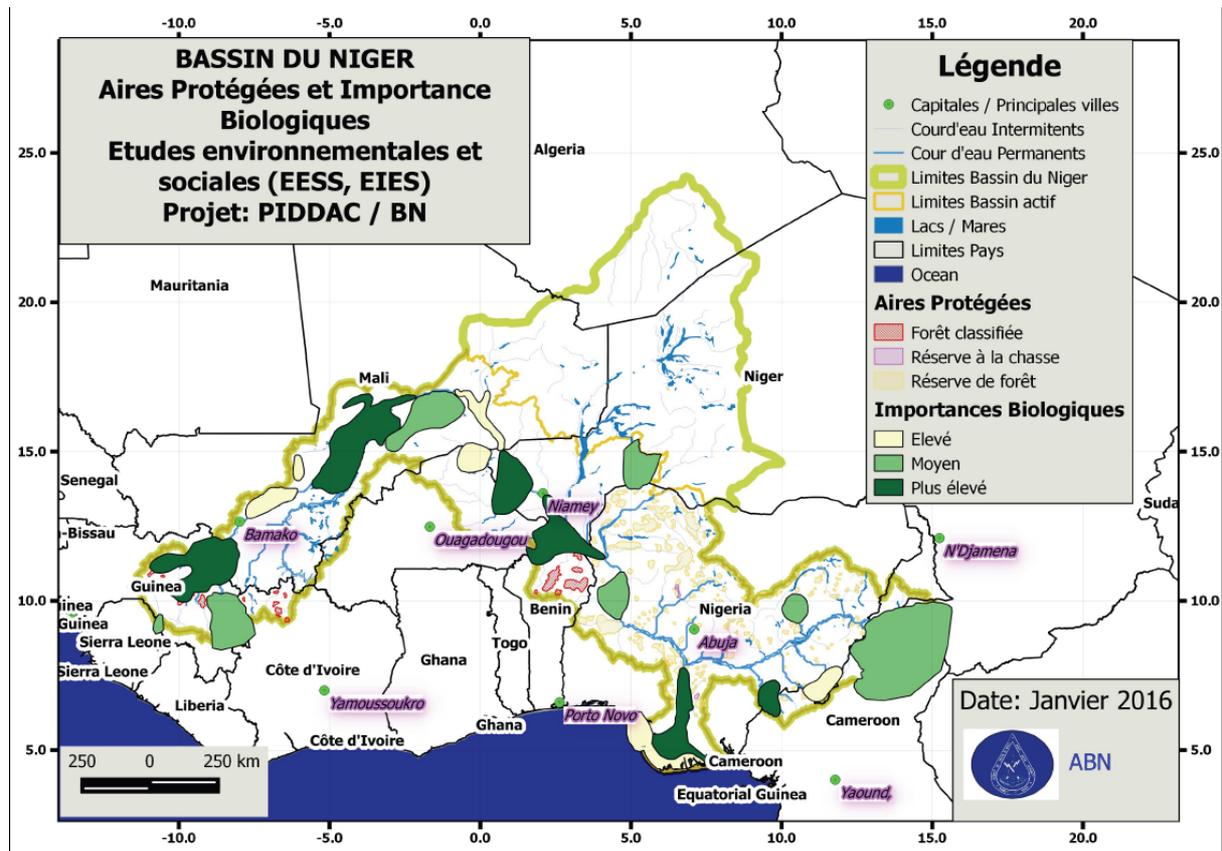


Figure 7: Protected Areas and Importance for Biodiversity
Source: IDES Sahel Design (from the NBA database)

However, as in the case of habitats and flora, terrestrial fauna has declined in recent years, while many species are threatened or have become scarce or have simply disappeared. Thus, today, over the entire basin, several species of mammals are threatened with extinction such as Addax (*Addax nasomaculatus*), the cuff sheep (*Ammonotragus lervia*), the giraffe (*Girafa camelopardis*) of which the Niger conserves the last West African specimens, the ostrich (*Struthio camelus camelus*), etc.

The fish fauna is relatively homogeneous throughout the study area, with the same species on the Upper Niger basin in Upper Guinea and Mali, including the interior delta. This "Sudano-Sahelian" settlement is very similar to that of the other large Sahelian rivers (Senegal, Gambia, Volta, Benoue, Lake Chad basin) and has strong similarities with that of the Nile basin.

The specific richness of the interior delta is particularly important: all the species in Upper Niger (130 to 140 different species distributed in 26 families), adapted to the environmental instability due to the seasonal variations of the hydrological cycle, are represented with the exception of some species under the heads of pelvis. 24 species are endemic to the Niger

basin. With overfishing, the demographic structure of populations has become considerably younger with a dominance of young individuals (three quarters of the fish caught are individuals of the year or “0+”). Large individuals (more than 3 years old, more than 50 cm) have become rare. The main species encountered are: cats or siluriform fishes of the Bagridae families (*Bagrus* spp., *Auchenoglanis occidentalis*, *Chrysichthys nigrodigitatus*, *Ch. Auratus*), Mochokidae (*Synodontis* spp.), Claridae (*Clarias* spp., *Heterobranchus longifilis*) and Shilbeidae (*Shilbe* spp.), Cyprinidae (*Labeo* spp., *Barbus* spp.) and Citharinidae (*Citharinus* sp), Mormyridae, Characidae (*Alestes* spp., *Brycinus* spp., *Hydrocynus*), Centropomidae (*Lates niloticus* Captain ") and the Cichlidae (tilapias). The captain and the cheetahs are the most sought species. Tilapias (with about half of the catch), *Clarias* and *Labeo* are the most abundant species in the catches of fishermen in Upper Guinea. For the wet and aquatic ecosystems of the Niger basin, which are one of the most important ecological resources in the world, this abundance must not overshadow the great fragility of these ecosystems, particularly those of the most important wetlands in terms of biological diversity are the Inner Delta, the Middle Niger Wetlands and the Maritime Delta. Indeed, their sensitivity is linked to their dependence on the hydraulic conditions of the river (height of water, flow, duration and period of submergence) and also to the development of the human economic and social activities they support.

The ichthyofauna of the Niger Basin with 138 species of fish recorded in the 1950s, grouped into 26 families, 62 genera and 24 of which are endemic, only 80 would remain now. Large droughts and large dams and settlements (which constitute new fishing areas and high concentrations of fishers) have contributed to change flood regimes, reduce natural production areas, in particular in the Delta, and to modify aquatic ecosystems. Thus, any action to exploit water resources can directly or indirectly have an impact on these ecosystems.

The decline in the biodiversity of aquatic fauna is also blamed on traditional fishing techniques, which lead to local overexploitation. Such techniques include inappropriate and overly tight netting, catches by non-selective dams, blast fishing and other toxic products, and so on. Currently, there are more serious threats on these wetlands as a result of this very high sensitivity to fluctuations in the river's hydrological regime and, above all, the very high pressure they are putting on the exploitation of their resources.

5.1.7. Hydrographic and Hydrological Contexts

The Niger River originates in the Fouta-Djalon plateaus in Guinea and successively crosses Mali, Niger, Benin and Nigeria where it flows into the Atlantic Ocean after a journey of about 4200km. It is the third longest river in Africa, the 14th in the world and the 9th in terms of the size of its watershed. Its active basin covers an area of approximately 1.5 million km² shared by the nine (9) countries grouped within the Niger Basin Authority: Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Guinea, Mali, Niger, Nigeria and Chad.

The non-active part of the catchment area basically concerns Algeria, Mali and Niger. The 82% of the total area of the basin is shared between three (3) countries. However, due to the spatial distribution of precipitation over the basin, a country's contribution to river flow, as

shown in Table 8, may be quite different from its rank in terms of watershed area. For example, the 4% of the Cameroonian part of the basin produces an average of 34 km³ per year, or almost 19% of the annual volume of river flows. In contrast, Mali, which ranks second in terms of area (26% of the total), has a negative contribution to the river flows. Niger's water losses during its crossing of the Malian territory are estimated at about 30 km³ in the middle year, whereas its contribution to the annual flows of the river is only 15 km³ (Olivry, 1986 and 2002).

Table 8: Niger River basin area in countries and their average contribution to annual flow⁶

Countries	Area in the Niger river basin (km ²)	% total area	Total Contribution to flow (km ³ /year)	% Total flow
Benin	46 384	2	3	1,6
Burkina Faso	83 442	4	1	0,5
Cameroon	87 900	4	34	18,7
Cote d'Ivoire	23 770	1	4	2,2
Guinea	97 168	5	36	19,8
Mali	578 850	29	Less than losses	0
Niger	427 323	22	Less than losses	0
Nigeria	629 545	32	117	64,3
Chad	20 020	1	1,6	0,9
Total	1 994 402	100	182	100

Source: NBA, 2002

In general, the Niger River regime varies from one climate zone to another. Therefore, flows in the different sections of the main stream of the Niger during a hydrological year from June to May of the following year are characterized by:

- floods in Koulikoro (Upper Niger Reference Station) from September to October;
- floods amortized and spread in the Inner Delta (October-November) with significant losses of water by evaporation and infiltration;
- two floods observed in the Middle Niger (in Niamey) after the border between Mali and Niger: the first known as “local” or “white” in September or October mainly caused by the right bank Niger-Burkinabe influx of tributaries and the second known as “Sudanian” or “Black” appearing in December-January or February, the maximum often exceeding that of the white flood depending on the years;
- maximum floods are observed in the "Lower Niger" thanks to the influx from the Benue in September-October

At the Inner Delta level, its hydrological functioning is largely dependent on flows from the Upper Niger and Bani basins and its own morphological and hydro-climatological conditions (effluents, floods, evaporation and infiltration).

In the Middle Niger, flows are largely dependent on flows from the Inner Delta and from the inflows of the right bank tributaries, on the one hand Gorouol, Dargol, Sirba, Diamangou and

⁶ Source : NBA & Olivry, 2002

Tapoas originate from Burkina Faso and on the other hand, the Mekrou, Alibori and Sota drain north of Benin. The average annual inter-annual flow from Niger to Niamey between 1971 and 2002 is only 704 m³ / s, compared with 1,062 m³ / s for the period 1929-1970, an overall reduction of 34%.

In the Lower Niger, the river receives several important tributaries, such as the Sokoto, the Kaduna and especially the Benue, the main tributary of the Niger River from the Adamaoua Mountains (Cameroon), whose watershed covers 450,000 km². Its contribution to its confluence at Lokoja with the Niger is at least equivalent to the contribution of the river itself: at Makurdi (before its confluence), its average inter-annual flow (1955-1995) is 2,920 m³ / s. The average inter-annual flow of Niger upstream of Jebba, downstream of the Kainji and Jebba dams is 1,454 m³ / s. After the confluence at Lokoja, it increases to 5,660 m³ / s (average of the period from 1915 to 2001). Like the Upper Niger and the Middle Niger, the Lower Niger is experiencing a significant drop in flows. The average of 1929-1970 is 6 055 m³ / s against 5 066 m³ / s (1971-2001), a decrease of about 17%. In addition, the most important tributary (Benue) flows into the Niger River at Lokoja, accounting for more than 60% of the flows at this station. The average annual flow recorded at the Lokoja station is 6352 m³ / s for a maximum flow rate of 19 664 m³ / s recorded on October 13th, 2014 and a minimum flow rate of 1570 m³ / s recorded on May 19th, 2015. Flows at this station during the 2014/2015 hydrological year remained lower than in the hydrological years 2011 / 2012, 2012 / 2013 and 2013/2014, but above the dry five-year period.

In Benin, the Benin basin of the Niger River owes its originality to the low valley of the Niger River which extends over 130 km and the watersheds of its three main Beninese tributaries: Mekrou (10500 km²), Alibori (13740 km²) and La Sota (13360 km²). The hydrographic network of the study area is dense; it consists essentially of two (02) basins, namely the basin of the Niger and that of the Oueme: (i) The Niger basin covers 38,000 km² (74.5% of the area of Borgou Alibori). It is fed by the tributaries of the River Niger which are the Mekrou, the Alibori and the Sota and (ii) The Oueme basin: 80 km long in Borgou, it is called the Upper Oueme and fed by the Yerou-Marou, Alpouro, Wêwê, Beffo and Okpara. These streams are at low water level during the month of March with a residual flow of 4.99 m³ / s for la Sota, in the months of December to April with cessation of flow for Alibori in the months from December to May with a residual flow of 124 m³ / s for the Niger River.

The volumes of drained water are estimated as follows: (i) Sota: 1 billion cubic meters; (ii) Alibori: 0.8 billion cubic meters; (iii) Niger: 30.8 billion cubic meters; and (iv) In the Mekrou basin at the outlet of Kompongou, this estimate is 583 million m³ / year, or 23.46% (DG-Eau, 1998). From the above, it appears that the project area has significant surface water resources. But the infrastructure and equipment for mobilizing these resources are sorely lacking. Furthermore, the resources of the Niger River are not totally available for the project area only because of the trans-border nature of this river.

In Burkina Faso, the Niger River watershed, with a total area of 83,442 km, consists of two separate parts and located at two ends of the country:

- the watershed of the Banifing, a tributary of the Bani which is itself one of the major tributaries of the Niger River. This basin is located west of the country where the average rainfall is estimated to be 950 mm. With a total area of 5,441 km², the Banifing basin is drained to the south by Seledogo and Sangoué and to the east by a multitude of rivers (Dougo, Konga, Dougbe), whose confluence forms the Sesse. The Tesse or Longo, the main tributary, receives the rivers of the south, confluence with the N'Gorlaka which borders with Mali over a hundred kilometers.
- the tributary basin on the right bank of the Niger River in the north of the country with an area of 78,001 km². The basins of these Burkinabe tributaries of the Niger occupy the entire northern and eastern third of the country. They can be subdivided into two groups:
 - the most northerly tributaries, which are the Beli (2.28 m³ / s), Gorouol (2.82 m³ / s), Goudebo and Dargol cover an area of 24 839 km²; They are largely endorhetic but can cause significant isolated flooding.
 - the Sudano-Sahelian tributaries, Faga, Sirba, Bonsoaga, Diamangou and Tapoa, cover an area of 53,162 km²; They have somewhat less irregular patterns and contribute to the Sudanian flood of the Niger River which occurs in September.

In Cameroon, the Niger hydrographic network consists of the tributaries of three watercourses: Upper Benoué, Kebi and Faro. The first two confluences upstream of Garoua. The third joins them at the Nigerian border. All of them are in the high peaks of Adamaoua or on the Mounts Mandara, at 1500 m altitude. They descend rapidly to reach altitude 500 m on less than 100 km. Before reaching the Nigerian border, they flow in the plains where slopes varies between 0.2% and 1%. The main permanent watercourses are the Benue and the Faro. The dams are basins for water reservoirs and are very rich in fish. They are Lagdo and Chidifi. The last type of runoff is mayos, which are temporary streams that usually flow in the rainy season. These rivers are subject to the phenomenon of silting which is the result of an important alluvium due to a strong erosion of watersheds. This erosion is caused by degradation of vegetation cover and other human activities. The accumulation of sand in the major bed of watercourses causes flooding that is detrimental to individual and collective infrastructure. This is the case of the Benue, for example, which is no longer navigable.

In Cote d'Ivoire, the hydrographic network of the Niger Basin consists of the sub-tributaries of the Sankarani and the Bani, which are the Baoulé, the Bagoué, the Kouroukelle and the Gbanhala. The rivers of the basin flow in south-north direction. The national portion of the Niger basin can be divided into two distinct sectors based on rainfall: the Odiénne sector which is representative of the Baoulé, Kouroukelle and Gbanhala sub-basins and the Boundiali sector which is representative of the Bagoué and Kanakelaba sub-basins. The Baoulé flows, for 330 km, from its source to the border of Cote d'Ivoire and Mali. It takes its source 32 kilometers east of Odiénne, towards Lengo at 600 meters. It then receives on its left bank the Douni and the Baie and on its right bank the Djémika and the Banifing. The average Baoulé slope between Beredougou and Djirila is 0.35 m / km. In Djirila, the watershed area is 4,170 km².

The Kouroukelle begins 60 kilometers south-west of Odienne. After a flow of 150 kilometers, it joins the Gbanhala and forms with it the river SANKARANI. The average slope of the Kouroukelle between Sirana of Odienne and Iradougou is of the order of 0.20 m / km. In Iradougou, the surface area of the basin is 1,990 km². The Guinean Basin of Niger consists of the Niger and six major tributaries: Tinkisso, Mafou, Niandan, Milo, Fie and Sankarani.

The Niger, also called Djoliba in the region, originates at Forokobia (CR-Kobikoro, Faranah Prefecture) at over 800 m altitude. It successively crosses the municipalities of Faranah, Kouroussa and Siguiri and returns to Malian territory after a flow of about 600 km. With a basin of 71,000 km², it receives successively in Guinean territory the Mafou in Banfele, the Niandan in Baro, the Milo in Djelibakoro and the Tinkisso in Siguiri.

The Tinkisso takes its source in the foothills of the Fouta Djallon mountain at about 1000 m altitude. It waters successively the municipalities of Dabola and Dinguiraye to flow into the Niger to Siguiri. With a length of 570 km, the Tinkisso has an estimated basin of 19,300 km². Its main tributaries are (i) on the right bank the Saba and Lele, (ii) on the left bank the Bouka and the Kounsili.

The Niandan takes its source near Kissidougou at about 750 m altitude. It crosses the municipalities of Kissidougou and Kouroussa to flow into the Niger in Baro. With a length of 250 km, its basin is estimated at 12,700 km². The main tributaries of the Niandan are (i) on the right bank the Kokou, the Dele and the Bale, and (ii) on the left bank the Kouya, which receives the Bessekere.

The Milo takes its source south of Kerouane in the Pic de Fon, at an altitude of 1,050 m. It crosses the municipalities of Kerouane and Kankan and flows into the Niger in Djelibakoro after a flow of 476 km. Its basin is entirely Guinean and covers an area of 13,200 km². Its main tributary is the Baoule.

The Mafou: it takes its source in the sub-prefecture of Beindou, in the municipality of Faranah. The site begins 10 km downstream of the confluence Niger - Mafou and evolves on both sides of the two rivers covering a good part of the Municipality of Kouroussa and Faranah. It is bounded on the west by the Municipality of Dabola, on the east by the Municipality of Kankan, on the south by the Municipality of Kissidougou and on the north by the Niandan to the limit of the Floodplains of the latter.

The Fie takes its source in Kantoumania (Mandiana), at an altitude of 400m and crosses the border to reach the Niger in Malian territory. Its watershed in Guinea covers 3,000 km² and its length is 150 km.

The Sankarani originates in the municipality of Beyla, at an altitude of about 800 m. It crosses the municipality of Kankan and Mandiana and returns to Ivorian territory after a flow of 478 km. Its watershed in Guinea covers 22,500 km². Its main tributary in Guinea is the Dion, which also originates from Beyla.

In Guinea, the Niger basin consists of the Niger and six major tributaries: Tinkisso, Mafou, Niandan, Milo, Fie and Sankarani. The Niandan takes its source near Kissidougou at about 750 m altitude. It crosses the municipalities of Kissidougou and Kouroussa to flow into the Niger in Baro. With a length of 250 km, its basin is estimated at 12,700 km². The main tributaries of the Niandan are (i) on the right bank the Kokou, the Dele and the Bale, and (ii) on the left bank the Kuya, which receives the Bsessekere.

The Milo takes its source south of Kerouane in the Pic de Fon, at an altitude of 1,050 m. It crosses the municipality of Kerouane and Kankan and flows into the Niger in Djelibakoro after a 476 km flow. Its basin is entirely Guinean and covers an area of 13,200 km². Its main tributary is the Baoule. The Mafou: it takes its source in the sub-prefecture of Beindou, in the municipality of Faranah. The site begins 10 km downstream of the confluence Niger - Mafou and evolves on both sides of the two rivers covering a good part of the Municipality of Kouroussa and Faranah. It is bordered on the west by the municipality of Dabola, on the east by the municipality of Kankan, on the south by the municipality of Kissidougou and on the north by the Niandan to the limit of the Floodplains of the latter.

In Mali, the Niger River and its main tributaries: Bani and Sankarani alone drain more than 80% of perennial surface water resources. In the average year about 56 billion m³ of water. In wet year about 88 billion m³ and in dry year about 24 billion m³. In the Inner Niger Delta 40 to 50% of incoming flows are lost through evapotranspiration, infiltration, irrigation, with serious environmental issues. The Bani, a major tributary of the Niger River, has seen its hydraulic characteristics change during the last twenty years. The inter-annual average flow is approximately 478 m³ / s, down 6% compared with the average for the period 1907-1979. The maximum flow observed was 3,540 m³ / s in 1967, while during the period 1980-1990, the flow was nil several times and the last 5 years the Bani did not flow during the months of April, May and June.

In the case of Sankarani, its contribution to the Selingue dam varies between 200 and 400 m³ / s, i.e. a volume of 6 to 12 billion m³, depending on the hydrological conditions of the year. The floods and low flows of this watercourse have been artificial since the impoundment of the Selingue dam in 1982. Indeed, the flows retained in the lake between the months of August and September are fully restored downstream once the inflows from Sankarani become inferior to the water requirements for electricity production. Thus, from mid-March onwards, turbine flows exceed 100 and 200 m³ / s from June onwards. The turbulent flows increase as the reservoir is emptied due to the increase in energy demand during the hot periods on the one hand and the decrease in the usable fall of the dam due to insufficient inflows during the dry season on the other hand.

The average annual flow of the Niger River in Dire at the outlet of the Inner Delta is 926 m³ / s, i.e. an annual flow of 29.2 billion m³. The values observed in wet year (1967) and dry year (1984) are respectively 1070 m³ / s, i.e. 33.7 billion m³ and 462 m³ / s, i.e. 14.6 billion m³. The water losses during the passage in the Delta are therefore of the order of

25 billion m³ on average during the period 1952 - 1999 that is 46% of the incoming volume. Despite the essential uses of the Niger River in Mali, the water resources of the Niger basin remain a very little exploited potential.

In Niger, surface waters are divided into two large basins: (i) The western basin with the largest hydrographic system consists of the Niger River (the only permanent watercourse in the country), the tributaries of the right bank of the river, the Goulbis, Ader Doutchi Maggia system and the Air valleys. This system drains about 30 billion m³ of water; (ii) The eastern basin is characterized by episodic flows. It is the system of Lake Chad whose main stream, the Komadougou Yobe, drains on average 500 106 m³ of water.

The decline in precipitation recorded from the 1970s in all West Africa, particularly in the Sahel, had a significant impact on the evolution of flows at the Niamey station on the Niger River (ABOU et al., 2002). Indeed, the degradation of the vegetation cover made the soil more sensitive to runoff. The local flood tends to become more important than the "Malian" flood. For example, in August 2012, Dargol, Gorouol and Sirba recorded very large flows, which contributed greatly to the flooding observed in the valley of the river, specifically in the Tillaberi Region. In addition, the Niger River basin is harshly affected by drought and desertification, leading to a very severe reduction in low water levels. The combined effects of extended water deficit and population growth have resulted in soil erosion, which has already been weakened by intensive deforestation (for agricultural and energy use) and caused the silting of the riverbed.

In Nigeria, the Niger River continues in south-easterly direction of 200 kilometers from the Niger-Nigeria border downstream to Yelwa. It collects some small tributaries of the right bank (the Chodou, Wessa and Kalia), all coming from Benin. A large tributary on the left bank, the Sokoto drains a large basin in the Sahelian region of Maradi, which encompasses the state of Sokoto-Rima and the northern part of the state of Kaduna. Originally from the Gusau region, it collects the la-dont Rima-Nigerian section (Goulbins) in the upper basin and begins dry valleys INTHE from the Air Mountain - on the right bank, a short distance downstream from the town of Sokoto. From the left bank, the Rima Sokoto River collects the Zamfara and the Ka.

After its confluence with La-Rima Sokoto River, flows the river Niger on a large plain, crossing from north to south for 200 kilometers towards Jebba. Its route flows through the Kainji Reservoir for 130 kilometers. Between Kainji and Jebba, the Niger collects smaller tributaries on the right bank, the Oli and Moschi, and various small watercourses on the left bank, whose contributions together are important. In Jebba, a second dam cuts the flow of the Niger River. At this point, the Niger River recovered the volume of flow that it had when it went from Guinea, more than 2,700 kilometers upstream.

From Jebba to Lokoja, along a range of nearly 400 kilometers, the Niger changes direction towards the south and collects minor tributaries on the right bank - the Alun, Oshin and Oro. About 150 kilometers downstream of Jebba, the Niger collects another important tributary of

the left bank, the Kaduna, which drains an area of 65,500 square kilometers in the western part of the Jos plateau. After heading northwest, the southwest of Kaduna turns, passing through the capital of the state of the same name, and collects several tributaries from the north, including the Mariga. With its steep slopes, the Kaduna is characterized by rapid flows, strong floods, and low bass that are indicative of a dry tropical climate. At the end of this is Lokoja, where the Niger meets the Benue.

In Lokoja, the Niger River enters the lower Niger River section, which includes the Niger Delta. From Lokoja, the Niger River takes north-south direction for 200 kilometers; it collects only a few small tributaries, including the Anambra on the left bank, which drains a basin with heavy precipitation. Onitsha is the last monitoring station on the river. The Niger low flows for another 100 kilometers and the lower valley gradually transforms into the vast Niger Delta covering about 30,000 square kilometers, with no less than 30 outlets to the ocean. The main course of the Niger takes the name of Nun as it crosses the Niger Delta and flows into the Gulf of Guinea, 4,200 kilometers from its source in Guinea.

In Chad, the hydrographic network of the Chadian portion of the Niger basin is made up of the main river, the Mayo-Kebbi, its tributaries and multiple lakes. Several other intermittent streams run from hills and mountains and mark the main river. The latter are of lesser importance. The whole network is well hierarchized and ramified, but shows signs of hydrographic degradation and silting of the bed. The Mayo-Kebbi, 200 km long, is the main tributary of the Benue River (located in Cameroon). Its watershed is an enclave deeply anchored in the western flanks of the Chadian basin and is currently the only link between the basins of Chad and Niger. It is fed by floods of the Logone and Tandjile from two different locations, Ere (at the inflow - the Tandjile in the Logone) and the Dana threshold (at the height of Yagoua) during the period of good hydraulicity of the Logone and the Tandjile.

Tandjile flood discharges pass through the scuppers under the paved road Djoumane-Kelo between Ere and Karoum. Those of Dana, follow north-south direction to join the bed to Dana. The annual discharge rate varies according to the size of the flood and the water flow of the year. Discharges at the Ere threshold happen as soon as the height at Ere reaches 5.30 m (zero 336.30 m) for a flow rate exceeding $1.750 \text{ m}^3 / \text{s}$ and can reach $500 \text{ m}^3 / \text{s}$. They vary according to the size of the flood and are of varying importance from one year to the next. The volume can be zero or reach one billion cubic meters a year out of 10. From the viewpoint of water quality, it should be noted that, in general, studies show that the main bed of the Niger basin and its tributaries present water of good physicochemical quality over most of their course.

Chemical pollution is considered as not very significant given the low industrialization of the basin and the limited use of fertilizers and pesticides for agriculture (Picouet et al., 2002, Marie et al., 2007).

However, there is a steady increase in certain indicators such as phosphates (Diarra and Cisse, 2004). Concentrations are not alarming at the moment. However, significant pollution cannot

be excluded in the future, given the increase in domestic releases, major industrialization projects and hydro-agricultural development in the Niger valley with increased use of fertilizers and pesticides (Marie et al. Al., 2007). In urban areas, waste from industries and hospitals, as well as toxic or polluting waste from activities such as tanneries, chemical plants, mines, handicrafts and slaughtering of animals are discharged into the river without treatment, in general by open channels. Rainwater flows through the wastewater system, which is littered with household waste. In rural areas, a very small proportion of the population uses latrines so that human wastes and excreta, animal manure, fertilizers and pesticides (at the level of irrigation schemes) are transported by runoff and pollute the environment and water points. Moreover, the Niger River is increasingly invaded by floating plants. The most common species are water hyacinth (*Eichornia crassipes*) and water lettuce (*Pistia stratiotes*). The proliferation of these plants dangerously threatens fishing, river transport, irrigated agriculture, public health and even the proper operation of dam turbines.

As regards health, all along the river, bacteriological pollution is widespread at the sites of human habitats, with high concentrations of coliforms and faecal streptococci. The waters of the river are non-drinkable according to WHO standards, but commonly used for drinking, with major health risks.

In Mali, for example, the Bamako-Koulikoro sector is the most exposed, as it collects, in addition to industrial discharges, household waste from the Bamako agglomeration, which has more than one million inhabitants (Marie et al., 2007). These domestic releases, estimated from the water consumption of the population, are estimated to be between 29,600 and 41,600 m³ / day (Tecsul, 1994). Only 4% of the population is connected to a sewage system and 13.6% of the houses are equipped with an individual sanitation system (fixed or septic tank). Water-borne diseases such as onchocerciasis, cholera, diarrhea, etc. are causes of mortality and desertion in the Niger valleys and remain obstacles to their development and the establishment of human communities. The average pH for the Niger waters at the Banankoro, Koulikoro, Ke-Macina and Selingue stations is 7. The nitrate concentration is between 0.2 and 15.0 mg / l.

An analysis of the suspended solids data shows that these vary greatly depending on the time of year. The highest grades are recorded during the rainy season (August - September). At this time, contents of the order of 2 g / l of suspended matter are obtained.

To obtain more reliable data on river water quality in the Niger Basin, the NBA has set up a monitoring network since May 2010. The objectives of this network are to acquire “statistical” data on physico-chemical and biological aspects in its general functioning (general monitoring) and to characterize the impact of isolated and diffuse pollution on the basin. This global network, referred to as Conventional, is comprised of 164 stations, including 134 general monitoring stations (assessing quality independently from external pressure) and 30 impact monitoring stations in order to capture anthropogenic effects in cities, industries, mines, etc.

5.1.8. Geological, hydrogeological and pedological contexts

5.1.9. Geology

The geology of the Niger basin (see figure 8 below) is characterized by its ancient terrain and the whole of its right bank (notably the basin heads of its tributaries):

- Archean base composed of granites, gneisses and micachists, for the Guinean part of the basin, northern Cote d'Ivoire, southwestern Mali, practically all of Burkina Faso, northern Benin with some basic intrusions (dolerites , Gabbros) in Guinea at the Fomi site and in Niger near Tillaberi;
- Middle and upper Precambrian, composed of schists and quartzites, flush in the low valleys of the Niger in Guinea and Mali, and Bani in Cote d'Ivoire and Burkina Faso, and very largely in the southeast of the Niger loop (Bourem, Gao, Ansongo) and the valley in Niamey;
- Cambrian, schists and sandstones, from Bamako to Sikasso and Ordovician, various sandstone-quartzites and sandstones from the Mandingue plateau and set of plateaux between Koulikoro, Koutiala and Bandiagara (Dogonland).

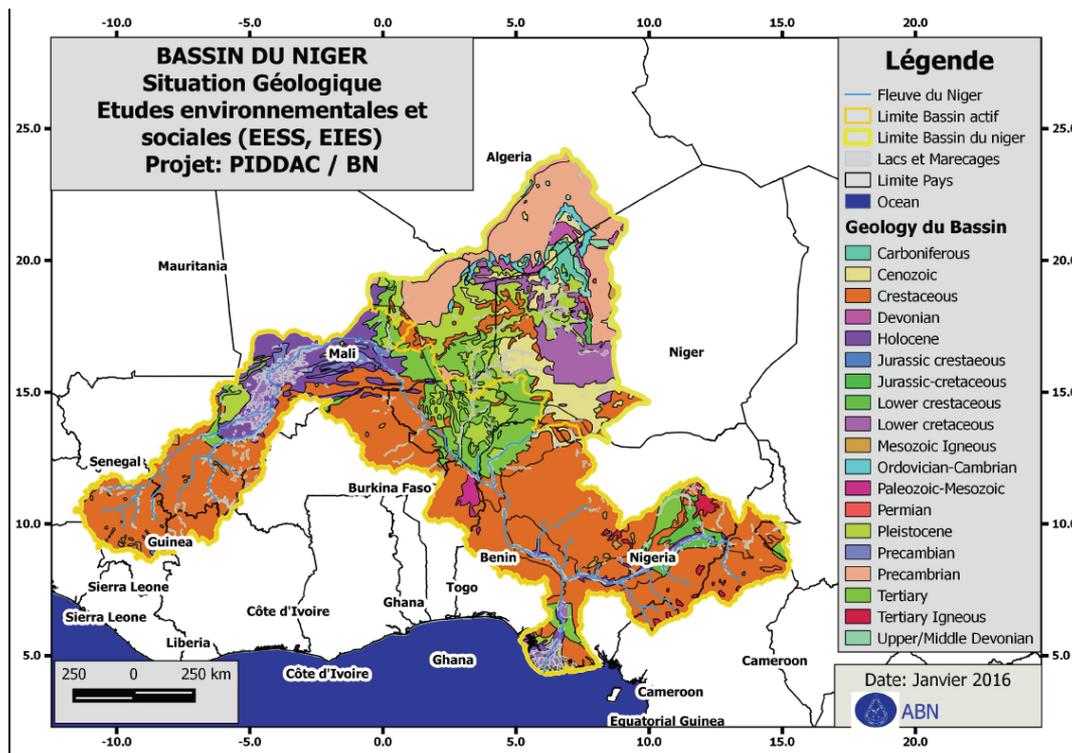


Figure 8: Geology of the Niger Basin

Source: GEF-UNDP / NBA Project Document, March 2001

Downstream of Koulikoro, north of Segou, in the Inner Delta, but also in the depression of the Gondo in the east of the Dogonland, quaternary and current recoveries (alluviums or dunes) mask the substratum and in particular the Continental Terminal (CT), which, however, is on the left bank of the Niger in Goundam, Timbuktu, Gourma Rharous, and is continuous from Bourem, Gao, to Niamey, Gaya with an extension to the north and the sedimentary basins of Taoudenit, Azaouad, Tilemsi and Azaouak. Under the Continental Terminal, which consists

of clay sandstone, sand and clay, there is the “Continental Intercalaire” (CI) which is found along the Niger in northern Benin, but especially in the Saharan zone of Mali and Niger.

The basin portion in Benin comprises two entities: the crystalline basement formations and the sedimentary formations of the Kandi plateau of about 10 000 km² in inconsistency with the basement. The two formations are covered to the north by a detrital (sandy) series belonging to the Continental Terminal and the deposits of sand alluvium and other detritus of the Quaternary in the valleys of the streams.

5.1.10. Pedology (soils)

In regard to pedology, there are three main types of soil in the Niger Basin:

- Ferrallitic soils observed in the extreme west of the Guinean basin of the Niger, south of the Bani basin, in northern Benin and over most of the Niger basin in Nigeria, including the Benoue basin. They are thick soils (from 3 to more than 10 m);
- The leached tropical ferruginous soils observed in the northern Bani Basin, on the outskirts of the Inner Delta in Mali, in eastern Burkina Faso and in the northern part of the Niger and Benue basins in Nigeria and Cameroon. They are associated with ferrallitic soils on the Upper Niger basin upstream of Bamako and on the Kaduna basin in Nigeria. Their thickness is variable and remains less than 3 m.
- Hydromorphic soils, linked to the presence of a temporary or permanent water table that is more or less close to the surface, which is found in basins, river beds, low clay plains, etc.

In the Benin portion of the Niger Basin, two relief units are distinguished:

- the sandstone plateau of Kandi, approximately 10,000 km² in the northeast, covered with erosion-resistant continental sandstones and of relatively high elevation separated by rare encased valleys;
- the Dahomeyan peneplain of about 34 395 km² (about 80% of the basin) comprising the hardest rocks of the Dahomeyan which follow geological directions (the sub-quartzite hills of Bembereke) and the old cuirasses on the basic rocks of the group of Kandi and located in the interfluvium between the Mekrou and the Alibori.

The main soils available in Benin are:

- Rough or poorly evolved mineral soils: These soils found at the top of the rock massifs most resistant to erosion and weathering and on the old breastplates which have developed mainly on the most basic series of the Dahomean.
- Ferrallitic soils: they are located mainly in the south of the country where climatic conditions are relatively favorable to their development. They are found over large areas on the Cretaceous and Continental Terminal formations, where they form the "barrier land". In the North, the ferrallitic soils found cover much smaller areas. They are mainly available on the summits of the reliefs with a relatively large vegetation cover.
- Tropical ferruginous soils: these soils cover most of the area north of latitude 7 ° 30' which corresponds approximately to the northern boundary of the Continental Terminal of the coastal basin.
- Vertisols: they cover almost the entire depression of the Lama and have developed from the Eocene formations.

- Hydromorphic soils: they are found mainly in the lowlands of the low valleys of Mono, Oueme and Kouffo and in the marshy areas of South Benin.
- The soils of the Niger basin in Benin are essentially the result of ferralization and ferrugination. They are supplemented by hydromorphic soils, consisting of alluvial plains and flooded lowlands, of relatively small extent and with high agricultural potential. They account for more than 90% of tropical ferruginous soils, favorable to cash crops and food crops. As with all of the country's soils, soils in the Project area are subject to leaching, depletion and seasonal flooding, all of which contribute to accelerated environmental degradation.

In Mali, for example, the phenomenon of land degradation is very severe (reduction of grazing land, depletion of agricultural land fertility and degradation of forest ecosystems). Land degradation is manifested by: (i) salinization of agricultural land and increase in alkalinity, particularly in rice areas, (ii) accelerated hydro-wind erosion of soils leading to loss of fertility, crusting, loss of soil structure and subsequently decrease in vegetation cover and loss of biodiversity, and (iii) reduction of the depth of topsoil and creation of dunes due to the increased impact of Wind erosion, resulting in decreased water retention capacity and nutrients (in all areas).

Arable land, all land suitable for agricultural uses, represents between 11.5 and 21 million hectares according to the rainfall years, i.e. between 9.2 and 16% of the total area of the territory (MEA, 2011). Over the period 2006-2014, the agricultural area has grown to over 4 million hectares (DNA / SE, 2014), increasing annually by 3 to 4% (ODHD, 2013) with a significant increase in the Rice and maize multiplied between 1960 and 2010 by 7.1 and 7.7 respectively (FAO-STAT). The annual losses of arable land on the 3 to 3.5 million ha of land cultivated annually are in average 6.5 tons / ha and can reach over 30 tons / ha in some areas (CSI-GDT). At many sites, cargo capacity is largely exceeded and almost 26% of cultivated land is marginal land. The economic losses associated with this degradation are estimated at CFAF 4,239 / ha / year for cultivated marginal lands and 90,000 FCFA / ha / year in the Sudanian zone due to the loss of nutrients. The total annual cost is estimated at about 12% of GDP.

5.1.11. Hydrogeology

In the Niger Basin, there are two well-differentiated aquifer categories depending on the geological formations: Continuous aquifers, regional subterranean transfer seats with hydraulic links to the river system. They are mainly located on the left bank (Mali, Niger, Chad, Nigeria, and Cameroon). There is some continuity in their characteristics in space, although these may obviously vary due to the heterogeneity of the aquifer material (lateral or vertical variations of facies) and its thickness changes. The deep aquifers are captive and often overcome by superficial aquifers in the formations of alterites on the surface of the plateaus, in the alluvium and colluvium of the plains and valley bottoms. The specific flows of the aquifer systems range from 0.5 to 30 m³ / h (groundwater depths less than 30 m deep) to 5 to 80 m³ / h for 10 meters (average sands between 75 and 180 m depth). Depending on their thickness and rainfall, surface aquifers are either semi-continuous and hydraulically connected

to deep aquifers, or discontinuous in perched conditions. The characteristics are also variable but clearly favorable compared to discontinuous aquifers with flows exceeding 200 m³ / h and with artesianism possibilities springing especially in Niger.

The aquifers of discontinuous milieus are semi-continuous or fully discontinuous depending on the density, extension and degree of intercalation of the crack networks affecting the surrounding rock and the hydraulic relationships with the aquifers in their recovery. This category of aquifers is found in compact geologic formations with little or no permeability, but locally with secondary permeability either by physico-chemical alteration or by cracking or fracturing. These discontinuous aquifers are mainly found on the right bank of the Niger River (Guinea, Mali, Cote d'Ivoire, Burkina Faso, Niger) in the Sudanese and Sudano-Sahelian areas of Guinea. The mean depth of the piezometric level is 14.5 m and the flows are relatively low: 4 m³ / h on average; however, this may be more depending on the context, up to 20 m³ / h depending on the fracture. The optimum drilling depth is 60 m. Village hydraulics rely mainly on aquifers of discontinuous melieus in the areas concerned. The general rule is the heterogeneity in terms of depth of water and average flow of drillings, the specific flows and the failure rates of drilling are very variable (30 to 70%).

In general, in the Niger basin, groundwater has acceptable physical and chemical characteristics, with some exception. The vast majority of the population use it for its own supply, livestock and in some cases for small-scale irrigation. In Mali, for example, they contribute 85% to 90% to the supply of drinking water to the populations, but play only a very ancillary role for irrigation because of their mobilization costs.

5.2. SOCIO-ECONOMIC CHARACTERISTICS

The Niger River basin is an important reference point for demographic and economic dynamics because of its enormous natural resources.

5.2.1. Demographic aspects

Demographic data indicate that the basin is an important home for about 45% of the West African population and more than 52% of the total population of the NBA member states.

This population, composed of a multitude of ethnic groups, is very unevenly distributed spatially. The natural conditions (climate, vegetation, relief, and hydrography) largely influence this distribution. With a population of over 82 million in the basin, Nigeria is concentrating the bulk of the population of the basin, which is close to 120 million. The highest urbanization rates in the basin are found in Nigeria, Mali, Cote d'Ivoire and Cameroon. The most important agglomerations are mainly in the south, in the Nigerian part of the basin.

In Benin, in the national part of the Basin according to the latest General Population Census of Population (RGPH4, 2013), the population of the project area is 1,689,382 inhabitants or 847,690 (50.18%) of women and 841,692 (49.52%) men, which means, among other things, that any development action carried out in this part of Benin that ignores women or neglects their participation would be an action that is doomed to failure, or that it does not really target

women's social and economic development of the region. The population of the project area is mainly rural: 70.64% live in rural areas compared to 29.36% in urban areas. The population of the area is predominantly young: 51.9% are under 15 years old and 43.6% are in the range of 15 - 59 age group. The area records a high foreign immigration. The three departments make up 21.53% of all foreign immigrants in Benin. The department of Alibori is the second zone of choice for foreigners in Benin (19.09%) with a very high Nigerian population (72% of the foreign community in the department).

Compared with national data, the area represents 14.03% of the total population, with a sex ratio of 100.21 against 95.16 for the whole. The reasons may be sought in the high immigration of agricultural labor for cotton cultivation or in the high post-partum mortality. The inter-censal growth rate for Alibori for 2002-2013 is 4.64 and that for Borgou is 4.61% while the national rate is 3.51%.

In Burkina Faso, on the basis of the final results of the RGPH 2006, the total population of the communes, directly concerned by the basin, would be about three million inhabitants in 2006, i.e. almost half of the population of the whole basin (47.23%) and almost a quarter of the total population of Burkina Faso for the same period. It is a population whose rate of increase (2.8%) is slightly lower than the national average of 3.1%. The basin population is predominantly rural (95%). The average density in the basin area (42 hbts / km²) remains below the national average of about 51.4 hbts / km². However, it appears that some provinces including Kouritenga (with 117.8 hbts / km²), Houet (with 82.7 hbts / km²), Ganzourgou (with 76.6 hbts / km²), Sanmatenga (with 64, 5 hbts / km²) and the Namentenga (with 51.5 hbts / km²) are fairly well above the national average. Conversely, the lowest densities are found mostly in the Eastern region with 15.5 hbts / km² in the Komandjari, 23.1 hbts / km² in the Tapoa and 27.3 hbts / km² in the Gourma.

In Cameroon, according to the results of the last census of Cameroon's population published in 2010, the total population of the study area (Benoue, Mayo Louti, Mayo Rey, Faro, Faro and Deo and Mayo Tsanaga) is 1,218,564 inhabitants with slightly more women than men, i.e. 1,251,183 as against 1,218,563. The population density is less than 5 inhabitants per km². The population is made up of a mosaic of ethnic groups, the main ones being Fulani, Fali, Daba, Moudang, Boum, Daba, Guidar, Kapsiki, Mandara, Gambai, Laka, Toupouri, the Guiziga and the Kotokos.

According to UNDP, in its human development report (2002), the population of the basin will be marked in the long term by strong urbanization. The current urbanization rate in the Basin is estimated at about 26%, compared to 33% for all the member countries of the NBA, with predominance of semi-urban centers (population of more than 5 000 inhabitants).

However, the rural component of the population will persist as a constant human settlements in the basin, following a pattern of unequally distributed distribution in space. The lower part of the basin will be more heavily urbanized than the Sahelian and upper parts, where the share of the rural population is expected to remain high.

In Cote d'Ivoire, the population of the Ivorian portion of the Niger River basin is estimated at 639 161 inhabitants. The Kabadougou Region, one of the components of the Denguele District, is located in the north-west of Cote d'Ivoire. It covers an area of 14,000 km², or 6% of the national territory, and is bounded in the north by the Folon Region, in the East by the Bagoue Region, in the West by the Ivorian-Guinean Border and in the South by The Regions of Bafing and Worodougou. Its population according to the last census (RGPH 2014) is estimated at 193 364 inhabitants. The Folon Region is part of the Denguele District. It is located in the north-west of Cote d'Ivoire. It covers an area of 7,239 km². It borders to the north with Mali, to the west with Guinea and is bounded to the east by the Bagoue region, to the south by the Kabadougou region. According to the RGPH 2014 data, its population is estimated at 96 415 inhabitants. The Folon region is an area where the main activity remains agriculture. The departments concerned by the project are Minignan and Kaniasso. Located in northern Cote d'Ivoire, the Region of Bagoue forms the District of Savanes with those of Poro and Tchologo. Its surface area is 10,668 km² for 375,687 inhabitants (RGPH 2014).

In Guinea, PIDACC will intervene in the Faranah, Kankan and N'Nzerekore regions through ten Municipalities including: Faranah, Dabola, Dinguiraye and Kissidougou (Faranah Region); Kankan, Mandiana, Siguiri, Kouroussa and Kerouane (Kankan Region) and Beyla municipality (N'Nzerekore Region). In this zone, we meet several ethnic groups composed mainly of Malinkes, Djallonkes, Kissiens and Fulanis. According to the data from the last general population census (RGHP 3) of 2014, the situation of the area gives a total population of 3 254 549 inhabitants. This population is relatively young. Indeed, the age pyramid shows the number of young people under the age of 15 (45.5%) and the age of the working population ranges between 15-64 (55%), as well as the low representation of people aged 65 and over (5%). Women represent 51% of the population.

Concerning the area of intervention of the PIDACC in Mali (which includes the regions of Koulikoro, Segou, Mopti, Timbuktu and Gao), there are 1,225,817 inhabitants, of whom 576,134 are active (47%) mainly composed of farmers, pastoralists, Fishermen, craftsmen and traders. The rural population accounts for 93% and there are 50.26% women and 49.74% men with a growth rate of 3%.

In Mali, the basin accounts for 87% of the country's total population. Several regions (Atacora in Benin), major states (Kaduna in Nigeria) or capitals such as Bamako and Niamey, are located along the river with high population densities, sometimes exceeding 2,000 inhabitants per km² (Urban Community of Niamey).

This population is young and predominantly female. The 15-49 age group represents more than half of the population. Nearly 44% of the inhabitants of the Basin are under 15 years of age. The observed population growth rate of 3% is considered high because, apart from any migration phenomenon, it would result in a doubling of the population every 25 years. However, this strong growth is offset by a strong emigration of the population especially in the Sudano-Sahelian zones.

In Niger, the national portion of the basin weighs considerably in relation to the national population. According to the demographic data from the 2012 General Population and Housing Census (GRP / H), the population of the study area is estimated at 9,115,408 inhabitants, including 2,037,713 hbts in the Dosso Region; 3,328,365 hbts in the Tahoua Region; 2,722,482 hbts in the Region of Tillabery and 1,026,848 hbts in the Region of Niamey. The population of the study area represents 53.19% of the total population of Niger. It is rural at more than 83% and urban at about 17%. The southern portion of the basin is densely populated by the migration of northern populations, particularly due to repeated droughts. The national part of the basin has one of the highest population growth rates in the world, 3.9% in relation to a high total fertility rate of 7.1 children per woman in 2012. The average density is 12 inhabitants per km². It conceals great disparities especially between the agricultural South and the desert north. Nine out of ten residents live in the southern belt, which constitutes only a third of the total area of the country. Thus, the occupation of space is mainly influenced by the availability of the resources necessary for the survival of the populations and the minimization of the constraints linked to the environment. The majority of the population is sedentary (98%) and live in rural areas (81.6%). However, urbanization is increasing. The annual population growth rate in urban areas, estimated at 6.2% per year, is about twice the growth of the total population. In terms of potentialities, the peculiarity of the population is to be extremely young (more than 45% are under 20 years of age), with a slight female predominance (50.1%).

The demographic weight of Nigeria, both internally and in relation to the entire project area, is 12.22%. In the project area, about 56% of households are agricultural. The agricultural population accounts for 78% of the total population of the area. Agricultural activities are therefore the main occupation of the population. A total of 45% of the population is under the age of 15 (0-14 years). Within this age group, men represent 46.2 per 43.7 of women. In the 15 to 34 age group (working population), women are more numerous (36.6%) than men (31.5%). On the other hand, over 85 years, there are slightly more men (0.5%) than women (0.4%). Nigeria is a multi-ethnic country. There are about 350 ethnic groups speaking different languages. Sometimes, this diversity causes problems of ethnic discrimination and nepotism and at times constitutes a brake on the country's economic development, since the factors of production are not always provided to those who can use them rationally. But overall, this ethnic variety is a wealth for the cultural heritage of the country.

In Chad, the Mayo-Kebbi basin has been one of the most important settlements in Chad since the colonial period. This strong demographics has been maintained as the last censuses of the population prove it. In the following lines, we will analyze the different factors that explain the dynamism of this population. According to the results of the second general population and housing census, the total population of Chad in 2009 is 11 274 106 inhabitants. Whereas the first general population and housing census of 1993 gave the figure of 6,288,261 inhabitants. An additional 4,985,845 inhabitants in 16 years. So over the last 16 years, it is noticed that the population of Chad is growing faster than the projections. Indeed, estimates based on the 2.5% growth rate predicted that in 2009 the population of Chad would be 8,791,902. The age group 18 years and over accounts for almost 43% of the total population.

The proportion of women in the total population is 51%. Their demographic weight in the Chadian population aged 18 and over is about 53%. The Mayo-Kebbi basin has one of the highest human densities in Chad. By numerical importance of its population, 'Mayo-Kebbi' in 1993, held the second place after the Chari-Baguirmi. In 2009, it occupies the first place before the metropolis of N'Djamena with 1,338 285 inhabitants. That is 11, 9% of the total population of the country. The Chadian part (Mayo-Kebbi West and East) of the study area of the Niger Basin covers 4 departments, 17 sub-municipalities and 31 cantons. The population of the Mayo-Kebbi West Region totally integrated in the NL is 564,470 inhabitants divided by sex as follows: 273,333 men and 291,137 women (Chad's RGPH2, INSEED 2009).

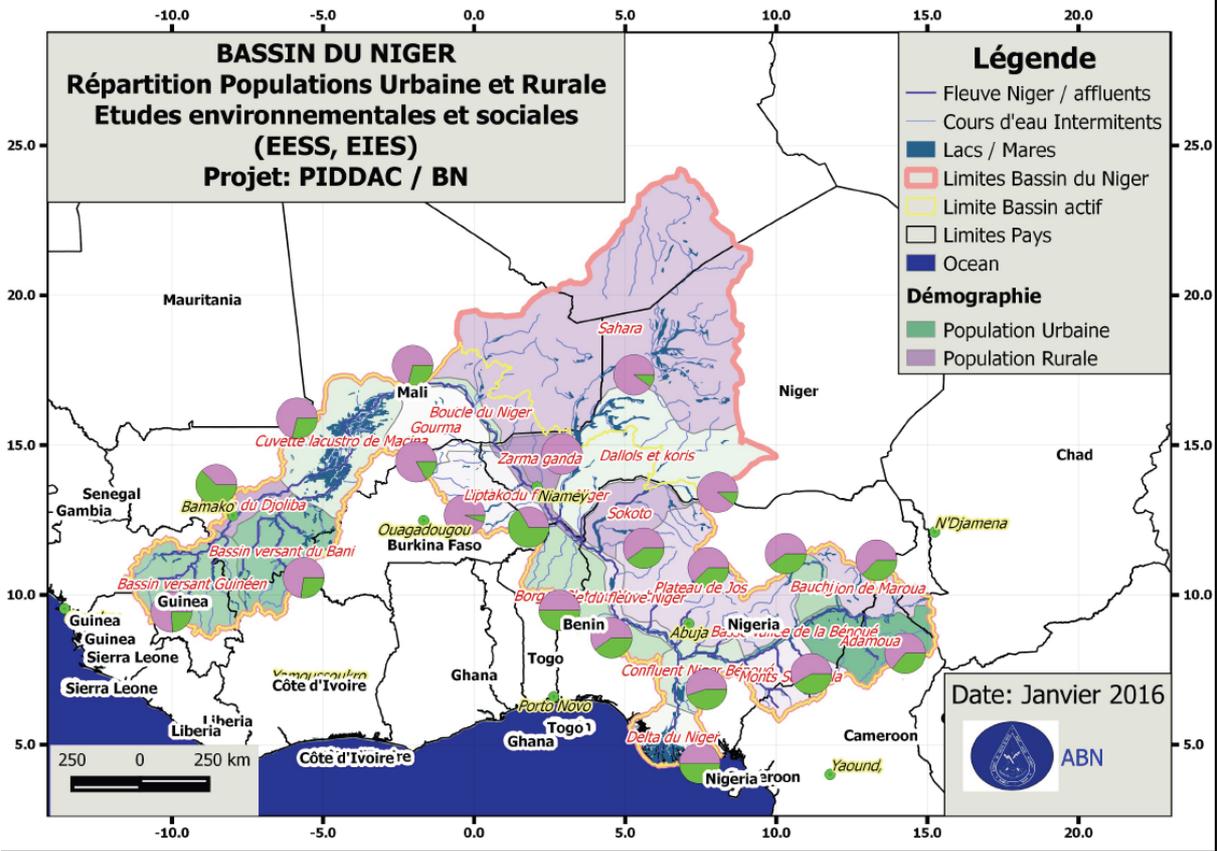


Figure 9 : Distribution of urban and rural population in the Niger Basin
 Source: IDES Sahel Design (from the NBA database)

5.2.2. Social and Land Organization

The socio-political context in rural areas is marked by centralized political systems, especially by the highly structured traditional chiefdoms. They are responsible for the organization and management of social affairs. In rural areas, land tenure management is usually a matter of customary law. The lands of a village were managed by the chiefs of land, generally from the founding clans of the village. The role of the chiefdoms is decisive and indispensable in the organization of the terroir, namely: (i) Land: land allocation; (ii) Managing conflicts between the main users of community resources and (iii) Management of natural resources (parks, forage reserves, sacred places and animals, etc.).

On the religious level, traditional leaders are guarantors and holders of the ancestral religious and cultural values from which they derive their power and deterrent power over their citizens.

Anthropologically, social life is organized according to community model. A family consists of several households around a concession manager. In Guinea, for example, the social organization of communities in the project area (Kankan, Kouroussa) is based on the extended family or "dembaya". The latter gather several families in the same concession ("Carre"). The numerous extended families which constitute the villages maintain relations of alliance or kinship according to the origin of the chiefs of clan or "kabila". Each village is administered by a village chief assisted by the village council whose number of members varies from 4 to 13, all notable, and is responsible for relations with the administration. In Guinea, for example, at the village level, power is held by the dean of the lineage of the clan or founding lineage. It is a typical and highly operational structure in Malinke land, and apart from these connections from one locality to that of the founder of the lineage, there are no other links of subjection from one locality to another. Neighborhood and district councils, assisted by the elderly council, especially made up of patriarchs, deal with the current affairs of the village communities (family conflicts, land disputes, etc.). Its operation and composition are complex and go back to the very origins of the villages.

In Cameroon, for example, the project area is organized into lamidats, which are traditional Muslim chiefdoms. Their traditional organization is structured as follows: (i) a Lamido who is the leader of the lamidat; (ii) a Lawane, Head of district or village chief and representative of Lamido and (iii) a Djaouro, a neighborhood chief and representative of Lawane.

The Lamido covers several villages and may be according to the population, Head of the first degree. He is the intermediary between the administration and the people. The villages headed by chiefs called "lawane" (chief of 2nd or 3rd degree), in their turn, generally include several neighborhoods led by heads of districts called "Djaouro". Most of the communities originate from the village and households formerly settled in the area and from which the other villages derived from. These derived villages will agglomerate around the households. The oldest settlers generally own land, forests and water. Newcomers make a request for land to the oldest for subsistence activities (agriculture, habitats, livestock, etc.).

Social organization in rural areas means that certain religious or other groups (griots, hunters, age groups, etc.) play an important role in the communities, it has an indisputable decision-making power in social affairs; the choice of spouses, family disputes, inter-community conflicts and others. Alongside its structures ensuring the proper functioning of the village society, there is a multitude of associations formed according to the principle of voluntary service. These are mainly self-help groups (by age groups, working groups, tontines). A large share of household heads have responsibilities in traditional social or religious organizations but their involvement in modern socio-economic organizations is limited.

The urban fabric, in part, inherited from the colonization, knows fortunes with variable geometry in the countries of the basin. In general, the urban network is not very developed

and the cities do not have hierarchical economic relations, nor even confirmed administrative relations. In each country, all cities are connected directly to the economic capital, which is also the place for executive and administrative power. Apart from Nigeria, Cameroon, Cote d'Ivoire and Benin, which have political capitals (Abuja, Yaounde, Yamoussokro and Porto-Novo), the other countries hardly plan to create political capitals. Rapid urban demographics and poverty make it difficult to implement urban development plans. Therefore, precarious neighborhoods or spontaneous settlements are developing in the basin countries. Generally, the structure of households is stable with a slight tendency towards the notion of a restricted family in the western sense of the term that emerges more and more.

5.2.3. Socio-economic activities

The basin of the Niger River mainly consists of poor countries belonging to the least developed countries (LDCs). Some are Sahelian landlocked and subject to a Sudano-Sahelian tropical climate characterized by repeated droughts in recent decades and increasing desertification. In addition to this most austere physical environment, these countries are developing in a difficult economic context with an economy driven by agriculture and livestock. These activities generate 40-60% of their export earnings and occupy 80-90% of the labor force. The remaining non-LDC countries remain poor despite the existence of non-agricultural resources, but still insufficiently or poorly exploited (mines, gold, oil, etc.). The Niger River plays a crucial role in the region and in the countries it crosses. It provides for the needs of a riverside population, in particular in various food productions (agricultural, fisheries and pastoral). The flood plains of the river are generally exploited for the cultivation of rice, cotton, and wheat, and many vegetable crops.

5.2.4. Agriculture

Agriculture is a key sector in the basin economy both for the generation of jobs (between 30 and 92% of the working population) and for food security in relation to rural densities. With a rural population share of 80% of the total population, it represents the basis for the sustainable development of the basin and constitutes a major issue for the Niger basin as it is the main activity and the first source of income for the populations. Given geographical realities, cultivated areas occupy on average only 17.5% of the total area of the Niger River basin. Thus, for the development of agriculture, the basin has a significant productive potential: availability, albeit limited but real, in agricultural land. Potential for irrigable land is significant because of the potential for surface water but little mobilized to support irrigation development.

Production systems that can be improved: the farm typology study reveals that a variety of farm types in the various regions are likely to improve. In the basin, irrigated areas per country represent, on average, less than 1% of their cultivated area, which shows the low level of general equipment in the basin and countries for using surface water and therefore its low level intensification. Only Mali, which holds on its territory about 1,700 km of the course of

the Niger with the large lake basin, made a real intensification effort with 3% of the land actually irrigated.

Agriculture remains weakly mechanized. On the other hand, plowing is predominantly present in the region. The use of inputs is low because of the level of poverty of the populations. Thus, extensive agriculture is the norm in the region. As a result, the region is being deforested and eroded due to the combination of many technical, socio-cultural and financial factors; in this case, the many environmentally harmful agricultural practices (bush fires, unsustainable exploitation of natural resources, difficult natural conditions at the end of the season, unfavorable property rights for young people and women, massive exodus of populations to forested areas, farmers and breeders' conflicts as a result of wandering and transhumance of animals, insufficient diversification of crops and low integration of farmers into the market, strong attachment to certain traditional beliefs prejudicial to women and children, etc.)

There are, however, practices of agricultural intensification associated with behavior more conscious of the environment fragility (contour crops, terraces, stone cords, etc.). Well-conducted intensification is a fundamental factor in the fight against soil erosion and silting but it represents an investment in the future. To be sustainable, it must be accompanied by land security. Therefore, priority is given to intensification by irrigation in total or partial control of water. Abundant as it is, it is in fact limited in volume and availability; and it is essential that moderate and reasonable use be made of it.

In the Niger basin, cereals are the most widely cultivated crops. Their nature varies according to the agro-climatic zones. The total quantity of agricultural products produced annually can be estimated at about 50 million tones, more than 70% of which comes from Nigeria (in proportion to its population). Associated with Mali and Niger, these three countries account for about 85% of total agricultural production in the Niger Basin.

In Benin, nearly two million hectares are cultivable; But only 25% of these are highlighted. Production systems are still traditional. Yams, maize, sorghum, rice, onions and potatoes are grown there. Cotton cultivation has been growing and widespread throughout the area for several decades. The town of Banikoara is the country's first cottonseed producing area with a production of 68,200 T in the 2014-2015 crop year. Cotton production in the Project area accounts for about 58.6% of national production during the rice crop; although still low, it has quadrupled in yield and doubled in less than a decade. Irrigated agriculture has remained embryonic and is mainly located in the commune of Malanville, where it has a rice perimeter of 516 hectares irrigated and operates through a gravity system. There are also small individual irrigated perimeters, located in the lower Sota valley (tributary of the Niger). The annual total area includes an irrigated rice area ranging from 500 to 900 ha.

The contribution of the agricultural sector to GDP has remained almost stable over the past five years at around 32.78. Plant production is the main pillar of the agricultural sector. Over

the last five years, its contribution has evolved globally in a growing manner. They are currently contributing more than 75.4% of GDP. These crops include:

- food crops, mainly cereals (maize, sorghum / millet and rice), roots and tubers (yams, cassava and sweet potatoes) and legumes (cowpeas, peanuts, soya and voandzou).
- market gardening products which do not cover the country's consumption needs for vegetables, suffer from quite marked inter-seasonal fluctuations.
- Fruit production (citrus fruits, mangoes, pineapples and bananas) was the subject of a revival in recent years through artisanal processing (dried fruits, jams and fruit juices, etc.), but actions taken for promoting them are still at the level that would make it possible to the best use of this production and export potential.
- export crops largely dominated by cotton, which is the country's first economic sector. Cashew and oil palm could once again become new opportunities if the technical, material and organizational progress made in recent years continues.

Animal production constitutes the second pole of economic activity of the agricultural sector. They contributed 18.5% to the formation of PIBA in 2014. Livestock production is still marked by the traditional practices of breeding cattle, sheep, goats, pigs and poultry, despite the rather conclusive results of the modern breeding in the last decade. Livestock numbers do not guarantee full coverage of animal protein requirements, particularly for meat, milk and eggs. The deficit is filled up with imports.

In Burkina Faso, agriculture is one of the main activities of the population in the regions covered by the PIDACC / BN. It is predominant in winter and occupies nearly 60% of the active population. Agriculture is of traditional type characterized by a low level of equipment. The crops grown in the project area are of three (3) orders: food crops, cash crops and vegetable crops. Agriculture is, therefore, mainly rainfed and subsistence crops, with a high dependence on climatic conditions, which results in a high variability in annual yields and cereal production.

The population of agricultural households was 12,146,000, or 87% of the national population (MAHRH, 2007). In terms of revenues from the sales of the five major cereals, on average each farm is managed annually with CFAF 1,087,348 and the largest receipts are recorded in farms in the eastern regions (CFAF 5,681,300), South Center (CFAF 2,247,395), Central East (CFAF 1,870,146) and to a lesser extent South-West (CFAF 1,083,300). But it is clear that in the majority of farms, production is mainly used to feed the members of the family. It is only with maize (about 40%), cowpea (about 45%), and to a lesser extent rice and sorghum, with a relatively large proportion, are sold particularly in the local market. The rate of coverage of cereal needs in the five intervention regions of the PIDACC / BN has fluctuated between 2011/2012 and 2012/2013, 2014/2015. These rates were respectively 104% and 103% for the East Center, 60% and 84% for the North Center, 90% and 151% for the East and 70% to 100% for the Sahel. For the 2014-2015 season, the rates were 92% in the East Center, 69% in the North Center, 119% in the East and 77% in the Sahel.

In Cameroon, agriculture is the main economic activity of the inhabitants. This activity remains mainly traditional and rainfed. It is practiced in a slash-and-burn manner and relies on rudimentary tools (machete, hoe, etc.). It reflects all social categories (men, women, children) and is directed toward food crops (Millet, corn, soybean, peanut, cowpea, voandzou, sweet potato, rice, cassava, vegetables and condiments), fruit trees (mango trees, Citrus, papaya, etc.) and cash crops (cotton only). Agricultural products are largely for self-consumption, another part is marketed in the periodic markets of the area. The last part is preserved to serve as seed of the next campaign.

Nearly 70% of the working-age population in the Sudano-Sahelian zone are agricultural workers (national average 60%). The total number of agricultural households in the Northern Region increased from 98,700 in 1984 to 224,710 in 2005, reaching 235,165 in 2009, representing 11.9 per cent of the total number of agricultural households in Cameroon (RGPH 2010). This significant increase in the number of farm households, especially between 1984 and 2005, reflects the significant impact of organized migration.

The main crops grown in the Region are rainfed crops such as red sorghum, millet, maize, peanut, cowpea, cotton, and sweet potato as well as off-season crops such as dry season sorghum / Muskwari, irrigated rice, recession corn, and various market gardening crops. While cereals constitute the food base for the populations of the area, irrigated rice and cotton are the main cash crops. For the Niger Basin and the BVB, there are generally three types of exploitation: (i) traditional agriculture where cereals, groundnuts and other speculation are cultivated around the dwellings; (ii) improved rainfed agriculture, which has mainly developed around cotton growing and which has resulted in great increase in corn sale; and (iii) intensive commercial agriculture, including rice farming and onion crops and other market gardening products, using small-scale irrigation on the banks of rivers and ponds. It should be pointed out, however, that the Cotton Development Corporation (SODECOTON) has just begun cotton and soybean industrial farming with the use of machinery as part of the development of agricultural development projects at Farkoumo - Djoumte and Kourtesse - Tapare (in the municipality of Faro) and the Flaye - Bogdibo and Yoko South - Vong Nah (Mayo Rey).

According to the data provided by the Cameroon Cotton Development Corporation (SODECOTON), for its area of intervention (which includes a part that is administratively within the Far North Region), a typical agricultural region has an average size of 7.4 people, of which 4.05 people or 55% are assets. Assuming that the stratification of cotton growers would also be indicative for all farms, a preponderance of small farms with a total cultivated area of about 3 ha (77% of the total population) would predominate. For 2011, the total area of major food crops is estimated at 408,600 ha, with sorghum / millet, and dry season sorghum accounting for 65% of this total area. As regards this area of food production, cotton would account for only about 28% of the total area planted with cotton and food crops (about 565 000 ha). Cotton farming is practiced by about 200,000 planters throughout the SODECOTON intervention area, including about 120,000 farmers in the Northern Region. As for the distribution of the gross income of agricultural households in the SODECOTON

intervention zone, it is estimated that for 2011 the cotton contribution would have been 52% of total income. For food crops, the following shares were observed: peanut 21%; Sorghum 10%; Maize 9%; Dry season sorghum 6% and soybean 3%.

The growth rate of food production per capita, which averaged 7.15% in the 1970s, has gradually decreased from 5.89% over the period 1980-1989 to 2.81% over the period 1990-1999, to be at -0.17% over the period 2000-2007. Over the same periods, net imports of cereals per capita increased on average by 18.33%. For its part, the cost of food imports is constantly increasing. According to Awono and Havard (2011), food imports, mostly made up of cereals, were multiplied by 35, passing from 14 to 490 million dollars from 1961 to 2007. In 2010, these imports were worth 487.7 billion CFA francs (RC / MINFI, 2011).

In Nigeria, the States of the Nigerian portion of the Niger Basin are the main agricultural production areas of the country; about 45% of the economically active population is employed in agriculture, livestock, forestry, fishing and hunting. These States of the zone provide the country with the bulk of food production and generate about 95% of the foreign exchange earned by Nigeria. Large areas of land characterize these areas. But the dry savannah climate keeps the soil dry for a long time in the year, while in the central and southern basin rainfall is greater and lasts longer. Consequently, the need for irrigation is more felt in the north than in the south. Aware of the economic importance in general and agriculture in particular of the Nigerian portion of the Niger basin, the successive governments of the country have always paid particular attention to the construction of irrigation systems to supply water to the dry savannah lands of these areas. NBA's support in this direction is important, through the project "Southern Chad irrigation", the "Bakolori, Kiri projects" and others that have made it possible to develop more than 1000 hectares for the cultivation of rice, vegetables, millet and barley.

Although the project area is a country rich in minerals and oil, agriculture plays an important role in the national economy. In 2012, the sector accounted for 22.4% of GDP and contributed 44.5% of total employment in 2004. Nigerian agriculture has grown steadily over the last decade and has more or less tripled between 2002 and 2012, with an average annual growth rate of 5.9%. Agricultural added value per worker was multiplied by the same factor during this period (World Bank, 2014). The most recent data on crop production in the project area provided by the FAO statistical unit (FAOSTAT) show that yams and cassava, followed by paddy rice and groundnuts are the most important food crops produced in the country, both in terms of value and quantity of production. Corn, sorghum and millet are also commonly produced cereals, while cashew is the most important cash crop produced in the Niger Basin. Agriculture in the study area is dominated by small-scale agriculture. The Commercial Agricultural Development Project (CADP) survey report made in 2010 indicates that over 90% of agricultural production comes from smallholder farmers with less than two hectares of crops (Nigeria, NBS, 2010). The other important characteristic of agriculture is that the majority of agricultural area belong to individual farmers. According to the 2010 National Survey of Nigeria, on the total area of land cultivated by private farmers in 2010, 83.9% is owned by an owner, 10.6% is family land, and 4.1 % of land leased / under royalty. There are

also incorporated farms, but their area is not known with accuracy. The majority of them are classified as sole proprietorships (76%), private limited companies (10%) and partnerships (9%). Cooperatives account for only 1% of incorporated farms (Nigeria, NBS and FMARD, 2012).

In Cote d'Ivoire, agriculture constitutes an important source of income. Cocoa and coffee alone occupy 2/3 of the cultivated land with a predominance of cocoa. Cotton, oil palm, cashew nuts and hevea occupy the remaining areas. Cote d'Ivoire is one of the largest cocoa producers and one of the world's largest exporters of cocoa beans (1 million 400 thousand tons), coffee (130,000 tons), palm oil (390,000 tons) and cashew nuts (450,000 tons). The share of agriculture in Ivorian exports is 40%. Ivorian rubber production has increased steadily in recent years (255,000 tons).

Rainfed crops dominate (but, rice, groundnuts) and are often associated. About 40 percent of the farms in the area produce cotton. Research successively developed the variety Mono then Allen of cotton. The latter variety, although associated with food crops, provides good yields of a long fiber cotton and therefore easily exportable. The cultivation of cotton in Cote d'Ivoire, mainly rainfed, is practiced by small individual farmers. It involves 150,000 planters each year in more than 4,000 villages. Cotton is the pivot of a set of crops that includes pure cotton in rotation with rice, corn, groundnuts, millet, and sorghum. The average yield of these crops is higher because of the residual effect of fertilizer used in cotton. Cotton in the north of the country is called white gold because of its contribution to the income of the savannah regions' populations. Cote d'Ivoire seed cotton production rose very rapidly as a result of increased yields (600 kg / ha in 1960 - 1,450 kg / ha in 1984) and acreage, reaching 400,000 tons in 2000. However, dropped during the period of socio-political crisis from 2002 to 2011 with a production of 120,000 tons in 2008 before rising up to 250,000 tons in 2011. Perennial crops are mangoes, shea and cashew nuts. Introduced in Cote d'Ivoire around 1957, the cashew tree was primarily used for reforestation in the northern and central savannah regions of the country. Beginning in 1972, cashew nuts were bought and exported to India. With the disappearance of the orchards of coffee and cocoa from the dry forests from the interior of the country, the cashew nut extended to the south taking the place left by coffee and cocoa. Existing orchards are very heterogeneous with very high population densities. The cultivation techniques are poorly managed and the lands poorly maintained. Producers are made up of a multitude of small farmers who are not grouped into cooperatives. The quantities of nuts exported rose very rapidly to 400,000 tons in 2011. The exploitation of mangoes originally regulated by the harvesting system is increasingly considered as a diversification crop with the export of mangoes to the European market. The mango tree is mainly grown in the northern part of Cote d'Ivoire where natural climatic conditions lend itself to its requirements, especially around Korhogo and Ferkessedougou. Mangoes production of $\frac{3}{4}$ in Cote d'Ivoire is performed by small producers whose plantation areas vary between 2 and 3 ha. The current trend is for the planting of Keitt and Kent varieties that are exported and benefit from strong demand in the domestic market. The mango crop is spread over 5 months from March to July thanks to a varied range of varieties. Mango production from 2000 to 2010 ranged from

25,000 to 45,000 tons (Figure 37) over an area of 5,000 to 7,000 ha. The planting density varies between 100 and 200 trees / ha. Yields range from 10 to 20 tons / ha.

In Guinea, agriculture is the basis of the economy and the engine of its growth. It accounts for one quarter of the GNP and nearly 67% of the population. Programming of public investments in favor of the agricultural sector represents 25% of the volume of the Public Investment Program (PIP) and 81% of the agricultural PIP, against an actual disbursement of around 5%, which is very far from the Maputo commitments which is in the order of 10% of the PIP. Food crops are the main crops with rice at the head, accounting for 42.6% of the area planted, followed by corn, fonio, groundnut and cassava. The arable area is estimated at 6 million hectares and represents 25% of the national territory. However, only 850 000 hectares are developed on average per year (14% of arable land), the rest being occupied by fallow land, more specifically in the project area in Upper Guinea for a mainly agropastoral purpose. The main agricultural products of Upper Guinea are cotton, rice, corn, fonio, groundnuts and cassava. Cotton: 98%, corn: 48%, manioc: 34%, fonio: 32,46%, rice: 31.3%, groundnut: 23.13%. Vegetable crops are also developing in urban and peri-urban areas of Kankan through the support of several projects such as Urban and Peri-urban Horticulture Support Project (HUP) managed by FAO. The market gardening sectors (okra, eggplant, onion, shallot, tomato, chilli) were organized into groups and unions. These crops play an important role in adapting to climate change and resilience of the producers.

In Mali, the populations of the intervention zone are mainly farmers and ranchers. The Niger River basin, which has important agro-sylvo-pastoral potential, is of great importance to the socio-economic populations. Arable land, that is, all land suitable for agricultural use, represents between 11.5 and 21 million hectares according to rainfall years, between 9.2 and 16% of the total area of the territory (MEA, 2011). Over the period 2006-2014, the agricultural area has grown to over 4 million hectares (DNA / SE, 2014), increasing annually by 3 to 4% (ODHD, 2013) with a significant increase in the Rice and maize multiplied between 1960 and 2010, respectively by 7.1 and 7.7 (FAOSTAT). Production systems are generally extensive and rely at least 90% on rainfed food crops or on the banks of the river or ponds on flood recession crops. Millet / sorghum, cowpea (and irrigated rice or flood recession) crops dominate. The yields are random, generally low to very low especially in the northern areas of the basin (millet / sorghum: 250-500 kg / ha). The areas of small irrigated perimeters in villages still have relatively limited areas (about 10,000 ha). Paddy yields are satisfactory (5T / ha). However, the practice of dual-crop cultivation is very limited, due among other things to low water levels and water supply difficulties for motor pumps due to sand banks. Access to the docks of the ferries is also difficult because of the same phenomenon. The contribution of the primary, secondary and tertiary sectors to GDP is 33%, 27% and 37%, respectively. Despite the structural difficulties of the cotton sector, which accounts for 6% of the population, production has doubled since 2008. In 2011-2012 it reached a level of 445 000 tons of seed cotton and would reach 480 000 tons in 2012-2013, making Mali again as the largest producer in sub-Saharan Africa ahead of Burkina Faso.

In Niger, two-thirds of Niger's total area is desert and only 11% of the land is suitable for agriculture. The potential for arable land is estimated at 14.5 million hectares, including 270,000 ha of irrigable land. Of this potential, about 6.2 million ha are planted in rainfed crops and 85,700 ha in irrigated crops. In total, agricultural use of arable land is estimated at 43%⁷. There are two modes of cultivation: rainfed crops (millet, sorghum, cowpea, cotton, peanuts, nutsedge, corn, etc.) and irrigated crops (rice, onion, sweet pepper, wheat, sugarcane, vegetable and arboriculture). Cereals (millet, sorghum, rice, fonio, corn) and cash crops (cowpea, groundnut, voandzou, sesame, sorrel, cotton and nutsedge) are the main crop speculation. Peasant farming practices are characterized by a low level of intensification and remain very predominantly manual. The yields obtained are low and very fluctuating. Average yields were 463.89 kg / ha for millet and 358.78 kg / ha for sorghum. The farming of cash crops (peanut, cotton) is specific to the southern zone, which is more watered. Peanut and Cowpea, with yields of 453.12 kg / ha and 245.45 kg / ha respectively, are the main export crops (Agricultural Statistics, 2014). Irrigated crops are usually grown on small areas. The small size of the lands makes the farm unsustainable economically. Moreover, the dysfunctions in the collective management of the water and the difficulties of maintenance of the structures hypothecate this activity.

The primary sector grew by 9.0% in 2014 to 42.3% of GDP, down from a decline of 0.8% in 2013 and an increase of 14.9% in annual growth of 7.7% over the period 2012-2014. This performance of the primary sector is attributable to agricultural production, which grew by 11.9% after declining by 3.0% in 2013. The increase was particularly driven by irrigated crops, which increased by 17.7% in 2014, compared with 7.3% increase in 2013. The growth of winter crops was modest in 2014 with a rate of 4.8% compared with 25.8% in 2013.

In Nigeria, about 56% of households in the project area are agricultural. The agricultural population accounts for 78% of the total population of the area. Agricultural activities are therefore the main occupation of the population. Although the project area is a country rich in minerals and oil, agriculture plays an important role in the national economy. In 2012, the sector accounted for 22.4% of GDP and contributed 44.5% of total employment in 2004. Nigerian agriculture has grown steadily over the last decade and has more or less tripled between 2002 and 2012, with an average annual growth rate of 5.9%. Agricultural added value per worker was multiplied by the same factor during this period (World Bank 2014). Agricultural GDP has grown steadily over the past two decades. However, as the dashed line shows, its share in total GDP fluctuated overall, while showing an average decline, indicating that other sectors are growing faster than agriculture. In particular, the share of agriculture in total GDP has declined considerably since 2002. Agricultural production includes crop, livestock, fisheries and forestry products. Among these sub-sectors, the share of crops in the total contribution of the agricultural sector to GDP is the largest. In 2012, according to provisional estimates by the Central Bank of Nigeria, the share of crops was almost 88% of total agricultural GDP, followed by livestock production (CBN 2014). In the crops sub-sector, the relative importance of roots and tubers crops is high relative to cereals - the second largest

⁷ CSAO-OCDE / CILSS, 2009, Food Security Profile Niger

crop category - with a national production in 2012 that is nearly four times that of cereals. The cultivation of textile plants is the least important in Nigeria. As shown in Table 2.1, with the exception of textile plants, production has increased in all crop categories over the past decade. The highest growth was in root and tuber production (44%), followed by vegetables (38%), cereals (23%) and fruits and nuts (15%). Production of textile plants, on the other hand, decreased by 25%. Cereals, however, take the lion's share of the country's cultivated land. They cover an area equivalent to the total area was vegetables (27%), followed by roots and tubers (8.4%). Cereal area increased only slowly (2.4%), while that of textile plants fell significantly (51%). According to FAO data (FAOSTAT), yams and cassava, followed by paddy rice and groundnuts, are the most important food crops produced in the country, both in terms of value and quantity of production. Corn, sorghum and millet are also commonly produced cereals, while cashew is the most important cash crop produced in Nigeria.

In Chad, agriculture holds the main part of the sedentary population, composed of farmers, agro-pastoralists, former transhumant herders converted to agriculture following the severe droughts in Chad and traders-farmers. Thus, in all the towns of the Chadian part of the Niger Basin, it is rare to meet a family that does not make at least partial incomes from the farm. Agricultural production includes cereals, oilseeds, legumes and tubers. To these food crops is added cotton, a major cash crop, which is now being challenged by certain crops such as oilseeds and legumes. Women and young people are more engaged in these latter cultures because they are sold well and quickly. The sale of cereals, especially corn, rice and also millet, is not overlooked by women and young people. In short, all agricultural products in the area are very important income resources. Agriculture continues to employ and support more than 80% of the working population and livestock farming plays a significant social and economic role for about 40% of the population. For the project, the development of agriculture will help those who practice it to reduce poverty and improve their living conditions.

In all productions combined, the quantity of agricultural commodity produced per inhabitant averages about 750 kg / inhabitant, with strong variations between countries. In general, the share of agriculture in the formation of wealth is declining due to the unfavorable evolution of the conditions under which it is carried out. In Nigeria, it has risen to 33%, in Niger to 18.6% today. On the other hand, there is a relative increase in Burkina where the cultivated areas have increased regularly by 3% per year while production has evolved at an average rate of 5% per year. For the development of this activity, the basin has a significant productive potential:

- availability of agricultural land. Potential for irrigable land is important because of the potential for surface water but little mobilized to support irrigation development;
- production systems⁸ that can be further improved. A study on farm typology reveals that a variety of farm types in the different regions are likely to improve;

⁸ AMBOUTA K. ABOUA G., 2009. Transboundary Environmental Diagnostic Analysis of the Niger River Basin

- the existence of agricultural intensification practices coupled with behavior more aware of the fragility of the environment (contour crops, terraces, stone cords, etc.). Well-conducted intensification is a fundamental factor in the fight against soil erosion and silting but it represents an investment in the future.
- the existence of national systems for agronomic research and a network of seed experimentation and production farms;

Among the constraints of agriculture, we can cite: (i) Inadequate water at the critical phases of the vegetative cycle of plants; (ii) Parasitic attacks and lack of inputs; (iii) Low producer prices and lack of effective marketing and input supply structures; (iv) Degradation of natural resources and declining soil fertility; (v) The predominance of the extensive production method with the low level of intensification of farms; (vi) The strong pressures linked to the traditional land tenure system are used widely despite the adoption of the rural code texts; (vii) The low level of organization of producers; (viii) Rural exodus ; (ix) The low level of rural incomes and difficulties in accessing bank financing; (x) Low valuation of agricultural products; (xi) The isolation and high costs of internal and external transport; (xii) Agriculture remains weakly mechanized (xiii) The use of inputs is low because of the level of poverty of the populations.

5.2.5. Breeding

After agriculture, livestock is an essential economic activity of the primary sector for all the countries of the basin, as about 80% of the populations are, in various forms, involved in this activity. The basin region is a breeding area that is expanding rapidly. The compilation of country data provides us approximately the information in Table 10. Livestock systems are still dominated by tradition, and the sector is slowly developing, based on the wandering of livestock in the resources. In total, the area contains about 162,864,666 sheep, 27,290,133 cattle, 43,611,043 goats and 2,539,068 pigs, which indicates the importance of the catchment area in Africa in general. However, the production is variable at the country level.

In Benin, the portion of the basin also constitutes an area par excellence of breeding. In zone 1 of the basin, species bred are in order of importance, cattle, sheep, goats and poultry. The bovine species is dominant. But the cattle population in the region accounts for only 11% of the livestock of the Borgou / Alibori departments, as against 21% for goats, 21% for sheep and 9% for poultry. The ruminants raised in the area are trypano-sensitive, in particular the bovine zebu breed and for small ruminants the large Sahelian breed. Poultry and sheep-goat farming is practiced by most farmers, whereas large livestock are mainly raised by Fulanis and have been, for some time, raised by some farmers. In Zone 2 of the Niger Basin, the breed raised is largely the Borgou / mixed breed Zebu, which is less susceptible to Trypanosomiasis than the Zebu. This part regroups a high number of cattle (41% of the livestock of the department, against 33% for goats, 40% for sheep and 37% for poultry). The breeding of small ruminants is dominated by the Guinean breed Djallonke trypano-tolerant.

The major challenges of the Livestock sub-sector by 2020 are threefold: (i) covering the food and nutritional needs of the population for animal products, in particular meat, milk and table eggs; (ii) improving the productivity and competitiveness of livestock sectors in order to increase the incomes of agricultural producers, meeting non-food needs (health care, education and other) and the contribution of the livestock subsector to the the growth of the national economy and the entry of foreign exchange; (iii) improving the attractiveness of livestock production in rural and peri-urban areas in order to create necessary conditions in the different agro-ecological zones of Benin, making livestock farming attractive, improving employment and living conditions in rural areas and to stabilize the driving forces, in particular young people and women in the practice of livestock farming.

In Burkina Faso, after farming, livestock is the second most important source of income in households, which is an essential economic activity in the primary sector. The sector is a vital tool in the fight against poverty, providing a fundamental contribution to the food and nutritional security of the population. Animal husbandry is characterized by an extensive type of system as a corollary low-weight animals. The practice of transhumance takes place in April and May to satisfy the demand of herds for fodder and water. According to the 2014 yearbook of the Ministry of Animal Resources, the number of livestock in Burkina Faso is estimated in 2012 to be 9,090,718 cattle, 9,277,746 sheep, 13,891,447 goats, 2,345,803 pigs, 40,014 equines, 18,364 camels and 33 752 203 poultry. It provides slightly more than 10% of the country's export earnings and is an important source of income for the rural populations. In the area of pasture management, there are a large number of pastoral areas (25 managed areas with an area of 749,982 ha in more than 120 potentially manageable areas), village grazing areas, corridors for transhumance and the different agro-ecological zones allow the development of diversified livestock that is already important numerically.

In Cameroon, animal breeding is a major activity in the study area. It is of the extensive type and the animals reared are: cattle, sheep, goats, Equians, asinians, pigs and poultry. It is estimated that the two Northern and Far Northern Regions account for 50% of the country's cattle population. As the production system is extensive, it relies heavily on transhumance and therefore uses large areas, resulting in a strong competition for land between livestock, agriculture and environment. In the Northern Region, almost 45% of the total area is devoted to protected areas and ZICs, while agricultural land occupies only about 10%. However, there are large differences between the 4 Departments. For the total grazing area, 50% of the resource is in the Mayo Rey. In the Department of Benoue, about 40% of the total area is available for pasture, while in the Department of Faro, almost 60% of the total area is occupied by parks and hunting areas, leaving little space for grazing. The share of crop residues in annual dry matter production varies greatly between Departments, ranging from a minimum of 3% for Mayo-Rey to a maximum of 41% for Mayo-Louti. In other words, there is an overload in the Mayo Louti; overload balance in the Benue; Under-load in the Faro and significant potential in the Mayo Rey.

However, cattle rearing is limited because of the lack of permanent pasture, so breeders are forced to move in the dry season in search of green areas (transhumance). The most frequent

animal diseases in the area are foot and mouth disease, peripneumonia, symptomatic anthrax, New castle disease, endoparasite, and distomatosis. The herds are monitored by the veterinary services.

Moreover, previous studies have shown that the problem of feeding ruminants in the Northern Region is essentially that of access to the resource. This is made difficult by a number of important factors, including: (i) difficult movement of animals due to an agricultural facility that takes little account of traditional grazing areas and cattle tracks; (ii) agriculture often occupies the residence place for livestock farmers by taking advantage of manure; (iii) protected areas are a major barrier, especially in the Departments of Mayo Rey and Faro; (iv) failure to respect the boundaries of grazing areas dating back to the 1960s; (v) insecurity of property and persons in certain areas; and (vi) increased travel costs due to increased taxes and other arbitrary levies. Consequently, conflicts related to agriculture are mostly encountered in the Departments of Mayo-Louti, Benoue and Faro, while conflicts linked to environment mainly concern the Mayo-Rey and, to a lesser extent, the Faro.

In Cote d'Ivoire, the area of the basin is suitable for breeding because of its Sudanese climate and its wealth of forage plants. Livestock is characterized by a varied and relatively large herd, the existence of numerous livestock markets and an active cross-border movement. Sedentary cattle breeding is the most important, with 430,291 heads, 53.0% in Tengrela, 35.6% in Boundiali and 11.4% in Odiene. The transhumant cattle population is estimated at 35% of the sedentary stock during the dry season. The animals pass through the northern part of the Basin area, where the entrance gates are (Tengrela, Tienko, Goulia). Livestock numbers increased by 49.2% over 10 years, from 101 031 to 150 820 heads between 1991 and 2002. Transhumance increases the pressure on the natural resources of the basin. Sheep and goat breeding is estimated at 169,448 head in 2002, of which 43.1% is in the Odiene department alone. Sheep herds have stabilized around 170 000-180 000 heads since 1995 (183 760). The cattle and sheep farms are traditionally managed on 4 120 km², i.e. 412 000 hectares (18% of the basin area). These ruminants, by compaction of the soil and the quantities of fecal waste, contribute to the degradation of the soil surface and to the siltation of the plains by the water runoff. The use of these manure for the manufacture of organic fertilizers is not well developed. The bare and compacted soils can evolve towards an often irreversible laterization, the corollary of which is the reduction of the vegetation cover. Poultry farming was 470 000 head in 1995 and 421 840 head in 2002. It is concentrated in the departments of Odiene (35.4%) and Boundiali (43.2%). It is also in constant progression. The impact of this type of farming on erosion and silting is negligible in the backyard or on farms. Pig breeding comes last, due to religious constraints. It increased from 670 head in 1995 to 24 681 head in 2002. Pig breeding is common in the department of Boundiali (73.7%). The livestock sector as a whole represents an average consumption requirement of 4.4 million m³ of water per year. The overall livestock production is 56,818 tons of meat. It covers more than 85 times the meat consumption requirements of the basin area. This sector occupies 1.6% and 0.3% of the active population respectively in the sub-basin of Bagoue and that of Baoule.

In Guinea, the livestock sector experienced significant progress between 1996 and 2003 with growth rates of 29% for cattle, 37% for small ruminants, 21% for pigs, 26% for village poultry and 419% for commercial poultry farming. The definite assets for livestock development are: (i) a relatively large livestock population with well-adapted and trypanotolerant rustic breeds, (ii) pastoral resources still offering opportunities for increasing ruminant numbers (about 27% of the total land area provides good grazing), (iii) high demand for organic matter in areas with a relatively high population density, such as the central plateau of Fouta-Djallon, (iii) adequate food resources for pig farming, Particularly in Guinea Forest Region, (iv) a very important development potential for sheep, goats and beekeeping, mainly in Middle Guinea and Upper Guinea, and (v) a relatively favorable institutional environment. More specifically in the project area, Upper Guinea has 760 171 cattle (representing 34% of the national total), 158 241 sheep (25.84%) and 728 631 goats (17.51%). Cattle are used in harnessed crops with a much higher level of equipment than other parts of Guinea.

Currently, health constraints are expressed by high mortality rates, of more than 30% in goats and more than 40% in sheep. Generally speaking, mortality can be retained in traditional breeding farms which receive no care of around 30%. The causes would be in the first instance, the internal parasites, and then the infectious diseases including anthrax.

In Mali, the national livestock population as at 31/12/14 is estimated at 10,313,330 cattle, 14,422,280 sheep, 20,083,130 goats, 527,950 equines, 960,400 asins, 998,560 camels, 78,500 pigs and 38 587,450 poultry. These estimates are based on data from the 1991 national census of livestock with average annual growth rates of 3% for cattle, 5% for sheep / goats, 2% for equines, 2% for asins, 2% for camels and 1% for pigs. Mopti remains by far the largest cattle-raising area with 28% of the workforce, while Gao leads the way in sheep and goats, with 20.34% and 19.33% of the national workforce, respectively. The region of Kayes is par excellence the equine breeding area, Kidal that of the camelins, Koulikoro and Segou those of the pigs while Sikasso dominates in poultry. Of all species, the regional distribution of asins appears to be the most homogeneous. Thus, the geography of livestock has undergone profound changes during the last decades. Successive droughts resulted in a movement of livestock from the northern Sahelian areas to the Sudanian zone. In wetlands, numbers have decreased a little during droughts and are growing steadily, in particular through the supply of external animals. In the area of the Delta, livestock was greatly disrupted by the absence of floods which seriously affected the production of Bourgou fields. The mortality and departure of many herds have significantly reduced the numbers in this region. The ownership approach of the livestock was also changed. That tends to increase among farmers (traction, integration with agriculture). For example, recent surveys show that only 8% of livestock farmers live exclusively on livestock (mainly in the regions of Gao and Mopti). At the same time, 12% are traders, craftsperson or employees and 80% are farmers as well. Livestock is increasingly practiced by sedentary populations in the center and south of the country. However, the Inner Delta is an essential passageway for transhumance farming, given its enormous potential for fodder resources.

The river system of the Niger is the main area of refuge for flocks. Fodder productivity is lower and natural ecosystems are very fragile. Successive droughts have led to reduced grazing and the disappearance of passage corridors and the strong competition between crops and aquatic pastures which has become a source of conflict. Given the traditional nature of these livestock systems, animal production is based on the export of cattle. For example, total exports of live animals in 1998 were estimated at 108,245 bovines, 258,654 sheep and goats, 295 camels and 970,996 birds for a total value of FCFA 26,7 billion and a weight of 43,6 million tons .

In Niger, a Sahelian country with a predominantly agro-pastoral vocation, livestock farming occupies more than 87% of the population and contributes more than 11% to national GDP, more than 15%⁹ of household income and over 25 % to meet food needs. More importantly, animal resources represent the country's second-largest source of export income, with 21% and 62%, respectively, for total revenues and those for rural products. The market value of this workforce was estimated at FCFA 3,140 billion. The annual production of livestock is FCFA 191.5 billion with an added value of FCFA¹⁰ 155 billion. This strong contribution makes this sub-sector an effective opportunity in the fight against poverty and food insecurity, not only because of its contribution to animal products of high nutritional value but also and above all the creation of jobs and income in rural areas. Traditional livestock systems are extensive and based on transhumance.

In Nigeria, livestock farming is also being developed in the project area. The species are bovine, ovine, caprine and poultry. There are large tracts of natural pastures and water points for cattle breeding. In 2012, according to provisional estimates by the Central Bank of Nigeria, the share of crops was almost 88% of total agricultural GDP, followed by livestock production (CBN 2014). Local meat production is the highest in the livestock sub-sector, which is about twice the weight of eggs produced in the country in 2012. In terms of growth, poultry meat production has (53%) over the past decade, followed by eggs (42%), milk (39%), local meat (28%) and sheep meat and goat meat (26%). Although the figures show a relatively large livestock population in Nigeria, the importance of the livestock load in the Sahelian countries is much greater because fodder productivity is proportionally lower and the process of desertification and the strong land pressure contribute to fragile natural ecosystems.

In Chad, most of the production actors living in the sites visited practice livestock farming, which is a very important source of income for them. These development actors raise large livestock, small ruminants, poultry and pigs. The breeding of large livestock is the responsibility of the men who consider it, first as the breeding of prestige, then as source of monetary income. As for women and young people; they are particularly interested in raising the small ruminants, poultry and pigs they sell locally in villages and weekly markets. This small-scale breeding is a very safe source of income for women, young people and even vulnerable people. In the case of a project, the development of small ruminant, poultry and pigs farming will help this layer of the population in the BN area to reduce poverty.

⁹ Source INS

¹⁰ Fifth National Report on Biological Diversity

Two types of cattle breeding are distinguished:

Cattle breeding around a community park or sedentary breeding: in this type of breeding, several owners entrust their animals to a herdsman who follows the flock and whose part of the salary is constituted by the milk produced. Natural grazing at "zero cost" and agricultural by-products are the basis for feeding this type of livestock. Agricultural activities are not integrated with those of livestock. However, there is a form of economic integration in which the two systems (agriculture and livestock farming) support one another: surpluses of agricultural production are invested in cattle, which are then sold for reinvestment in agricultural production;

Extensive breeding: the latter is practiced by populations divided by the demands of different pastoral systems such as nomadism and transhumance. It is a system of rearing based on cyclical movements linked to the state of the pastures and the water points according to certain routes. In recent years, there has been a reduction in pastoral land, not only due to severe droughts, but also to the reduction of grazing areas due to demography and the lack of respect for traditional transhumance channels. Transhumance circuits often go beyond state borders and lead to interdependencies in some sub-region countries in terms of the sanitary situation of herds and the management of their space. Production is more commercially oriented than in the type of community or sedentary farming.

The river is in all seasons a refuge area for herds and especially for Sahelian livestock. With the decline in pastures and water points due to successive droughts, this trend has intensified and is the source of many conflicts between farmers and livestock breeders. Moreover, the concentration of herds has led in many places to a very significant degradation of natural pastures (grass cover, bourgou fields) and sylvo-pastoral resources (successive prunings). The area of the bourgou fields has declined markedly in recent years because of the decline in floods and overgrazing and because they increasingly compete with agricultural crops. In addition, the main source of livestock feed is 80% of the natural pastures in the entire dry season basin (Sahelian and Sudanian). The productivity of these pastures varies according to the rainfall pattern characteristic of the region. However, each year a forage deficit occurs during the dry season when bush fires burn all the grass straws and where most natural streams are dry. During this dry season, in the most favorable places (flood plains of the river and its tributaries, the Inland Delta, ponds and water reservoirs), The transhumance is mainly due to an excessive concentration of livestock, which actually exceeds the seasonal load capacity: there is then overgrazing. Continuous browsing of pastures, pruning and trimming of trees to allow herds to gain access to aerial fodder lead to the disappearance of vegetation cover which, coupled with intense and repeated trampling of livestock, increases the sensitivity of the soil to actions of water and wind erosion.

Moreover, in all the countries of the basin, on the one hand, the increase in livestock numbers is due, in particular, to the beneficial effects of veterinary prophylaxis measures (vaccination of animals among others) and, on the other hand, to the reduction of pastures because of

drought and the increase in cultivated areas at the expense of natural vegetation formations and rangelands; livestock raising will be a real challenge in the next few years. In terms of the constraints of the livestock sector, they are mainly linked to the traditional mode of production, which limits its growth. The main constraints faced by the livestock sub-sector are: the persistence of certain infectious diseases, food dependent on rainfall, the decline in pastoral areas that pose a serious threat to production systems, the coverage of water supply needs, the low level of investment and the low exploitation rate of livestock.

In Mali, for example, successive droughts have led to rainfall deficits of the order of 30% and a displacement of isohyets of nearly 200 km to the south. Water deficits have led to a reduction in primary production, a change in the structure of the vegetation cover and a massive reduction in wildlife and livestock. These climatic hazards have caused disturbances in all ecosystems. The induced changes associated with anthropogenic activities have seriously affected these activities. Pasture degradation is observed from north to south. Some plant species have moved according to isohyets. Thus, in the Sahelian South zone, climatic changes have led to the gradual disappearance of *Andropogon gayanus* and *Bombax costatum*, resulting in savannah “sahelization”. Similarly, in the inner Delta of the Niger, there is a reduction in bourgou fields. The deficit was large enough to decimate woody plants, limit the germination of annual plant seeds and reduce herbaceous plants.

Agro-climatic constraints

The inadequate and spatio-temporal distribution of rainfall is a major constraint on livestock production in the basin. The low level of rainfall has an impact on renewable resources. It reduces the soil water stock which is no longer sufficient to fill up deficits during the rainy season. These effects contribute to the reduction of pastures and water required for the expansion of livestock activities;

Animal health constraints

The main animal health constraints that contribute to the persistence of diseases are:

- an animal health system that is poorly adapted to the mobility of livestock characterizing pastoral systems. The local veterinary services for mobile breeders are still insufficient;
- inadequate means and capacity for intervention;
- weak distribution channels which restrict access to veterinary products in some localities of Niger;
- inadequate basic health facilities and mobile intervention services. Some municipalities have no livestock infrastructure, or the equipment is out of use;
- poor diagnostic and epidemiological surveillance capacity;
- inadequate implementation of the policy for the privatization of the veterinary profession.

Constraints related to food insecurity of livestock and access to pastoral resources

- The feeding of livestock, in a context of pastoral breeding depending mainly on natural pastures, faces the following main constraints:
- the recurrence of fodder deficits under the effects of climate change;
- difficulties in accessing agro-industrial by-products and agricultural by-products and the high cost of acquiring inputs due to their low availability;

- land insecurity increasingly affecting traditional production systems. This situation hinders mobility and limits access to many routes due to the occupation of transhumance corridors, pastoral areas / enclaves by crops;
- constraints linked to access to natural pastures which result in a degradation of the range areas and their insufficiency (shrinkage). These difficulties relate mainly to existing land practices and the development of competitive activities;
- inadequate pastoral water points and their poor mesh size. This hampers access to certain trails that serve as back-up areas during times of food crisis for flocks.

The constraints linked to infrastructures for the valorization of livestock production

The absence of an appropriate device for the collection, processing and marketing of animal products has always been stressed as a major constraint for livestock development. Indeed, it appears as a bottleneck in value chains and thus limits the value added on livestock production and income. From this point of view, the main constraints are:

- poor performance of the collection circuits and the dilapidated market infrastructures for production (cattle market, milk collection center, etc.);
- the lack of processing and conservation units for animal production (modern slaughterhouses, dairies, etc.), with the exception of the capital;
- the lack of reliable marketing channels both inside and outside the country;
- access difficulties to financing for production and marketing operations;
- obsolescence, and the lack of road networks to allow the commercial flow of production.

5.2.6. Fisheries and Aquaculture

The Niger River basin encompasses considerable fishing potential, which is a traditional activity, generally practiced by ethnic groups of fishermen. As a result, fishing is an important activity of the rural sector throughout the basin. It contributes greatly to food security by providing proteins at good prices to the populations. It is practiced along the Niger River and on certain sections of its tributaries. Thus, in some localities (from Timbuktu to Malanville) where there are fishing communities, the fishing activity is locally dense. However, this activity is threatened by the insufficient refilling of the stock due to overfishing and the decline in flooding due to drought and dam regulation, giving this activity a tendency to become a side activity alongside with agriculture and crafts. Fishing and fish farming are practiced in the Niger basin together with artisanal fisheries. Smoked or dried products are partly exported to neighboring countries including Nigeria. Traditional smoking of fish is carried out by women and its sale is a significant source of income for poor people.

In Benin, an estimated 2,000 fishermen operate in the project area and include Beninese, Niger national, Malian, Nigerian and Togolese. There are about 800 professional fishermen in the commune of Karimama (of which 2/3 are Nigerians and Malians) and nearly 600 in the commune of Malanville, most of them from Niger and Mali. Fish caught are smoked on the fishing grounds by women and sold on the urban markets of Malanville, Kandi and Parakou.

In Burkina Faso, fishing is of economic importance for the Niger basin in particular and for the country in general (over 8000 jobs, with a contribution to GDP of 2.9%). National fish production is estimated at 8 500 tons / year according to the document on priority strategies

and programs for the development and management of fishery resources. Fish consumption per capita per year has increased from 1.3 kg in the 1980s to 2 kg in the 1990s. An upward trend is observed mainly in large towns and at production centers. Consequently, a national strategy for the development of fishery resources through the rational exploitation of potential has been developed and is being implemented.

In Cameroon, in the Niger basin, the Lagdo dam is the main provider of fish in the North Cameroon region. It is operated by 1363 fishermen in 121 encampments around the lake. Representation of fishermen per nationality includes: 60% —Cameroonians, 17% —Malians, 22%— Chadians and 1%— Malian. All these fishermen, despite their different nationality, live together without any problem around the lake. They are organized in GIC to defend their interests and today there are about twenty fishing GIC. The practice of fishing in the lake is done by obtaining an artisanal fishing license issued by the regional delegation of Ministry of Livestock, Farming and Animal Industries of the Northern Region. To exploit the resource, they use the following gear: gill nets, traps, longlines, beach seines, mosquito nets and sparrow hawks. The boats used for the displacement on the lake are canoes with outboard motor or not. With the decline in the fishery production of the lake, some fishermen are gradually converting to farmers and ranchers, which sometimes causes problems of land acquisition especially for foreign fishermen.

The fishery production of the Lagdo dam has started from 15000t of fish in 1985 to 7000t today. This decline in fish catching is due to climate change, high fishing density on the lake (about 15 fishers / ha), use of gear prohibited by regulations, reduction in floodplain areas that are potential spawning areas and the silting up of the lake. This decline in fish catching has led the Cameroonian State to take measures such as: (i) the closure of the dam from June to October for biological rest, (ii) the establishment of spawning areas in the lake, (iii) Cage farming and (iv) development of fish farming in the region. All these measures are aimed at reducing the heavy pressure on the fishery resource and subsequently the increase in dam production. For example, the introduction of biological rest in 2012 has increased fish production from the lake this year from 5000t to 7000t in 2015.

In Cote d'Ivoire, there is very little fishing in the Niger basin, the inhabitants being farmers and herders. In addition, the fishermen are mainly from Malian nationality (bozos). This sector has an economic activity and an impact on silting almost zero (less than 1000 tons / year, MIRAH). Continental artisanal fishing is practiced in watercourses, rivers, lakes for hydroelectric, hydro-agricultural and agro-pastoral dams by foreign-dominated communities (originating in Mali of the Bozo ethnic group). Estimated production of between 6,000 and 13,000 tons is well below the production potential of water bodies. Cichlid species (Tilapia) are most commonly caught in most inland fisheries.

In Guinea, the tonnage harvested is estimated at 1,239,485 kg in 2007. It is in Upper Guinea that the largest floodplains in the country are identified in terms of area - of the order of 100,000 ha in total - which gives this region a high fishery productivity. The theoretical production potential of inland fisheries in Guinea has been estimated at between 7,000 and

8,500 t / year in periods of good water supply, of which 80% are in Upper Guinea. Inland fisheries are essentially of the river type, the only true lake fishery in Guinea being the Garafiri hydroelectric dam. In addition, there is no system for statistical monitoring of inland fisheries production, which has been estimated at between 5 000 and 6 000 t / year for nearly 10 years.

The people traditionally involved in fishing in Guinea are Malinkes from Somono caste. The Somono are largely from Guinean origin, although some are from Malian origin given the extent of the ancient Malinke kingdom. The Guinean fisheries also welcome Bozo fishermen, originally from Mali (inland Niger Delta). The Bozo have been, for many years, the confirmed continental fishermen of the Sudano-Sahelian zone and are present in different countries of the sub-region. Their presence in Guinea was particularly noticeable during the years of great drought until the early 1990s. Their numbers have since been stagnant or even decreasing, with the return of relatively good hydrological conditions in the Inner Niger Delta and the creation of dam fisheries in Mali and Burkina Faso, which have reoriented migration flows. Commonly used fishing techniques, although prohibited, are particularly harmful to the environment and pose a risk to human health: fishing for toxic plants, explosives and chemicals.

The aquaculture sub-sector in Guinea is still marginal, despite various initiatives that have been going on for nearly 50 years in the country, both in maritime and continental contexts. Total fish production in Guinea was estimated at 50 t in 2006 (BAD/PDPA Project, February 2008). Interesting results for semi-intensive or extensive fish farming in the Guinea Forest region and aquaculture developments (potholes in flood plains) in Upper Guinea have been recorded since the end of the 1990s , within the framework of micro-development projects supported by AFD / AFVP, BAD, FAO and Japan, which could lead to more structured and ambitious development programs.

In Mali, fishing is a very important activity on the Niger River and its tributaries. It accounts for 4.2% of the national GDP. Although a small part of Mali's fisheries production, of the order of a few percent, comes from the Senegal River basin (in particular from the lake of Manantali dam), it can be said that the Malian fishery is practiced in most part, in the Niger river basin. The production of the Delta represents the bulk of the fishery potential. This area provides 85% of national production. The number of fishermen is estimated at 70,000 for the Inland Delta. It is therefore acceptable, in the first analysis and given the statistical uncertainties, to attribute to this basin almost all the national production figure and its evolution, i.e. 55,000 to 140,000 tons of fresh weight equivalent depending on the year. The performance of fish production can also be assessed in relation to the areas that produce it. This is possible in the Inner Delta, where flooded areas (7,000 to 20,000 km² depending on the year) can be linked to production (40,000 to 120,000 tons according to the year and depending on the flood), showing an average productivity of 60kg per hectare of flooding, which is within the range generally accepted for this type of environment, 50 to 100 kg / ha; however, if one considers particular areas of the Delta, favorable and intensively exploited, high values of 100 kg / ha or more are observed locally.

In the fisheries sector, Niger has an appreciable fish potential estimated at 120 000 ha of fresh water. National fisheries production is estimated at more than 20 000 tons in 2010, representing an annual turnover of more than FCFA 10 billion.

However, the exploitation of fishery resources is facing many difficulties today. The decline in production is more felt in the three regions with high fishing potential that are affected by the intervention of the PIDDACC Tillabery, Niamey and Dosso; unfortunately there are no reliable statistics on national fisheries production and less on regional ones. This decline in fish production is explained by the following factors: (i) reduction of the volume of water causing low flows, drying-up and drying of water bodies; (ii) silting, invasion by plants and pollution of water bodies, which leads to a reduction in their productivity; (iii) the isolation and low access to the market for the disposal of fish products; (iv) insufficient methods and logistics of conservation and transport and (v) the absence or inadequacy of projects for the development and exploitation of the value chains of fishery products.

In Niger, the fish sector occupies 10,000 fishermen on a full-time basis, supports more than 50,000 people and contributes about FCFA 6 billion to the national economy per year. Fish sector reached a production record of 55,860 t in 2004¹¹. Several nationalities participate in fishing activities in each of the member countries of the NBA. Production is down annually at less than 4,000 T. This fall is attributed to lower flows from the upstream¹².

In Nigeria, national production (marine and freshwater combined) estimated in 2000 is 1,024,981 t / year, with at least 509,000 t from the basin area and water bodies located at the dams, following the government's incentive policy. Freshwater diadromous fish, mainly tilapia, dominate the fisheries sub-sector, followed by demersal fish (such as catfish) and pelagic fish (such as mackerel), two Species raised in marine aquaculture. In terms of production growth, shellfish production was the highest and almost doubled in the last decade (99.6%), followed by diadromous fish (67%), demersal fish (28%) and pelagic fish (27%). During the same period, crustacean production decreased by 10.5%.

In Nigeria, the Niger River basin has a significant fishing potential, a traditional activity, generally practiced by fishermen. However, drought and decline in flooding explain the fact that this activity tends to become a secondary activity in relation to agriculture and craft industry. Most often, fish are smoked before being sold, traditional smoking is done by women and the sale of smoked fish is a considerable source of income for the poor. Traditional fishing techniques, which are commonly used but prohibited, are particularly harmful to the environment and pose a risk to human health. That means fishing with toxic plants, explosives and chemicals. Local fisheries compete with smoked fish imported from Mali. Reduced fish size has resulted in the use of mesh fishing of narrow nets which, in turn, diminishes potential and has an impact on biodiversity. In addition, the development of

¹¹ National Multisectoral Study Niger 2004

¹² Ambouta K. Aboua G., 2009. Transboundary Environmental Diagnostic Analysis of the Niger River Basin

fishing is hampered by the proliferation of water hyacinth and industrial or agricultural pollution (heavy metals and pesticides). In Nigeria, national production (both sea and freshwater, as estimated in 1992) was 300,000.t / year, with at least 30% of this total water regime in the dams following the political incitement of the government.

In Chad, the Mayo-Kebbi has extensive flood plains (yaere), with hydromorphic soils, which are areas of predilection for fish breeding. The river system is composed of watercourses, the principal ones being the Mayo-Kebbi (200 km), the Kabbia (162 km) and the Loka, the lakes which are Lere lake (41 km²), the Youe / Ngara lake 18 km²), lake Tikem (17 km²), Lake Fianga (16 km²), lake Trene (10 km²), lake Kabbia and lake Boro. The overflowing of the Logone flood waters at the thresholds of Ere and Bongor (Dana in Cameroon) and known as the "capture of the Logone by the Benue" floods the entire plain between Gounou-Gaya and Fianga. Therefore, almost all the fish species (136) inventoried by J. Blache (1964) in Chad are present in the Mayo-Kebbi basin. These potentials make the Mayo-Kebbi one of the country's major fish-producing regions. Several ethnic groups in the project's intervention zone (Moudang, Haoussa, Toupouri, Kera, Moussey, Massa,) carry out fishing activities. Unfortunately, this occupation is often not taken into account or underestimated in the economic calculations of households. According to Arditi (1997), in Mayo-Kebbi area, fishing would represent only 5.1% of household income. Besides, statistical data on the evolution of landed quantities or the size of the persons concerned are not available. Nevertheless, it is acknowledged that this activity occupies a large part of the population bordering lakes and rivers. There are several intermittent or permanent fishponds in the department of Mayo-Dallah which offer an opportunity to develop a fish farm adapted to the conditions of production in peasant environment. These fishponds can therefore be stocked with fry which can be supplied by a hatchery. To this end, the construction of a nursery in Pala could serve as a motivation for some private initiatives of fish farmers who obtain their fry caught in wilderness from Lere and Fianga. Also, water reservoirs (dams, pond management) planned to be carried out as part of the implementation of this project may be stocked as fry produced by the Pala hatchery station in order to increase fish production in the localities benefiting from the said infrastructures.

The Niger basin provides the gist of the country's fisheries. In the normal hydrological period, fish production is around 100 000 t / year, placing Mali among the first African countries producing freshwater fish. In addition, the potential for village fish farming development is high, but it concerns other areas (outside large-scale commercial fishing areas) and other (rather agricultural) populations. Today, fishing is faced with tremendous difficulties, including the use of fishing methods and gear that are unsafe for the survival of fishery resources (Keep-all, fishing nets, sparrow hawks, Etc.), long-term climatic hazards, excessive fishing effort on the backdrop of conflicts over land claims, the invasion of watercourses, rivers and bodies of water by aquatic plants, etc. Other constraints include the following:

- The rather difficult climatic conditions, in particular the high evaporation rate of water bodies, impose more rigor and ingenuity, both technically and organizationally, in the development strategies of aquaculture and responsible fishing;

- degradation and silting of ponds and other bodies of water, which result in a quantitative and qualitative modification of aquatic fauna;
- Pollution of water bodies following the use of chemical fertilizers in agriculture, which makes these ecosystems unbearable for the fish fauna inhabiting it and can lead to the loss of specimens and the loss of biological diversity;
- Inadequate organization of fishing communities resulting in inefficient contribution of the sector to the social, nutritional and economic objectives of the country and timid progress towards the effective accountability of the communities in the management of resources. This inadequacy also explains the current informal nature of the sector's actions;
- The near non-existence of research and development, which explains why about twenty years after the first experiments in the sector, there is still no proven approach and data on the sustainable management of fisheries resources and on aquaculture on a national level;
- Inadequate capacities of the actors at different levels, in terms of management.

Fishing and fish farming are practiced in the Niger basin alongside artisanal fisheries. Smoked or dried products are partly exported to neighboring countries such as Ghana, Burkina Faso and Cote d'Ivoire. Traditional smoking of fish is carried out by women and its sale is a significant source of income for poor people. Fish farming is not developed in the area. However, it is a potential activity, which can be boosted when outreach activities are undertaken, as well as the financing of related infrastructure. It will be necessary to rely on changes in the behavior of populations (professional retraining) and development structures.

5.2.7. Forestry

The total forest cover of all the member countries of the NBA was evaluated in 2001 to 835 000 km². Nearly 5% of the active part of the Niger basin, or about 75 000 km², is covered by classified forests or reserves. The forest resources of the Basin consist of steppe, shrub savannah, wooded savannah, forest and gallery forests.

In Benin, in the Malanville-Karimama sub-basin, the total area covered by the vegetation formation of the forest area is 15 244.64 ha. Recent studies by PEDREGDE (2012) have revealed that for all the Commune, 16 localities are highly dependent on the sub-basin. The dominant vegetation formations are the savannas, as dense forests have regressed considerably. The formations of Forest / Arboreal and savannah are the most important formations that occupy the soil. The forest cover rate is on average 83.4% (Inventory Data, 2011). The region contains the following classified areas: National Park of W Niger River (563280 ha), Goungoun Forest (73476 ha), Roneraie de Goroubi (654 ha). The main forest species are: *Anogissusleicarpus*, *Vitellariaparadoxa*, *Detariummicrocarpum*, *Combretumglutinosum*, *Crssopterysfebrifuga*, *Burkeauafricana*, *Mitragynainermiset Terminanliamacroptura* etc. The species planted are: *Azadirachta indica*, *Eucalyptus* spp. In the fields, some species, depending on their uses, are conserved: *Tamarindusindica*, *Parkiabiglobosa*, *Vitellariaparadoxa*, *Adonsoniadigitata*. This area is home to the National Park of W (PNW). Recovery is very low and the species of trees encountered consist mainly of *Acacia* sp. and *Combretumspet*, some rare *Borassus aethiopum*. The most threatened plant

species in this forest region are the forage trees, namely *Khaya senegalensis*, *Azizica africana* and *Pterocarpus erinaceus*. At the wildlife level, there is no endemic species. The endangered species (IUCN Red List) present in the region include *Acacia (Acinonyx jubatus hecki)*, *Lycaon (Lycaon pictus)*, *Lamatin (Trichectchussenegalensis)*, *Elephant (Panthera leo)*, *leopard (Panthera pardus)*, *cob (Reduncaredunca)*, and *golden jackal (Canis aureus)*. Environmental degradation in this area can be summarized as follows: (i) Strong agro-land pressure; (ii) Existence of grazing land due to extensive livestock management in the face of increasing natural resources (iv) Trans-boundary transhumance and planting of crops in passing corridors by farmers, (v) Free grazing in agricultural areas and non-compliance with transit corridors; (vi) Installation of crops in passing corridors by farmers; (vii) Recurring conflicts between farmers and herders; (viii) Remoteness of the region; (ix) Difficulty in accessing credit. The natural resources of this sub-basin are constantly being degraded by anthropogenic factors combined with climate change. These situations only exacerbate the vulnerability of forest ecosystems.

In the Banikoara-Kandi-Gogounou-Segbana sub-basin, the forest cover rate is 67.72%. The classified estates are: (i) W Niger River National Park (563280 Ha); (ii) Hunting Zone of Djona (115770 Ha); (iii) Atacora Game Area (129370 Ha); (iv) Goungoun classified forest (73476 Ha); (v) Upper Alibori Forest (251592 Ha); (vi) Sota classified forest (53678 Ha); (vii) “Trois Rivieres” classified forest (259500 Ha); (viii) Ouenou-Benou classified forest (30 000 Ha); (ix) Sacred Forest Affoufooussi (20 Ha); (X) Sacred forest of Goubagou Son (50 Ha). This area is home to a community wildlife reserve project in the buffer zone of the Niger River W National Park in the Banikoara Commune called the RAPIDALIBORI Project. In this area, there are still some relics of forest areas that can still supply wood, but valuable species are very scarce and wildlife is increasingly rare. Rare or threatened plant species in this region are: *Khayasenegalensis*, *Milicia excelsa*, which are red-listed species of the IUCN that are highly vulnerable to anthropogenic pressures. The main factors degrading natural resources in this region are: agriculture, livestock / transhumance and poaching. The nuisances created for fauna and flora are mainly linked to: wildfires in disregard of the rules in force, extension of cultivated areas, overgrazing, hunting with beaters, amplified by the migratory flows of hunters organizing hunting and poaching from one commune to another. These different behaviors are the basis of the destruction of wildlife habitat, the loss of biodiversity, and in turn the disappearance of wildlife. Natural resources (soils, vegetation, water, etc.) are then subjected to strong anthropogenic pressure, resulting in a rapid rate of environmental degradation.

In the sub-basin of Bembereke, Sinende, Kalale and Nikki, the classified forests of the region are: Upper Alibori (251592 Ha); Ouenou-Benou (33977 ha). The plant species of rare or threatened status in the forest region are: *Azizica africana*, *Khayasenegalensis* species, *Pterocarpuserinaceus*, *Milicia excelsa*. As for wildlife, rare or threatened species are: *bubal (Alcelaphus bucelaphus mjpr)*, *buffalo (Syncerus caffer)*, *hippotrague (Hippopotragusequinus)*. At the level of this region, the production-consumption balance of wood-energy would be positive. But in a few years, if nothing is done, the situation will be reversed. The region is one of the most resource-rich areas in Benin. Moreover, due to the weakness of the technical

framework combined with incivism, this wealth is subject to a number of factors of degradation, namely: - poor cultivation practices, - ignition of late vegetation fires, - the anarchic and fraudulent exploitation of forests, - carbonization, - poaching, - transhumance, - the installation of crops in passing corridors by farmers.

In Burkina Faso, in the project area, degradation of natural resources combined with the negative impacts of climate change has resulted in a reduction of forest formations and a decrease in woody formations due in part to the extension of sown areas and pastures. In addition, wood is exploited for consumption or marketing purposes, some of which is intended for charcoal production. Social groups specializing in charcoal production have settled in forest areas for the production of charcoal. Loggers usually work with lumberjacks and charcoal burners who are paid for piece work. They are often regarded as independent, but in practice the financial relations established with the forestry operators (granting of advances on production, supplying the worksites) bind them together. As part of the restoration of vegetation cover, the Technical Directorates of Environment and the basin agencies often carry out the following activities: (i) completion of forest inventories (ii) organization of populations in forestry groups (iii) delimitation of communal forests (iv) production of seedlings taking into account local species providing NWFPs (v) monitoring community and associative plantations through the development and follow-up of the implementation of specifications and (v) conducting information and sensitization campaigns on climate change, its causes, effects and possible solutions.

In Guinea, the Upper Guinea region is home to 20% of the country's total population and contains more than 50% of the available resources of wood products from natural forest formations. About 90-95% of domestic energy is supplied by burning wood for kitchen and heating purposes. For example, in the project area in Guinea, total demand for wood products is currently estimated at 1.3 million tons for all 5 prefectures in the Kankan region, and is 95% on wood energy. Demand is largely met by resources from the region or from neighboring sites in Guinea Forest Region. Commercialization to satisfy local demand is therefore almost exclusively concentrated on supplying urban centers (about 0.3 million tons / year, 21% of the total), with the city of Kankan as the main market. However, marketing flows on the markets of the region and especially on the wood market of Kankan exceed local needs by sales to other regions of Guinea, mainly Conakry and Mali in Bamako. The use of charcoal is not very widespread and even in the urban centers where it is concentrated it does not exceed 20% of the demand for wood energy. Producers, local or professional coal miners, work in proximity (20 to 30 km) to the consumption centers. Since the export bans were lifted in fact, at the end of 2007, purchases of Malian merchants were resumed at a price justifying transport over 200 km. The quantities exported from the region would be in the region of 10 to 15 000 tons / year, at a level close to that estimated for local consumption.

In Mali, forestry plays a leading role in the national economy and contributes 4.9% of GDP to forestry production. According to the DNEF statistics, taking into account harvesting products, wild fruits and species for the pharmacopoeia, the estimated value of the products of the forestry sector independent of the tree fodder would be of the order of FCFA 70 billion

per year. National controlled production over the past five years is estimated at 373,633m³ firewood and 23,880.50 tons of coal (MEATEU, 2001). The trade in wood fuels represents a turnover of FCFA 21 billion / year. According to official statistics, controlled production of lumber over the last five years is 204 418m³ (DNAER, DNCN). Imports during the same period are valued at 75 091m³ (DNSI). Controlled timber production for the past five years is estimated at over 16,261 m³. The gross value generated per year is estimated at FCFA 100 million. Sources: Annual reports of DNAER and DNCN from 1984 to 2003. Studies have shown that consumption of wood and coal has increased at the same rate as population growth. The pressure is therefore very strong on the wood resources, which contributes to the impoverishment of the vegetal cover and forest, already reduced by the extension of cultures. The overexploitation of wood resources has been perceived since 1974 as one of the worrying problems in Mali in general and in the Niger basin in particular. The Malian part of the Niger basin has experienced numerous attempts of reforestation, both at the individual and at the state level. The latter case was made through regional and local projects. These are the village plantation pilot projects (PPPV - 1982 - 1985), village land management and management projects (1985-1993), village forestry support projects (1985-1993), agro- Forestry (1992 - 1997) and natural resource management projects (PGRN). Local community organizations are currently playing a leading role in achieving reforestation in village lands. They are supported in their efforts by various financial institutions, including national and international financial institutions.

The Mali-Green program (1974-1998) included the entire basin but particularly the Sahelian strip. It has contributed to information, awareness and education of the popular masses on the importance of reforestation as a means of combating drought and desertification. The activities of these projects and programs include village groves, restoration of forest galleries and the application of agroforestry. Field plantations are generally local private initiatives involving individuals or production units (concession).

These projects have resulted in the involvement of the population and socio-professional associations in order to enable them to appropriate forest management and conservation techniques and technologies during the implementation of the programs. In addition to the village terroirs, the development and reforestation also concerned classified forests and river banks. Several institutions (national and international) as well as NGOs have invested in reforestation, either as a main objective or as an activity within the framework of regional development and conservation of the environment. Forest seedlings account for 81.52% of total production and fruit trees account for only 18.48%. This rate of forest seedlings is decreasing while that of fruit plants is clearly increasing. The Timbuktu and Sikasso regions have the highest production rates of forest seedlings (37.10% and 17.69%). The production of potted plants is higher than that of bare root plants.

In Niger, there are more than 16 million hectares of forests, 11,600,000 ha of marginal forest land and 4,400,000 ha of developable forest land in 1989. In Mali, the forestry potential is generally estimated at 100 million ha concerns 3.4 million ha, or about 26% of the country's land area, including 1.3 million ha of classified forest and 3.9 million protected areas (1.5

million ha in Mopti and 1, 75 million in Gao) to which must be added the anthropogenic or agricultural plantations (crops and fallows) estimated at 15.7 million ha.

Unfortunately, this potential is heavily threatened by human and anthropogenic pressure combined with climatic factors. Timber is an essential economic commodity for the population as it is the main source of energy in the Niger River basin, including in cities where it is also consumed in the form of coal. The balance of wood production / consumption shows that the overall situation is negative on the basin and with strong contrasts between countries: in Niger, forests provide 87% of the population's energy needs, which can vary between 1.5 and 2 million tons per year.

In Nigeria and Cote d'Ivoire, the situation is alarming, as both countries have fewer than 10 million hectares with a deforestation rate of around 3.5% per year. Thus, in most of the Niger basin, fuel wood consumption is higher than the production of natural plant formations, with wood supply being achieved by a decrease in the stock of standing timber, which is untenable in the long term and which may lead to more or less short-term and, depending on the area, increased desertification. The strong demographic growth, and in particular that of the towns, increases this phenomenon from year to year; and wood consumption, together with agricultural clearing, is one of the major causes of soil erosion and impoverishment in the Niger basin.

According to the FAO, Chad has 12,692,000 ha of forests of which 14,000 ha are plantations and 12,678,000 ha are natural. Subjected to intensive deforestation, these forests are declining everywhere; the various pressures they face do not allow them to play their ecological and biological role, and thus guarantee the productivity of the soil which is constantly decreasing. Firewood is the main source of energy; the total primary energy needs are thus 90% met by fuel wood and charcoal. More than 80% of the energy consumed in Niger comes from wood and charcoal, i.e. more than 2 million tons per year. In areas with a population density of more than 30 inhabitants / km², timber exploitation has become the subject of systematic deforestation around the cities and in bands along the roads. Therefore, it is difficult to find wood within a 15 to 30 km radius in Kankan, Guinea, or more than 100 km in Niamey, Niger.

This situation exposes the soil to erosion and degrades the watershed. The challenges of sustainable forestry for the basin are built around the following problematic axes: How can the sustainability of the forest resource be made possible? How can spatial planning policies be reconciled with forest preservation? How can bush fires be controlled? The role of alternative energies to wood will mainly be played by improving the incomes of the populations who will have more access to it.

5.2.8. Mines and industries

a) Mines

The Upper Niger and the Middle Niger have significant potential for mineral resources (gold, diamonds, uranium, phosphates, hydrocarbons, etc.). In Mali, research has highlighted the existence of significant mineral resources and deposits including gold, diamond, copper, lead,

zinc, iron, phosphate, bauxite, manganese, uranium, limestone, gypsum, bituminous shale. In Chad, marble and cipolin are reported. In Niger, uranium and gold are exploited and are the country's main mineral resources with a significant impact on the national economy.

In Guinea, the main gold deposits of Upper Guinea are located in the sectors of Siguiri-Mandiana, Dinguiraye, Niandan and Banie. They are characterized by high levels (5 to 10 g / m³). Concerning diamond mining resources, industrial exploitation is carried out by a few large mining companies, notably Aredor-First City Mining, operating a large deposit in the Banankoro region. Individual exploitation has been prohibited in Upper Guinea since 1984, mainly for political reasons. However, diamonds are occasionally collected during the exploitation of gold in the placers.

Upper Guinea currently has four industrial mines in operation. The Kiniero mine, Kouroussa prefecture, is operated by SEMAFO. The other mines in operation are located in Dinguiraye Prefectures (Dinguiraye Mining Company), Siguiri (Koron / Siguiri deposit by Ashanti Gold) and Kerouane (AREDOR). In the study area - from the Niandan valley to the inner Niger Delta - artisanal mining activities are: (i) traditional gold mining, which is widely present in several areas of the study area, and (ii) the extraction of materials for construction - sand and clay - with many sites spread all along the waterways.

The Upper Niger basin is famous in history for its artisanal gold mining activity, which has made the wealth of the great West African empires. The Malian empire in the thirteenth century, whose capital Niani is in the present prefecture of Siguiri, Guinea's first gold province, is the best example. The informal nature of the activity makes it difficult to have reliable figures for gold panning in the study area. The socio-economic survey has nevertheless been able to estimate the place of this type of income in the household revenue of the zone.

In Upper Guinea, artisanal gold panning is concentrated in the valleys of Niger and its tributaries (Tinkisso, Niandan, Milo, Sankarani) in the prefectures of Siguiri, Kankan, Mandiana, Dinguiraye, Kouroussa and Faranah. The activity is authorized in reserved areas defined by ministerial order in charge of mines. The Siguiri sector is one of the main gold panning centers: nearly 50,000 gold miners currently produce between 3 and 5 tons of gold per year. Gold panning contributes to the income of 75% of households and is an important source of secondary income (17%, 11% and 29% respectively). In addition, 52% of the villages surveyed had mines on their territory.

The bed of the Niger River constitutes an important deposit of aggregates (sand and gravel), particularly in the sandy areas of the river and in the delta. The extraction of these materials takes place in many areas along the river. The exploitation, which is done according to traditional methods (donkey carts, canoes ...), is generally limited. In some sectors, as in the vicinity of the Bamako agglomeration, there is a high demand for aggregates for the manufacture of concrete blocks and concrete. Operation is done with mechanized machines (shovels and trucks).

Unfortunately, the exploitation of these resources is mostly artisanal and causes considerable environmental damage (gaping holes left, destruction of vegetation cover, deviation of streams, pollution, etc.). Mining activities mobilize soils and rock materials on sites of varying but mostly localized extent. The current development of gold mining in the Niger River basin is accompanied by significant risks of pollution of surface and / or underground waters by heavy metals. Moreover, close to urban centers, the extraction of sand and other substances useful for construction, using heavy equipment and trucks, contributes to the erosion of the banks and banks of the koris and the river. Thus, downstream, watercourses can be severely polluted by effluents used for the washing and processing of minerals with highly toxic products, or clogged by the sedimentation of fine particles from earthy effluents. The impact of this activity on the environment can be significant in terms of erosion when many points of exploitation are spread along the watercourses and when the fuel wood consumption becomes large and is made by anarchic authorization on natural vegetation cover. In Nigeria, the exploitation of oil and natural gas is causing serious damage to the marine and coastal environment. The result has been a pollution of biodiversity (mangrove), an impoverishment of agricultural land through oil exploitation, gas fires.

The exploitation of gold initially and essentially artisanal with a high intensity of labor, creates in some places phenomena of erosion and significant pollution. In general, little is known about the consumption of water from mines, but this demand is significant. In Burkina Faso, for example, this demand is estimated at 0.35 million m³ per year in the basin portion. This shows that the development of the mining sector in the Niger basin must be considered in the context of an adequate mobilization of water resources and receive special attention, especially in the Sahelian countries where water is an essential concern. The situation of mines in the basin is characterized by the existence of private operators and the intervention of the State, particularly through legislation on the protection and promotion of the sector (mining codes). It is important to develop strategies to reconcile the economic development of the mining sector with consideration of the environmental and social aspects of the basin.

Industries—Apart from Nigeria, industrial activities in the national part of the Niger basin are still relatively small. These industries are concentrated near major urban centers and agglomerations. These include the chemical industries (soap factory), the agro-food industries (dairies, slaughterhouses, oil mills, soap factories, etc.), textile industries, tanneries and dyers. These units are a source of pollution due to a lack of sewage treatment plants and effluent discharges into the river. In Nigeria, several more large-scale industries are installed along the riversides and discharge their industrial effluents directly without proper control or treatment. These include the Nigerian Sugar Company (Bacita), Premier Brewer, PLC (Onitsha), and petrochemical industries.

In Niger, for example, the urban community of Niamey has 49 establishments with an active artisanal or industrial function (agro-food, chemical / para-chemical, energy, textiles). Of these, 30 are truly industrial. All these industrial plants discharge their effluents directly, tannery, slaughterhouse, brewery and hospitals being the most polluting units. The main sources of pollution are biological, with significant organic waste. Surveys were carried out

on an ad hoc basis on all the industrial establishments in Niamey, which were used to characterize effluents. For the slaughterhouse, for example, the content of solids, germ and ammonium exceeds national and international standards. In Bamako (Mali), the Niger River receives more than 2,200 m³ / day of industrial wastewater (slaughterhouses, tanneries, textiles, soap factory, oil and chemical industries), to which must be added 16,000 m³ / day of wastewater from dyes, chemical pollutants, and heavy metals.

The development of cotton cultivation and the promotion of some economic activities in the areas of agriculture, livestock and fisheries, in particular, should contribute to raising the level of industrialization in the basin. The development of industry must take environmental and social aspects into account in the management rules for industrial installations in order to encourage sustainable management of natural resources. In this regard, it should encourage the sharing of benefits with the poorest populations.

5.2.9. Energy sector

The energy available in the basin comes from a number of sources, specifically oil, wood and charcoal, hydropower and solar power to a lesser extent. Energy consumption per capita is extremely low in the Niger Basin: about 0.3 tons of oil equivalent (toe) / habit / year against African, world and North American averages of 0.63, 1.76 and 8.46 toe / capita / year¹³. Electricity consumption is 70 kWh per capita while the African average is 740 kWh. Wood and charcoal are the most widely used sources of energy in the region. In the rural environment, cooking is done exclusively with wood and often with charcoal. Electricity is expensive and often inaccessible to the majority of the population. As for gas, it is reserved for some category of well-off people. Access to electricity and the use of gas is very limited mainly because of their cost still too high. In Burkina Faso, 12% of households have access to electricity. In Mali and Guinea, electricity accounts for 3% of total energy needs. Solar energy, due to the high cost of investments and the poor control of this technology by the populations, is still poorly used. The use of oil is limited to cooking food and lighting houses especially in rural and semi-urban areas.

Only the Kainji and Jebba dams on the Niger River operated by Nigeria that provide electricity to Niger and Burkina Faso. In Guinea, the only functional hydroelectric dam is Tinkisso with a reservoir capacity of 466 m³. Yet the region has tremendous hydroelectric potential. In Niger, the hydroelectric potential of the country is likely to produce an energy of about 1040 GWh / year for an installed capacity of 278 MW.

Electricity demand is expected to grow by 17% per year on average in the Niger basin, while hydroelectric potential is underutilized; biomass is overexploited; renewable energy is underdeveloped; and hydrocarbons are unevenly distributed in West and Central Africa. With urbanization, the demand for petroleum products and electricity will increase at the expense of traditional products such as firewood. The efforts made by the States for this

¹³ Ambouta K. Aboua G., 2009. Transboundary Environmental Diagnostic Analysis of the Niger River Basin

purpose could help to confirm this trend. The assets for the development of this sector are the existence of hydroelectric potential; the existence of rural electrification programs and electrical interconnections between countries.

Consequently, the main challenges facing the energy sector include: improving reliable, cheap and environmentally friendly access to energy for improved overall management. The sector at the basin level, and West and Central Africa as a tool for poverty reduction and sustainable development. It is worth noting that the Niger basin possesses relatively large hydroelectric and hydro-agricultural development possibilities, the exploitation of which could contribute to the economic and social development of the basin. Given the natural potential of the basin and the current development of the economic uses of its resources, it could be said that the exploitation of the comparative advantages of the basin is not carried out optimally in order to strengthen its contribution to the development of the countries. The main challenges are the establishment of institutional frameworks for the exploitation of the energy potential of the basin (esp. hydroelectric potential), the substitution of wood energy and the improvement of cooperation between States (in particular with the harmonization of national policies).

5.2.10. Tourism

Despite the potential of the basin, tourism in the basin is generally poorly developed outside of tourist areas such as the Dogonland, Timbuktu and Djenne in Mali. The development of tourism suffers from the general inadequacy of reception, communication and transport infrastructures and the lack of incentive policies for tourism, in particular eco-tourism. The basin has a very diverse fauna and flora and several important reserves and parks in which eco-tourism could develop. Among the important sites are the Inland Delta and the Parks and Reserves (Table 9), including the Upper Niger National Park (Guinea / Mali), W Park (Niger, Burkina, Benin), Kainji National Park (Nigeria). Besides, in the Upper Niger, the Upper Niger National Park (in Guinea) and an extensive network of protected areas in Cameroon in Lower Niger. In the Niger River Basin, the development of tourism, and in particular, ecotourism and better protection of parks and nature reserves would result in better protection of the environment. In most of the localities of the basin, tourism activities are still at a start-up stage with prospects for progress.

In Benin, the eco-tourism potential is composed of quite diverse natural resources (the Niger River W-park, the Kudou fall in Banikoara, the Alfakoara elephant pool and the Kandi-Fo waterfall in Kandi) A rich cultural heritage that promotes the development of various types of tourism activities, including: vision of specific landscapes, vision of wildlife and birdlife, sport hunting and fishing.

In Burkina Faso, tourism is booming and the basin area is the hunting tourism area of Burkina Faso with almost 3 million hectares of protected areas, where many structures have been developed recently allowing the practice of hunting and sightseeing. The Arly National Park, the Singou Wildlife Reserves, the W Park, etc., offer sports hunters, the Safari, the opportunity to realize their dream and experience strong sensations in front of the gracious

works of nature. In Cameroon, the basin area records the most tourists after the Central and Littoral provinces. It is made up of national parks, hunting areas, accommodation, catering and leisure establishments, tourism agencies, folk dances, etc.

In Cote d'Ivoire, the majority of the basin inhabited by Malinke and Senoufo is characterized by a rich tourist heritage. In addition to the Poro (ancestral dance of initiation), the traditional dances (N'Coron, N'Gomi and others in Boundiali) can be cited as part of the rich tourist fabric of the area; the Lo, Fle, Bele Bele, Bar-Fonohi, de Tengrela, etc. the existence of sacred forests throughout the region, the blast furnaces from which the blacksmiths produced iron for the manufacture of agricultural tools (dabas, cutters, and other white weapons), artisanal weavers, pottery with a variety of design motifs, loincloth weaving and dyeing, sculpture, the ancient mosque in Mud "Bogomissiri", the cave "Tindahara" and the hyena mountain in Diamakani, the beautiful white hills of Beniasso (Beniassokrou), etc. make the basin, a tourist destination to exploit in the years to come.

In Guinea, as part of an effort to organize the tourism sector, 275 sites have been identified and classified as natural (162 sites), cultural (82 sites), or ecological (31). However, the tourist infrastructure is relatively undeveloped, although there are hotels in most inner centers.

In Mali, tourism is essentially cultural. The national tourism policy is based on the cultural values of Mali and around picturesque sites often listed on the UNESCO World Heritage list as the tomb of Askia, Timbuktu, Djenne, Dogonland or immaterial goods such as crossing Oxen in Diafarabe (yara and Degal). The three most known and most visited areas of tourists are Bamako and the Mandingo land, the Inner Delta, with the Dogonland, and Timbuktu and Gao on the Niger River loop.

In Niger, most tourists visit the capital, Niamey and the northern interior of the desert. Tourism along the river is limited to seeing the hippos in Ayorou, the Boubon sites; and at the Parc of W. Hotels outside Niamey, Ayorou and Agadez are limited in number. The W Niger National Park has reliable tourist infrastructures (the Hotel de la Tapoa, a rest house, hiking trails, tourist facilitation service) and quality service. Some 20 tourist guides recruited mainly from the waterfront villages were trained by the park and Point Afrique to improve their knowledge of wildlife. The form of tourism exploitation currently practiced is vision tourism. The tourism and educational interest of the PNWN is undeniable and constantly increasing. The development of tourism, however, suffers from the general inadequacy of reception, communication and transport infrastructures and the lack of incentive policies for tourism, in particular eco-tourism. However, the development of tourism, ecotourism and better protection of parks and nature reserves would result in better protection of the environment.

In Nigeria, the project area with its potential surface water resources, offers a wide variety of recreational and tourist attractions such as expanses and spacious rivers and beaches, ideal for swimming and other water sports, potential beach tourism, the establishment of boating and sport fishing facilities. Many of these attractions are still largely untapped. There are great

opportunities for investment in recreation and tourism in the area for local and foreign investors.

In Chad, tourism richness is expressed through a varied natural environment and a rich cultural heritage characterized by the existence of a traditional chieftaincy, an original habitat through a local architecture, periodic ritual ceremonies to celebrate major events of the population life.

However, the tourism sector is not without consequence on the reception areas. Indeed, the classic impacts of tourism of greater importance are garbage and oil pollution, resulting from an increase in activities on the river. Another problem that is already real and will increase, if not properly controlled, is the evacuation of effluents from hotels directly into the river. The construction of reception centers for tourism (hotels), the development of tourist sites can have negative consequences on both the soil and the flora and fauna.

5.2.11. Craft

This sector is experiencing a relative outbreak in view of the fact that different settlement groups have a cultural know-how in the promotion of handicrafts, which in turn fuels tourism and eco-tourism in the basin. The majority of the population is renowned for their creative genius in the work of leather, dyeing, weaving (Bogolan, Faso dafani). Substantial efforts are being made in all the countries of the Basin (mainly in Burkina Faso, Mali and Niger) for the promotion of craftsmanship at the national and global levels (Artisanal Fair of Ouagadougou (SIAO), Women Artisanal Fair SAFEM, etc.). In Niger, for example, several trades have been identified, comprising 240 trades, and it is estimated that more than 600 000 jobs were created in this sector in 2001. This sector can thus contribute to the fight against Poverty and sustainable development in the basin and therefore needs more promotion.

5.2.12. Basic social sectors

a) Drinking water supply and sanitation

Drinking water supplies are provided by groundwater catchment facilities (wells and boreholes) and water distribution systems. In rural areas, drinking water supply is provided by wells and boreholes, most often carried out through the village water supply programs. Generally in urban areas, the water supply is provided by complete networks of water supply by Companies or Offices. The supply of drinking water to the populations of the Niger basin comes from several sources, namely: (i) Surface waters consisting of the Niger River and its tributaries, ponds, temporary rivers, reservoirs of water and (ii) Groundwater including sources, emergences, alluvial groundwater and other aquifers.

The state of play in this area is characterized by low coverage of drinking water needs. In spite of the existence of village water supply programs, many areas of the basin are deficient in modern water points. In general, water supply is provided by state agencies through mobilization structures and different distribution systems, depending on whether they are in rural areas, semi-urban areas or urban areas. In rural areas, the various technological options

for the supply of drinking water are: wells, boreholes equipped with manually operated pumps, and small drinking water supplies.

It should be noted that wells are not always perennial and do not provide good quality water for human consumption. In addition, in spite of the efforts made to effectively manage the maintenance of these water points by the users, the problem of maintenance of the pumps has not yet found a sustainable solution; and pumps break down for long-term, often they are abandoned. In Niger, this has required the setting up of a new method of village organization with the creation of associations of water users who have the legal personality necessary for the award of contracts.

In urban and semi-urban areas, the supply of drinking water is mainly provided by the parastatals which often have contracts of leasing with the State. With the advent of the International Drinking Water Supply and Sanitation Decade (DIEPA 81-90), different governments have put in place sectorial projects or national water supply and sanitation programs (AEPA). Indeed, the states committed themselves to improve during this period the standards and the quality of the services of supply of drinking water and sanitation. Access to basic drinking water and sanitation services, full participation of beneficiaries in projects and taking into account endogenous realities were among the priorities of the decade.

Access to drinking water varies greatly from one country to another. It is 75% in rural areas and 53% in urban areas in Burkina Faso in 1995; 26 per cent in rural areas and 63 per cent in urban areas in Nigeria in the same year. Beginning urbanization is already confronted with problems of public and family sanitation, of solid and liquid waste management. Access to drinking water varies from 30% in Northeastern Nigeria to almost 74% in the South West, and access to basic sanitation by 45% in the Northeast to 70% in the Southeast. The Government is making every effort to meet these challenges by granting budget allocations to social programs.

Access to water is a major challenge in Niger. Thus, the water potential and the countless efforts of the governments of Niger with the support of the technical and financial partners have made it possible to improve the coverage of drinking water in Niger. However, the disparity between cities and rural areas is important. The coverage of rural and urban drinking water needs in 2011 was 63.7% and 72.7% respectively. However, the level is insufficient to reach the MDG target set at 80% by 2015¹⁴.

The situation of sanitation in towns and villages is worrying despite some progress. It is characterized by the existence of hygiene problems and the prevalence of waterborne diseases. Inadequate investment in this area partly explains this situation. Today, however, this sub-sector is undergoing a transformation under the combined effect of the State, local authorities and development partners. In Niger, for example, in 2011, access to sanitation is still low with rates of 13%. For millions of Nigerians, 50% of them under 18 years of age and

¹⁴ Economic and social development plan (PDES) 2012-2015

21% of them under 5 years of age, simple wells, Niger River water or ponds are the only water sources. In Guinea, the drinking water supply to the populations of the program area is provided in urban centers through gravity-fed water supply networks managed by the SEG, most of which are dilapidated and in rural areas by drilling carried out by SNAPE. From 1979 to 2003, SNAPE has set up 3.118 water points for the supply of the rural populations. Despite these efforts, the demand for drinking water supply is still very high, especially in the dry season, characterized by low water levels.

In Cameroon, for the populations of the urban area, water is supplied by the CAMWATER Company but, on the other hand, for the village populations' access to drinking water is very limited in spite of the presence of some boreholes and / or wells. In general, the study area is counted among the areas where the level of access to drinking water was lowest in 2007. Indeed, the northern and extreme regions where the activities of the Accessibility to drinking water is 23.1% (9th out of 10 regions) and 29.4% (8th out of 10 regions). As a result, the majority of the population rely on unprotected watercourses, wells and streams, and other unimproved water sources. Some populations have to travel long distances to find water points to satisfy their needs irrespective of water quality. In the Northern Region, only 35% of households have access to drinking water, and as a result of the strong population growth in rural areas, the situation has deteriorated since 2001 when 42.8% of households had access to drinking water. The percentage of households with access to drinking water and electricity is the lowest in the Northern and Far North regions compared to other regions of the country. In terms of sanitation, the project area in 2007 had the lowest accessibility levels to a decent toilet. The two regions most concerned, namely the North and the Far North, are the last ones respectively with 6% and 6.3% of people who have access to a decent toilet. By comparing the level of access to drinking water with that of access to a decent toilet, it is found that the latter is much delayed. As a result, drinking water improvement alone will not achieve the desired results.

All the countries in the basin have developed national strategies for achieving the Millennium Development Goals with technical support from UNDP country offices. Programs and projects have been initiated in the eight priority areas and especially in the field of water and sanitation. These programs have made it possible to obtain substantial financing for the renewal of equipment, the extension of the networks and the restructuring of the water and sanitation sector. As a result, the situation has considerably improved in the nine countries of the basin where, in 2000, an average of 58% of the population had access to drinking water and sanitation. The problem of access to water is one of the causes of low life expectancy and high morbidity in the basin.

The increase in coverage rates is the main issue in the subsector. This requires a better knowledge / use of groundwater, particularly under-utilized. The issue in terms of integrated water resources management are therefore paramount: (i) Only sustainable and integrated management can make it possible to regulate water resources in order to guarantee the availability of water throughout the basin; (ii) This integrated management necessarily involves improving information on drinking water supply possibilities in the basin; (iii) Only

sustainable and integrated management can ensure good quality water throughout the basin, reducing pollution; and (iv) A better knowledge of underground resources is essential for this management. At this point, the involvement of the basin States in the Integrated Water Resource Management (GIRE) process through the adoption of the GIRE National Action Plan is beneficial for the conservation of water resources.

b) Health

The basic determinants of health include mortality rate, infant mortality, life expectancy, birth rate, number of doctors per 1,000 inhabitants and the number of hospital beds per 1000 population, etc. The current level of key indicators of morbidity and mortality reflects the overall health status of the basin populations. All the countries of the basin are faced with major difficulties in terms of health, given the natural environment and human activities which maintain a favorable climate for the proliferation of different types of diseases.

The health situation in the Benin region of the Niger basin is comparable to that of the whole country. It is characterized by varied and diverse tropical pathologies with a strong predominance of endemo-epidemic conditions. The most common are malaria, diarrhea and gastroenteritis. To these are added the target diseases of the Expanded Program of Immunization such as measles, polio, tetanus, pertussis, tuberculosis, meningitis. HIV / AIDS is also prevalent in the area. It is a permanent threat to the health of populations, including the juvenile layer. By 2014, vaccination coverage was 88.5% in the area compared to 89% nationally. Malnutrition and anemia are an important part of maternal and child health problems. There are large disparities in reproductive health. While in 2006, 88% of women received prenatal care, the proportion dropped to 61% in Alibori.

Infant-juvenile mortality is at 125 %, the most important factor in this mortality is the mother's level of education (179 % mortality in Atacora). With respect to immunization coverage, less than one child in 12-23 months out of two (47%) received all vaccines from the Expanded Program on Immunization, that is, one dose of BCG, three doses of DTCoq, three doses of polio and one dose of measles in 2007. Changes according to the place of residence are important and highlight the low vaccination coverage of the rural environment compared to the urban environment (43% vs. 55%). In addition, the proportion of fully immunized children increases with the mother's level of education: (43% for children of uneducated mothers and 80% for mothers with a secondary level or more) and with the Economic status of the child's household from 34% among the poorest households to 65% among the richest.

As regards prenatal care, almost nine in ten women (88%) went to antenatal clinics managed by health workers, mostly nurses and midwives (80%). Just over one in ten women (11%) received no prenatal care during pregnancy. 59% of women had received the number of shots needed to protect their last birth against neonatal tetanus. As for births that took place in the five years prior to the survey, 22% occurred at home and 78% were in a health care facility, mostly in the public sector (65%).

As for the use of mosquito nets, more than one in two Beninese households has at least one, whether treated or not (56%) in 2007. For impregnated mosquito nets, the proportion is 40%. Only 25% of households have insecticide-treated mosquito nets (ITNs). But less than half of the children (47%) sleep under a mosquito net. The proportions of those who use impregnated mosquito nets and ITNs are 33% and 20%, respectively.

In Burkina Faso, the health situation, despite a certain improvement, is still characterized by high general and specific mortality rates. Surveys show a high gross mortality rate in the population of 11.8 ‰ in 2006. Mother and child are the most vulnerable groups. The maternal mortality ratio was 484 per 100,000 live births (Demographic Health Survey, 1998). It is 307.3 per 100,000 live births (Census of Population and Housing 2006). According to the same source, the infant mortality rate is 91.7 per 1,000 live births and the infant and child mortality rate is 141.9 per 1,000 live births. Life expectancy at birth rose from 36.7 years in 1960 to 50.4 years in 2000 and 57 years in 2008, an increase of 20.3 years (World Year Perspective). The epidemiological profile of the country is marked by the persistence of a high burden of disease due to endemic epidemics including HIV infection and the progressive increase in the burden of non-communicable diseases. The major diseases affecting public health are malaria, acute respiratory infections, malnutrition, diarrheal diseases, HIV, AIDS, STIs, tuberculosis, leprosy and neglected tropical diseases. In addition, Burkina Faso is regularly faced with epidemic outbreaks (cerebrospinal meningitis, measles, and poliomyelitis). Significant prevention efforts through vaccination are being made. Non-communicable diseases are on the increase. They include, among others, cardiovascular diseases, mental disorders and diseases, metabolic diseases such as diabetes, malnutrition and other nutritional deficiencies, cancers, genetic diseases and injuries caused by road accidents.

In Cameroon, the project area has both public and private health facilities. At the public level, two regional hospitals, notably in Maroua and Garoua, district health centers, namely in Lagdo, Rey Bouba, Guider, Hina and Tignere. At the lower level, there are health centers. However, it should be emphasized at the private level that the reference health facility remains the Guider Chinese hospital, as there are private clinics that play a predominant role in health coverage. In the region, the main diseases are water-borne diseases, including cholera, diarrhea and malaria. In 2010, the two regions most affected by the PIDACC / BN, namely the Far North Region and the Northern Region, were the areas where malaria mortality among children under five in outpatient clinics was the highest, 76% (10th out of 10 regions) and 73% (9th out of 10 regions). In the Northern Region, the infant-juvenile mortality rate is alarming compared to the national average: in 2004, (144 for Cameroon in total), children between 12 and 23 months of age, only 38.1% are fully vaccinated (national average 52.3%). (25.6% in the Far North, 32.9% in the Northern Region, not even half the national average (63.6%)).

In Cote d'Ivoire, the crude mortality rate rose from 12.3 ‰ in 1988 to 14 ‰ in 2006. Life expectancy at birth was 51.3 years in 2006. The causes of this increase in Mortality are numerous. These include the continued degradation of people's living conditions, the

persistence of endemo-epidemic diseases, HIV / AIDS, poor nutrition practices and the causes of modern lifestyles (smoking, excessive drinking alcohol, unhealthy diet).

Malaria is the leading cause of morbidity and mortality in Cote d'Ivoire, among children under five years of age. According to a situational analysis of malaria epidemiological data carried out in 2010 by the National Malaria Control Program (PNLP), approximately 50% of the reasons for consultations in the ESPC are due to malaria. In 2008, the incidence of malaria in the general population was 84.16 ‰. In children younger than 5 years, this disease had an incidence of 217.31 ‰. From 2006 to 2008, the use of long-lasting insecticidal nets increased significantly by 3% to 14.8%. In 2006, only 26% of children under 5 years of age received appropriate treatment.

In 2010, UNAIDS estimated the prevalence of HIV / AIDS at 3.4%, ranking Cote d'Ivoire among the West African countries most affected by the HIV / AIDS epidemic. The number of people living with HIV was 450,000 and the number of orphans made vulnerable by AIDS was 440,000. In 2009, the tuberculosis mortality rate was estimated at 85 cases per 100,000 inhabitants. The number of patients increased from 21,204 in 2006 to 23,210 cases in 2010, and in 2011 to 22,911 cases, including 14,405 smear positive cases (contagious form of the disease). Among the factors incriminated in this recrudescence, the constant impoverishment of the populations is in the front line. The HIV / AIDS pandemic is the most favorable factor in the development of tuberculosis. 36% to 41% of tuberculosis cases are attributable to HIV and HIV, and the prevalence among TB patients is high (39% in 2007, 29% in 2008, 30% in 2009, and 24% in 2010). Tuberculosis is the first opportunistic infection and the leading cause of death among PVVIH. The percentage of TB patients who received an HIV test among patients registered in TB clinics was 73% in 2010. In the same year, 140 Diagnostic and Treatment Centers CDT), including 16 Anti-tuberculosis Centers (TB Centers), which provided regular and free availability of essential anti-tuberculosis drugs. According to the results of two national surveys on anti-tuberculosis drug resistance, primary resistance increased from 5.4% in 1996 to 2.5% in 2006. For retreatment, the secondary resistance rate is estimated at 8, 6% according to the WHO 2008 report (National Health Development Plan (PNDS) 2012 - 2015).

In Guinea, the public health infrastructure in the basin consists of 10 hospitals, 155 health centers and 1 health post. To these infrastructures must be added the few private medical offices set up in the big cities (Kankan, Kissidougou and Siguiriri). The first reasons for consultation are malaria, intestinal parasitic infections, diarrheal diseases, urinary diseases and respiratory infections. The STI / HIV prevalence rate is beginning to assume worrying proportions in the large urban centers (Kankan and Kissidougou) and in the mining cities (Lero and SAG). Primary care drugs are distributed at relatively affordable costs in the Health Centers. On the other hand, specialties are distributed by private pharmacies at higher costs beyond the pecuniary possibilities of the populations. Overall, according to the main indicators, the Guinean population health issue is a concern: (i) Infant mortality rate: 91 per thousand (ii) Juvenile mortality rate: 79 per thousand (iii) Infant-juvenile mortality rate: 163 per thousand (iv) Maternal mortality rate: 980 per 100,000 live births (v) HIV prevalence rate:

1.5% and (v) Proportion of population with sustainable access to a source of drinking water: 59.2%.

The different forms of nutritional deficiencies and infectious and parasitic diseases prevail in the country. Some emerging diseases (HIV / AIDS, high blood pressure, diabetes, cervical cancer, etc.) and re-emerging diseases (tuberculosis, trypanosomiasis ...) are becoming increasingly worrying in the country's epidemiological picture. The same applies to traffic accidents and drug addiction. Finally, obstetric pathologies are still a major concern. A Demographic and Health Survey (DHS) conducted in 2005 revealed a greater vulnerability of children (mortality and underweight) in the Kankan region compared to the national average. Recently, the epidemic of Ebola virus has affected some areas of the project; studies are in progress to identify the social and economic consequences.

The organization of local health system follows the administrative division of the country. In the chief town of prefecture, the prefectural health department (DPS) manages the health system of the prefecture. The prefectural hospital is the reference care structure at this level. The health centers are located in the sub-prefecture main towns for a group of 6,000 to 15,000 inhabitants within a radius of 5 to 15 km. They provide primary care services including preventive and curative, prenatal, vaccine and health education consultations. Health posts at the district headquarters level, or even large villages, constitute relay structures for health centers for a group of 600 to 1,500 inhabitants within a radius of 7 to 10 km.

In Mali, health indicators is worrying given the wide discrepancies between urban and rural areas, regions and socio-economic groups. Excess mortality among the poorest groups is largely due to avoidable conditions. Water-borne diseases are estimated at more than 80% of all pathologies. It includes diseases caught by ingestion (dracunculiasis, cholera, diarrhea, etc.) or by contact (schistosomiasis, etc.) or diseases in which water is the living environment of hosts of parasite larvae (malaria, Onchocerciasis, etc.). For example, there is a high incidence of water-borne diseases, such as guinea worm in the Mopti, Timbuktu and Gao regions, with more than 829 cases in 2003, trachoma with a national prevalence of 34.9% of active trachoma in Children under 10 years of age and diarrhea (according to EDSM III) with a prevalence of 19% in children under 5 and 29% in children aged 6 to 11 months are the third cause of consultation after malaria and acute respiratory infections. According to the results of the EDSM III, the epidemiological situation of HIV / AIDS is characterized by a national seroprevalence rate estimated at 1% in 2009.

Overall, the health situation in Mali is characterized by the fact that the levels of morbidity and mortality are high due mainly to: (i) Inadequate health coverage (63% of the population lives more than 15 km from a first contact health center offering the Minimum Package of Activities); (ii) Inadequate financial resources allocated to the health sector in relation to needs; (iii) An unhealthy natural environment conducive to the transmission of infectious and parasitic diseases due to defective personal hygiene and very often inadequate behavior towards the environment; (iv) Inadequate access to drinking water; (v) The persistence of

some customs and traditions which are often detrimental to health and; (vi) Low levels of literacy, education and information for the population.

In Niger, health situation in the basin is characterized by an upsurge in water-borne diseases and lack of sanitation. Health infrastructure is inadequate and often degraded. Health infrastructure coverage differs greatly between urban and rural areas. The epidemiological profile shows that the top ten diseases are malaria, cough or cold, pneumonia, diarrhea, malnutrition, dermatological diseases, digestive disorders, trauma / wounds / burns, simple conjunctivitis and dysentery. According to the demographic survey, the results show a markedly higher level in urban than in rural areas. Overall, HIV prevalence in urban areas is 0.8%, compared to 0.2% in rural areas. Among women, the gap between the two settings is higher than for men: the rate of seroprevalence is 1.1% in urban areas compared to 0.2% in rural areas; for men, it is 0.5% and 0.3%, respectively. As for the regions, there is a gap between Niamey (urban area) and the others (rural areas). In Tillaberi, the seroprevalence rate is the lowest (0.2%)¹⁵.

In Nigeria, health situation in the project area is comparable to that of the entire country. It is characterized by varied and diverse tropical pathologies with a strong predominance of endemo-epidemic infections. The most common are malaria, poliomyelitis, cholera, meningitis and AIDS. Life expectancy is around 52 years in 2013. Infant mortality is at 20.1%. There were 37 doctors per 100,000 inhabitants in 2007. The health sector in Chad in general and that of the national portion in the Niger Basin is hardly better than that of the other regions due to the obsolete state of the centers, lack of equipment, products and the non-use of hygiene rules etc. The health situation is characterized by varied and diverse tropical pathologies with a strong predominance of endemo-epidemic infections. The most common are malaria, diarrhea and gastroenteritis. Some villages continue to consume water from ponds and watercourses, favorable to the development of parasitic diseases. The worrying rise of AIDS is a scourge that calls on everybody.

In Chad, the health sector in general and that of the national portion in the Niger Basin is hardly better than the other regions due to the obsolete nature of the centers, lack of equipment, products and the non-use of hygiene rules etc. The health situation is characterized by varied and diverse tropical pathologies with a strong predominance of endemo-epidemic infections. The most common are malaria, diarrhea and gastroenteritis. Some villages continue to consume water from ponds and watercourses, favorable to the development of parasitic diseases. The worrying rise of AIDS is a scourge that calls on everybody. In terms of human resources, efforts are being made in the basin with significant progress in Niger and Nigeria. For example, in Niger, the number of health workers in 2006 was 2,798 with a ratio close to 8 nurses per 5,000 inhabitants and 6 midwives per 5,000 women of reproductive age in Niamey. In Nigeria, in 2005, there were 24,522 hospitals, 21,222 clinics or health centers, 85,523 hospital beds and more than 42,563 physicians, with the total elimination of leprosy in several regions of the country, the fight against the spread of HIV / AIDS and the accelerated

¹⁵ EDSN/MISCN/INS/2012

training of medical personnel. In Cote d'Ivoire, the ratio for medical personnel is estimated at 1 for 9,602 inhabitants, compared to 1 nurse for 2,340 inhabitants and 1 midwife for 8,455 inhabitants.

In the end, the health system is characterized by: (i) The persistence of health issues related to collective hygiene, environment; (ii) A predominance of infectious and parasitic diseases; (iii) Underutilization of health services by a population with unmet health needs; (iv) An ill-controlled demography; (v) Limited financial accessibility for a large majority of the population; (vi) Low community participation in the development of health action; (vii) The lack of health insurance for the poor; (viii) Too much concentration of resources and efforts on the provision of curative care to the detriment of promotional and preventive care; (ix) An overall inadequacy of resources necessary for the development of health system and; (x) The enclavement of the villages.

Despite the efforts made in terms of investment in the health system, coverage is insufficient and the utilization rate of health facilities is very low (21.6% in Burkina Faso and 27% in Cote d'Ivoire). Subsequently, mortality and morbidity rates is very high. Malaria, diarrheal diseases, acute respiratory infections, tuberculosis, poliomyelitis, intestinal parasites, endemic diseases (onchocerciasis, buruli ulcer), diseases with epidemic potential (cholera, yellow fever, meningitis) , are generally the burden of the disease and all present with incidence or prevalence rates that confirm high morbidity rates and therefore a general health concern.

c) Education

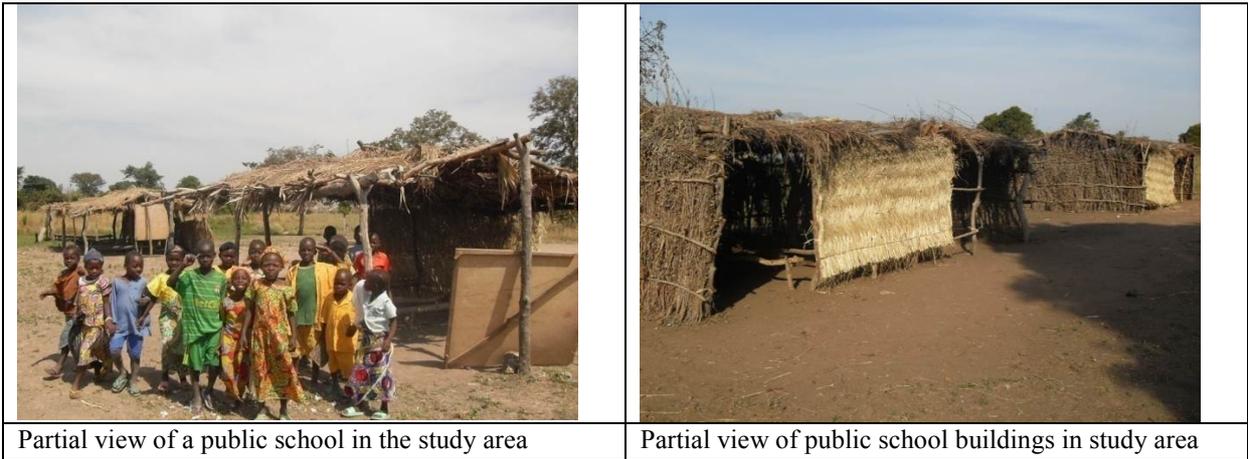
Education is a fundamental sector in the development programs of the Basin countries. It is seen as an indispensable lever for the economic and social development of a country. Countries in the basin are aware that eradicating illiteracy, increasing enrollment rates and having a high level of human capital are essential conditions for the sustainable development of the country. The implementation of these educational support programs has enabled Nigeria to have a national literacy rate of 64.2% in 2006, with 73% men and 55.4% women respectively. This higher rate among young people aged 15 to 24 with 80.7% of men and 72.2% of women with a national score of 76.5% among young people in Nigeria. The literacy rate is steadily declining from 1999 (64.1%) and 1991 (71.9%). The study shows that it is much higher in the south of the country and particularly in the south-east (73.5%) than in the north-west (23.2%, men 31.0, women 15.4%).

In Benin, the level of education of the populations in the project area is low. Indeed, according to the census carried out by INSAE in 2002, eight (8) out of every 10 people, aged 15 and over, have never attended school, as have 84.3% of young people aged 15 to 24 years. This is the highest rate of people out of school in Benin. The net enrollment rate (6-14 years) is estimated at 25.5% for the area. Although bold action is being taken by the Government to provide schooling for girls (free primary education, for example), the enrollment rate for girls is still lower than for boys. However, there is an improvement in the phenomenon with the support of development partners, in particular USAID, whose financial support contributes significantly to the improvement of quality primary education in the country, thus the creation

of new schools (both public and private) to reverse the trend. The literacy level of young people and adults is the lowest in Benin: only 12.7% of young people aged 15-24 are literate and 10.7% of adults (15 years and over).

Burkina Faso has been engaged for some years now in the implementation of the education system reform in order to make basic compulsory education free for all children aged 3 to 16 years. In this context, the transfer of pre-school and post-primary education (first cycle of the secondary education) to the Ministry of Education and Literacy is envisaged and implemented with a view to constitute primary education, the continuum of basic education system. The ambition of the political authorities is to make the education system coherent, more functional and more adapted to the socio-economic and cultural development needs of Burkina Faso. With this new system, basic education now includes preschool, primary and post-primary education, which form a single cycle called the thirteen-year continuum within an Integrated Basic Education Complex (CIEB). The indicators of the education system in 2007 are: (i) Gross enrollment ratio in primary education: 60.7%, (ii) Net enrollment rate: 47.7%, (iii) Net literacy rate of individuals over 15 years of age: 28.3%, (iv) Literacy rate of individuals aged 15-24 years: 39.3% and (v) Very inadequate literacy. 26% of adults and 34% of children under 18 can read and write. The issues facing the education system development include: (i) extending basic education coverage (number of schools varies greatly by region), while improving its quality and (ii) ensuring the development of the education system including the post-primary level in order to meet the demand for skilled labor and to ensure that the graduates of the education system meet qualitatively and quantitatively economic needs.

In Cameroon, educational infrastructure and teachers are very unequally distributed between urban and rural areas. In rural areas, pupils must deal with makeshift classrooms made of branches and straw. The teaching staff is very inadequate, hence the strong presence of the parents' teachers. The pictures below illustrate some of these educational facilities.



Picture 2 : Illustration of school infrastructure
Source: Mission terrain Consultants nationaux

While at the national level, access to universal primary education has gradually improved since 2001, the Northern Region - starting from a very low level - lags behind: in 2010 only 60.2% of children between the ages of 6 and 11 attended a primary or secondary school (59% in the Far North, national average 82.6%). This low enrollment rate also resulted in a low literacy rate of 41.1% (73.0% for the whole country and 31% for the Far North). With respect to gender equality and women's empowerment (MDG 3), the Northern Region presents itself as the most backward region in terms of the gender parity index in primary and secondary education. In the North, for every 100 boys, only 74 girls are enrolled in primary school. In secondary schools, the index drops to 48 girls per 100 boys (national average 0.99 for primary education and 0.93 for secondary school).

In Cote d'Ivoire, the educational system consists of two types of education: general education and technical education and vocational training. Act No. 95-695 of 7 September 1995 on education stipulates that general education comprises three levels: (i) the level of pre-school and primary education; (ii) the level of general secondary education and (iii) the level of higher education. Technical education and vocational training begin at the secondary level. Primary enrollment ratios increased from 51 per cent in 1996 to 55 per cent in 2000. The net enrollment rate for girls is 44.3%, compared with 53% for boys, with a marked 3.6 % increase in girls enrolled in school. In the field of literacy, several structures exist, such as the National Literacy Committee, the Autonomous Literacy Service and the National Literacy Support Fund. However, the proportion of illiterates in the population is high. (PND 2012 - 2015). The level of illiteracy is at a relatively high level, although it has decreased by 0.5 points on average per year since 1998 (63%). The results of the RGPH 2014 indicate that on the basis of the population aged 15 years and over (13 185 520 individuals), more than half (56.1%) cannot read or write in any language. This rate varies from 30.1% for the City of Abidjan to 84.7% in the Folon region. As a result, the rate is higher in the northern regions of the country (over 70%) than in the southern regions around Abidjan (below the national average). In addition, women are less literate than men (63% versus 49%). Just as the non-Ivorian population is more affected (73%) than the Ivorian population (51%)¹⁶.

In Guinea, the construction of school infrastructure in line with the development policy of the sector has grown rapidly during the last decade. The average overall enrollment ratio (male and female) in 2005 was 57%; that of girls is 53%. The prefectures of Mandiana and Dinguiraye have the lowest enrollment (less than 35%). In Mali almost 70% of the working population does not have access to education. Gross enrollment ratios at the primary level rose from 70.5% (59.9% for girls) in 2003/04 to 74.0% (63.4% for girls) in 2004-2005 and 84% 2013. For the second cycle, gross enrollment ratios increased from 34.4% to 38.0% for all students (from 25.4% to 28.5% for girls). These rates are lower in rural areas than in urban areas, and regional differences are considerable.

It should be noted that in Niger since 2003 all educational activities in Niger are part of the implementation of a Ten-Year Development Plan for Education (PDDE) 2003-2012. It is in

¹⁶ Source : INS (National Institute of Statistics), Final Result RGPH 2014).

this sense that significant progress has been made in the field of education in Niger, especially at the level of basic education. The gross enrollment ratio (GER) recorded significant progress over the period 2007-2008 to 2010-2011. During this period, it increased from 62.6% to 76.1%; A gain of 13.5 percentage points. However, this increase conceals significant disparities between girls and boys (17.6 percentage points of disadvantage for girls) and between backgrounds (19.1 points against the rural environment). Overall, the education system is plagued by many difficulties, the most notorious of which are: (i) An average quality of education resulting from the inadequacy of teaching materials, laboratories and workshops, school libraries and the persistence of the teacher deficit at different levels of the system and (ii) An enrollment rate of young graduates increasingly low.

In Nigeria, the literacy rate is steadily declining from 1999 (64.1%) and 1991 (71.9%). The study shows that it is much higher in the south of the country and particularly in the south-east (73.5%) than in the north-west (23.2%, men 31.0, women 15.4%). The educational system in Chad comprises several levels of education and training, namely: preschool, primary, secondary, higher education and vocational training. In terms of spatial distribution, 86% of schools are located in rural areas and the rest in urban areas. For 2010/2011, the number of schools surveyed is 8,786. The enrollment in primary education is 128,603 pupils. The Gross Enrollment Rate (GER) is 91%. This rate marks the disparities of 107% for boys against 80% for girls. The completion rate is 37%, and there is also a significant gap between girls (28%) and boys (47%), corresponding to a parity index of 0.6. Analysis shows that girls stay shorter than boys (3.5 out of 10 for boys and only 2.6 out of 10 for girls).

Differences in completion exist between regions. Indeed, regions with relatively high Completion Rates are predominantly those in the south. These include Mayo Kebbi West (74.5%), Logone Occidental (61.8%), Tandjile (60%), Logone Oriental (51%). Those with the lowest completion rates are the Ennedi (5.2%), Lake (6.2%), Sila (6.3%), Borkou (6.9%), Barh El Gazal (8.1%), Kanem (%) And Salamat (8.7%).

As far as average education is concerned, in 2010/2011, the number of establishments in the average education is 924 for a workforce of 315,754 pupils. The average Gross Rate is 59.2%, 41% for boys and 59.2% for girls. There is a difference of 23 percentage points in favor of boys. In addition to this disparity, there are also disparities between the regions: N'Djamena, Mayo-Kebbi Ouest and Mayo-Kebbi Est have high school enrollment rates of 68%, 70% and 45% respectively. Tibesti, Ennedi, Sila, Kanem and Barh El Gazal have TBS below 5%. There are also significant regional gender disparities. The parity index in N'Djamena (0.67%) is the highest and the lowest is in the Salamat region. The completion of average education is linked to that of primary education. In 2000/2011, only 18% of those admitted in the 6th year arrived in 3rd; Girls are the most affected with 10% against 27% for boys. The parity index is only 0.37 and shows a significant gap between girls and boys. The analysis of completion rates also shows significant disparities between regions: N'Djamena, Mayo-Kebbi West, Mayo-Kebbi East, Tandjile, Moyen-Chari, Logone Occidental, Logone Oriental, Mandoul record completion rates, the highest being between 18% and 48%. Tibesti, Sila, Ennedi, WadiFira, Borkou and Batha have completion rates below 3%. For general secondary

education in 2010/2011, the number of secondary schools is 345. Most general secondary schools are located in urban areas (58%). The city of N'Djamena (capital) alone accounts for 28% of the total number of such establishments. The gross enrollment rate is 19%, of which 30% for boys and 9% for girls. This disparity is also observed between the regions: N'Djamena (61%), Mayo-Kebbi Ouest (42%), Mayo-Kebbi Est (28%), Tandjile Logone Occidental (21%), Logone Oriental (19%) and Mandoul 15%. Ennedi, Sila, Batha, Wadi Fira, Kanem, Lake, Borkou and Barh El Gazal have very low rates. The completion rate of the secondary cycle is 17.8% (about 8% for girls and 29% for boys). This rate is slightly inflated by re-enrollments in the final year following repeated failures of students in the baccalaureate. The completion rate adjusted by re-enrollment is much lower and is around 11%.

Despite significant improvements in access to education over the past decade, considerable efforts are still needed to achieve by 2015 the goal of enrolling all children to school. Thus, according to the UNDP Human Development Report 2002, Chad is far behind in reaching universal primary education by 2015, an objective that faces major challenges, as well in the socio-cultural level as in the size of human and financial investment, particularly in the following areas: (i) Parents' awareness of the need to educate their children, especially their daughters; (ii) improving the supply of education with the support of community initiatives for the construction of schools, the acquisition of teaching aids, and the recruitment of teaching staff; And (iii) improving the quality of education through appropriate training of staff, appropriate assignment and upgrading of the teaching function.

5.2.13. Gender analysis

In addition to the problems identified in the development of the resources of the basin, problems related to gender relations, young people and vulnerable groups' participation in the development of the resources of the Niger basin are added. In the region of the basin, women's activities are very numerous and varied. In addition to their implications in traditional domestic tasks, women lead various productive activities. In the project area in Benin, for example, women represent more than 50% of the population. They are heads of household up to 11% of all heads of household of the area. In terms of economic activities, women practice agriculture and constitute an important labor force in the family field. For their own account, they grow all types of crops including cotton for which they often depend on their husbands for plowing (animal traction) and phytosanitary treatments. However, they have at their disposal incomes from their agricultural activities. Apart from agricultural activities, women practice small-scale farming (small ruminants, poultry) and small-scale trade, especially food crops. These two sectors (agriculture and commerce) occupy 85% of the active women in the zone. In general, woman plays an important role in development. However, she does not always benefit from the distribution of wealth.

In rural areas, they are the basis for a number of activities (exploitation of individual plots, small-scale and commercial activities, gathering and processing of harvesting products, processing and marketing of fish etc.). In addition, women participate in all community development activities. This goes from crop growing to fishing, through the gathering and

care of livestock. The fields of the women are seeded in fonio, groundnut, and generally grow rice. Their secondary activities include: maintenance of vegetable gardens. They are, however, marginalized in terms of access to land and the process of inheritance of goods still under customary law. Rural women also care for the well-being of family members and management activities. Because of their work, they provide part of the family income and the water fetching chore still occupies much of their time.

In urban areas, women have less restrictive tasks. Women's conditions have improved in the recent years. They have access to decision-making processes, schooling and literacy. Increasingly, women are taking an active part in the democratization process in their country and are strengthening their base of action through the creation of NGOs and Associations in particular. There has also been tremendous progress in the area of women's advancement since the 1990s. In the Niger Basin there are no countries where jobs are available for men.

"Equal knowledge, equal employment and equal pay" could be stated in the analysis of gender at the basin level. This progress is reflected in: (i) Taking into account the gender approach in development projects and programs; (ii) The increasing importance of women in economic and social life; (iii) The creation of women's organizations and institutional reforms that take into account the interests of women; (iv) Enhanced school enrollment of women; and (v) Empowering women in decision-making bodies.

Despite these efforts, women are faced with difficulties, the main ones being the following (i) access to credit; (ii) access to factors of production: estimated by them to be too expensive for cash purchases; (iii) access to equipment; (iv) access to land and (v) low incomes etc. In the Basin region, young people are actively involved in resource development activities. But lacking sufficient means of production and lacking decision-making power, they do not fully enjoy the benefits of their efforts. Given the fact that young people make up a large part of the population of the basin, measures (credit facilitation, more accountability in decision-making, better organization, etc.) aim to integrate them more in the basin development process. Must be taken. Vulnerable groups, particularly because of their extreme poverty, are also not fully involved in resource development activities in the basin. Measures taken by each of the states of the Niger basin (aid funds, support projects, etc.) for their welfare and aimed at enhancing their participation in development processes should be encouraged and pursued.

5.2.14. Poverty Profile / Household Living Conditions

Many economic activities depend directly on the exploitation of natural resources (water, soil, fauna and flora). Besides hydraulic works and installations, the economic activities of the basin are practiced extensively and by craftsmen with systems of exploitation very little modernized. The economic sectors that suffer the direct impacts of poverty and its negative effects are agriculture, urbanization, forests, fisheries and fish farming and livestock.

The total GDP of the nine countries of the NBA reached 70 billion FCFA in 2000, with an average growth rate of 3%. The average per capita GDP is estimated at US \$ 350 / year in

2000. Since this modest economic growth has not been followed by a real redistribution of wealth, the situation of the already poor and very large majority in the countries of the NBA has continued to deteriorate. Poverty has reached worrying proportions in the majority of countries and especially in the Sahel countries (Burkina Faso, Mali, Niger and Chad).

The poverty line is 46.4% in Burkina Faso, 50% in Cameroon, 63% in Niger, 60% in Chad, and 38.4% in Cote d'Ivoire with predominance in rural areas: 96% of the poor are in rural areas in Burkina Faso, 74% in Mali, 86% in Niger and 75% in Cote d'Ivoire. Women and youth are the most affected by poverty. The poverty situation is shown in table 8 below. The basin remains a relatively old settlement area characterized by ethnic diversity that is at the basis of a plurality of social life and of the relations of production. It is now a migratory calling area because of the more favorable agro-ecological conditions.

The social conflicts linked to the exploitation of the resources of the basin are quite common and usually oppose the farmers, the farmers or the indigenous ones to the migrants. In addition to these recurrent social aspects, the economy of the basin suffers from the weakness and inadequacy of the socio-economic infrastructures and facilities (drinking water supply, sanitation, water retention and hydro-agricultural perimeters, pastoral hydraulics, Electric and sanitary installations, roads, etc.). All these shortcomings have negative consequences and increase the poverty of these populations, as shown in Table 9 below.

Table 9: Poverty in the Niger River Basin Countries

Country	PPA (*)/inhabt/year (2000) (\$ EU)	GDP (**)/inhabt (2000) (\$ EU)	% of population below the monetary poverty line (2 EU / day)	adult literacy rate (% of 15 years and over)
Benin	990	349	33,0	37,4
Burkina Faso	976	191	85,8	23,9
Cameroon	1 703	597	64,4	75,8
Cote D'ivoire	1 630	588	49,4	46,8
Guinea	1 982	366	40,0	-
Mali	797	201	90,6	41,5
Niger	746	166	85,3	15,9
Nigerie	896	360	90,8	63,9
Chad	871	177	64,0	42,6

Source: World Human Development Report, UNDP 2002)

(*) PPA: Annual per capita income adjusted for purchasing power parity

(**) GDP: Annual per capita income, not adjusted for purchasing power parity.

In Benin, according to INSAE (2008), poverty takes on forms and dimensions. According to EMICov 2011 data, the rural poverty index estimated from household expenditure increased from 25.2% in 1990 to 33% in 1999-2000 and 38.4% in 2011; while the urban poverty index rose from 28.5% in 1990 to 23.3% in 2000 and 29.8% in 2011. Poverty reduction is assessed through the evolution of the proportion of the population spending less than \$ 1 per day. The proportion of the population with less than one dollar per day increased from 40.8% in 2009

to 53.9% in 2011. Compared to the residential environment, income poverty is higher in rural areas (68%) than in urban areas (34.3%). The incidence rate of income poverty increased from 35.2% in 2009 to 36.2%, while the poverty gap index rose to 0.271 in 2011, compared with 0.297 in 2009. The share of the poorest quintile of the population in national consumption is 6.1 in 2011 compared to 5.7 in 2009. The country is among the least developed countries and is ranked 165 out of 187 for the index Human Development (HDI) in 2014 and 151st in the last ranking of the Doing Business Report of the World Bank 2015.

According to the monetary approach, the proportion of the poor population in 2007 is estimated at 33% (compared to 37% in 2006). Money poverty depends on household income at a set threshold. These thresholds are calculated on the basis of the prices of the goods and services available in each space entity (Common). At the national level, this threshold is 109,400 FCFA per person per year in rural areas and FCFA 116,545 per person per year in urban centers. In addition, INSAE (2009) shows that the departments of Alibori and Borgou are the poorest departments in Benin, mainly by monetary poverty, with an estimated incidence of 43% and 39% respectively. A national average incidence of 33%. On the other hand, the poorest departments are Oueme and Littoral with a respective incidence of 25% and 26%. Also, the value of the incidence of income poverty is higher in rural areas than in cities.

In Burkina Faso, poverty is first and foremost structural in nature: (i) the main source of income for the population is agriculture and livestock, which are affected by climatic and rainfall vagaries; (ii) the country has few natural resources and is obliged to import petroleum products at high costs for the production of electricity and fuel for vehicles; (iii) population health problems are aggravated by endemic tropical diseases and, above all, the rising cost of pharmaceuticals due to devaluation; (iv) the landlocked country increases its costs of transport, equipment and supplies to such an extent as to undermine the competitiveness of its economy; (v) the economic infrastructure, which was very weak or non-existent at independence, remains very inadequate. Poverty is a complex phenomenon in that it manifests itself in various forms: lack of income and sufficient productive resources to ensure viable livelihoods, poor access to social services (health, housing, education, drinking water etc.), social exclusion and lack of participation in decision-making. It is not only quantitative (its monetary character - inadequate income and consumption) and qualitative (its aspects related to access to essential needs or even the shortage of capacities).

A study carried out in 1996 on the basis of the results of the priority survey (EP.I) on the living conditions of households conducted from October 1994 to January 1995, established a poverty line corresponding to a daily calorific food requirement Adult of 2283 calories. On this basis, and according to the structure of expenditure (food and non-food) of households, the absolute national poverty line in Burkina Faso was established at 41,099 FCFA per adult per year. The proportion of the population living below this line was estimated at 44.5%. As a result, in 1994 poverty was predominantly located in rural areas; it affected farming households and particularly those of food crops.

In Cote d'Ivoire, the 2008 Household Living Standards Survey revealed a poverty rate of 48.9%. This rate was 29.5% in urban areas and 62.5% in rural areas. According to the 2011 Human Development Report, the Human Development Index (HDI) in Cote d'Ivoire was 0.4006 and ranked the country at 170th out of 187.

In Cameroon, it should first be noted that Cameroon's Fourth Survey of Households (ECAM 4) defines the poverty line in Cameroon at CFAF 339,715 per adult equivalent and per year, about 28,310 FCFA per month and therefore 931 FCFA per day. On the basis of this principle, it is considered as poor any person living in a poor household, that is, a household or at least one adult equivalent, lives on less than 931 FCFA per day. The Cameroonian part of the Niger Basin is one of the poorest regions of Cameroon. Indeed, according to ECAM 4, the far north and north regions concerned by the PIDACC in Cameroon have a poverty rate of 74.3% (1st out of 10) and 67.9% (2nd out of 10). The national average is 37.5%. It appears that households in the study area live in precarious conditions. From 2007 to 2011, the proportion of the population living below poverty line (income below US \$ 1.25 per day) increased from 50.2% to 63.7% for the entire Northern Region (Average Cameroon 39.9%).

In rural areas, this incidence is estimated at 73.6% (55% for Cameroon in 2007). In terms of food security (MDG 1), the three Northern Regions (Adamaoua, Far North and North) displayed in 2011 rates of 20% to 31.6% underweight children under 5 years of age. Although this situation has improved recently, it remains precarious compared to the rest of the country (14.6%). Cereal production now fails to keep pace with population growth. According to the World Food Program (WFP), a deficit of 119,500 tons was recorded in the Northern and Far North regions in 2012, and the FAO in October 2012 estimated about 400,000 (about 7% of the Total population) the number of people in need of emergency food aid due to production shortfalls and damage caused by the August / September 2012 floods. However, food insecurity is currently only a local phenomenon. In spite of the strong population growth, the Northern Region in principle has the necessary natural resources to ensure its food security, provided that the existing potential is better exploited.

In Guinea, GNP per capita was around \$ 379.5 in 2010. Since 2007, there has been an increase in poverty. More than half of the population lives below the poverty line (estimated at USD 196 per person) and 19% in extreme poverty. Poverty is more pronounced in rural areas with 80% of the overall population. 60% of this population is poor and contributes to 86% of global poverty. In terms of income, and in relation to the poverty line, the urban person is 3.5 times better than his / her rural counterpart. The results of the surveys conducted in the framework of the working out SNSA shows that six prefectures out of ten (Kouroussa, Kerouane, Beyla, Dinguiraye, Mandiana and Siguiri) having almost 60% of BGN population are living in extreme poverty with an annual income inferior to 172.240 GNF (card n ° 5). Surveys conducted by EICB (1993) enabled to establish the Upper Guinea populations' living standards on average of 181.644 GNF per inhabitant per year, against a national average of 289.167 GNF. At the level of food security, rice is the country's main food product. In the BGN, where food diets are diversified rice consumption is about 60 kg / inhbt / year. This ration can be provided by the prefectures of Beyla, Faranah, Kissidougou and Kankan.

In Mali, revenue per inhabitant is estimated to US dollars 240 and social indexes rank Mali at the 166th position in the world according to PNUD's Human Development Index (HDI). Poverty is a generalized phenomenon in Mali, as 63.8% and 21% of the total population are living in poverty and in the extreme poverty. If poverty is essentially rural, it also affects more and more big cities because of the degradation of labor market and migrations. It manifests in terms of shortcoming in the major fields of well-being which are illiteracy, malnutrition, reduced longevity, unhealthy habitat, reduced participation in socio-economic life. The three factors of the most cited risk by the populations themselves are food, disease and lack of job.

In Niger for instance, the profile of poverty¹⁷ established in 2011 on the basis of the National Survey on Budget and Household Consumption (NSBHC) indicates that poverty affects more rural area than urban area, with a more pronounced predominance in women. The incidence of poverty is moreover the distribution between the different regions of the country. The regions of Maradi, Tillabery and Dosso with the highest levels of poverty; in the first two regions, almost three persons out of five are poor. The regions of Dosso and Tillabery which are the study area have respectively 12% et 16% of the population of Niger, about 28% of the countries' population have the last levels of all the poor.

Woman's image of poverty and inequalities in Niger is reflected by less access to credit compared to men. Rural populations are mainly worried by poverty phenomenon because of their structure and production system essentially based on agriculture in rainy season and stock-farming, highly dependent on climate risk. Other factors linked to cultural weights would justify the low consumption level per capita in the region of Maradi which is structurally the poorest. About 60% of rural people are living under poverty line. The rural population suffers from malnutrition exacerbated by recurrent food crises (1973, 1984, 2005, 2010 and 2012) and migrations inducing populations. Women are more vulnerable due to unequal access to production factors (property, capital) and knowledge (education, literacy).

In Nigeria, on the basis on CEA method, 55% of the population in Nigeria changed 2003/2004. Rural areas are disadvantaged, with a poverty rate of 64% against 43% for urban areas. About two-thirds of poor (65%) inhabited in rural areas. The north of the country was considered as poorer than the south. The three regions of the north have the highest poverty rate (minus 63%) and together, they reckon the two thirds of poor in Nigeria. Health profile provides in the framework of the definition of poverty line (CEA) limits to poverty rate and the distribution of poor per area and per State. Other assessments of poverty, notably the depth and the harshness of poverty were evaluated on the basis of the sole maximum limit of relative poverty line. According to these estimates, the depth and harshness of poverty are 1.5% higher in rural areas than urban areas. Likewise, values recorded for the two poverty assessments were higher in the north areas than in the south areas of the country.

¹⁷Ministry of Land use planning and community development: PDES 2012-2015

The National Statistical Office of Nigeria analyzed trends in poverty statistics estimated on the basis of relative poverty lines (National Bureau of Statistics, 2005). It has been shown, for example, that poverty line for the minimum limit of relative poverty line fell from 46% in 1985 to 43% in 1992 and then increased to 66% in 1996 before sliding back to 54% in 2004. Similar trends were defined for poverty rate at different levels: type of locality and area, education levels, occupation and sex of head of household. Poverty rates are higher in rural areas than in urban areas in Nigeria. For example, in 2003/2004, 63% of the rural population lived below the maximum limit of the relative poverty line compared to 43% in urban areas. The ratio of poverty rates in rural to urban areas decreased from 1.36 in 1985/1986 to 1.20 in 1996/1997 and then increased to 1.47 in 2003/2004. In the area, since 1985, the northern areas have higher poverty rates than the southern areas of the country. In 2003/04, almost two-thirds of the population in all northern areas was poor, compared to 43% in the south-west and 27% in the southeast. In addition, in 2003/2004, the variation between zones was greater than in previous years. For example, in 1985/86, poverty rate ranged from 30% in the southeast to 55% in the northeast. In 2003/2004, poverty rate was 27% in the southeast and 72% in the northeast. In terms of household size, poverty rates were higher in large households.

In 1985/86, the poverty rate was between 24% for those living in households headed by a person with post-secondary education and 51% for those living in households headed by a person who did not have formal education. In 2003/2004, the corresponding values of poverty rate were 26% and 69% respectively, reflecting enormous disparities between the categories defined by the level of education of the head of household. In 2003/2004, almost half of the poor (48%) lived in households headed by a person who had no formal education. Literacy rates were lower among people living in poorer households. In 2003/2004, 66% of those interviewed living in households in the richest quintile could read and write in English, compared with only 40% of those in the poorest quintile (National Statistics Office, 2005).

As regards the study area, the living conditions of the populations of the area are almost identical to those of the country. Gross National Income (GNI) per capita was US \$ 1,180 in 2010, but the distribution of income is disproportionately high, with a Gini coefficient of 43.70 in 2011. About 63% of the population lives below the Poverty (less than one dollar a day); 42% do not have access to drinking water and 69% lack basic sanitation facilities. Nigeria's social indicators are below the African average. In 2011, life expectancy was 51.9 years and the adult literacy rate was 61.3%, compared with a life expectancy of 57.7 years and an adult literacy rate of 67%. However, income and social conditions vary enormously from one region to another: the North has higher levels of poverty and social deprivation than in the South. Poverty is more pronounced in the Northwest (almost 86%) and the Northeast (78%). Populations in these two regions are four times more likely to be out of school than those in the South. The prevalence of malnutrition is also higher in these northern regions and lower in the South-East and South regions in general. Access to drinking water ranges from 30% in the Northeast to almost 74% in the Southwest, and access to basic sanitation from 45% in the Northeast to 70% in the South-East. The Government is making every effort to meet these challenges by allocating budget allocations to social programs (Country Strategy Paper 2013-2017 prepared by the African Development Bank, January 2013).

In Chad—project area, 564 470 inhabitants, 52% of whom are women and 80% of young people (girls and boys). Official statistics indicate that 36% (below the threshold of 109,000 CFA francs / year) do not have the resources to meet their basic food needs. The poorest 20% live with only 153 FCFA (0.3 USD) per day and share 6.4% of total consumption while the richest 20% spend on average CFAF 1,105 per day, that is, 2.3 USD / day).

From this paradoxical situation, which is characterized by the availability of resources on the one hand and the poverty of the populations on the other, it can be inferred that exploitation of the resources of the basin is not carried out to the best Living conditions of the basin populations. Many economic activities in the basin depend directly on the exploitation of natural resources (water, soil, fauna and flora). Besides hydraulic works and fittings, these activities (agricultural, pastoral and mining in particular) are practiced extensively or by craftsmen. As such, rural economy remains largely dependent on the environment. Forests are cleared at a greater rate than natural regeneration, and degraded environments offer fewer resources to the poor, whose populations are increasing day by day.

The consequences of economic imbalances and environmental degradation are thus felt through: (i) the attractiveness of the rural population to the cities, which leads to an implantation in marginal peripheral areas and to the adoption of an urban way of life, that is to say an urbanized lifestyle based essentially on the resources of the rural area; and (ii) an increase in the urban population and a high demand for energy, which is generally satisfied by the use of wood and charcoal, thus contributing to the degradation of vegetation cover and soil erosion in the areas of exploitation. The income of these countries comes mainly from a cash economy (oil, uranium, cocoa, coffee, cotton) and is subject to fluctuations in the international market, or a primary economy based on cereal and low added value traditional activities. In the light of all the above, the struggle against poverty is now a major challenge for all member countries of the NBA.

5.2.15. Sensitivity analyzes (constraints, opportunities and challenges) related to the PIDACC

Among the main ecological problems encountered in the PIDACC / BN area in Benin, there is a growing pressure on the natural environments and their resources, especially the conversion of these environments to agricultural land and / pasture. This is manifested on the field by uncontrolled exploitation of forest resources and products. All these practices combined with the effects of recurrent droughts have the following major consequences: (i) amplification of the desertification process; (ii) soil erosion; (iii) fragmentation and loss of wildlife habitats; (iv) the rarefaction and local disappearance of some plant and animal species; (v) exposure of some species to excessively vulnerable thresholds; (vi) impoverishment of aquatic environments; (vii) loss of the ecosystems potential to self-sustain through natural balance and to provide and (viii) goods and services in a sustainable manner.

At the socio-economic level, the project area is predominantly inhabited by a rural population living below the poverty line. Among the obstacles to the reduction of this poverty, there is a

prominent place, the isolation of these rural areas of the communes where a large part of the populations live. Other causes of poverty include: (i) low coverage of health facilities and skilled health workers; (ii) inadequate and / or lack of adequate sanitation facilities; (iii) low coverage of the population's drinking water needs; (iv) the loss of fertility in agricultural and pastoral lands due to deforestation and climate change; (v) inadequate market facilities; (vi) difficulties in accessing credit and (vii) the very degraded state of the tracks.

In Benin, the PIDACC intervention zones straddle two zones of the eight agro-ecological zones identified in Benin including: (i) Zone 1: the extreme North (North Benin); (ii) Zone 2: the cotton zone of North Benin; (iii) Zone 3: the South-Borgou food-producing area; (iv) Zone 4: West Zone Atacora-North Donga; (v) Zone 5: the cotton zone of the Center; (vi) Zone 6: the bar land area; (vii) Zone 7: the western zone of the depression; (viii) Zone 8: the fisheries zone. Of these eight areas, four (4) are particularly vulnerable to climate change according to a 2006¹⁸ study: these are zones 1, 4, 5 and 8. The identification of these four areas was carried out through an evaluation conducted in 2008 as part of the NAPA process, which has therefore retained these agro-ecological zones in order to benefit from an “emergency adaptation action”. On the basis of this identification and after a major climate risk assessment of four zones¹⁹, nine pilot communes were selected as particularly vulnerable to climate change risks: Malanville (Zone 1: Extreme (Zone 4: West Atacora and North Donga), Savalou and Aplahoue (Zone 5: cotton zone of the Center), Bopa, Ouinhi, Adjohoun and So-Ava (Zone 8: fisheries zone). On the whole, these areas are characterized by livelihoods and productive practices and activities related to agriculture, fisheries and fish farming, small livestock farming, petty trade, etc. The inhabitants of these areas are therefore generally small farmers, market gardeners, breeders, fishermen, traders specializing in the processing of agricultural products, etc.

The diagnostic analysis was carried out using the SWOT matrix, based on elements of the situation described above and other information from the literature review, which revealed the strengths, weaknesses, opportunities, and the threats that characterize the ICCPR activities. The analysis of these various factors identified in the SWOT with the purpose of developing strategic orientations made it possible to regroup and combine factors at the level of each SWOT component. The results of this analysis are as follows:

At the strengths level:

- (i) Strength1: Target groups have very good knowledge of the effects of climate change. It incorporates the following factors: (i) Target groups have a fairly good understanding of the effects of climate change, (ii) Target groups believe that climate change is due to human actions, (iii) Target groups believe that adaptation measures are (may be) effective.

¹⁸ Aho, P.N., 2006. Concentrated assessment of vulnerability to current climate variations and extreme weather events, Republic of Benin, National Action Program for Adaptation to Climate Change, Cotonou, Benin.

¹⁹ MEPN-PPG 4, 2009, Statistical and cartographic assessment of climate risks in agro-ecological zones covered by the project NAPA1. MEPN, Integrated Adaptation Program to Address the Adverse Effects of Climate Change on Agricultural Production and Food Security in Benin, Cotonou, Benin.

- (ii) Strength 2: Local mobilization potential. It incorporates: (i) Local potential for mobilization (organization, willingness) to adapt to CC, (ii) Credit granted by members to the orientations given by facilitators (CARDER, NGOs), good collaboration between the actors of PIDACC and the local and traditional authorities, (Credits granted by the target groups to the orientations given by the local and traditional religious authorities.
- (iii) Strength 3: There are attempts at adaptation to Climate Change. It incorporates: (i) Strong expectations of adaptation measures advocated by PIDACC, (ii) adaptations trials / attempts made by the target groups improve their yields, (iii) Some target groups develop endogenous, (iv) existence of initiatives to share experiences among the target groups.

At the level of weaknesses:

- (i) Weakness 1: Fatalist attitude of the target groups. It incorporates: (i) Target groups believe that the effects of climate change are due to violation of prohibitions; (ii) some target groups are pessimistic about improving the situation; (iii) other target groups await solutions to climate change from the governmental; (iv) abandonment of some producers from production activities (taxi-motorcycle case); (v) the rural exodus of producers.
- (ii) Weakness 2: Weak knowledge of target groups on adaptation to Climate Change
- (iii) Weakness 3: Poor adaptation practices. It incorporates: (i) adoption of environmentally harmful adaptation practices (chemical fertilizer use) (ii) adaptation to climate change is systematically taken into account in the producers' association activities at local levels.

At the Opportunities level:

- (i) Opportunity 1: The target groups are favorable to adaptation to CC. It incorporates the following factors: (i) there are some adaptation initiatives undertaken and tested by the target groups; (ii) Target groups believe that adaptation is normal because CC is natural; (iii) existence of mechanisms and actors favorable to adaptation to CC; (iv) existence of a structural framework of actions (policy, strategic and programmatic documents) to combat the adverse effects of CC.
- (ii) Opportunity 2: existence of mechanisms and actors favorable to adaptation to CC. It includes: (i) availability of technical and financial partners to assist Benin in implementing its structural framework for action to combat the adverse effects of CC; (ii) multi-sectorial dimension to interventions for combating the adverse effects of CC through the involvement of several ministries and research institutes, etc. (iv) involvement of deconcentrated structures in the implementation of the structural framework of actions to combat the adverse effects of CC; (v) existence of strategic adaptation measures to CC (defined and known); (vi) existence of well-structured producer organizations.

At the threats level:

Threat 1: Delay in the implementation of structural measures to promote adaptation to CC. It incorporates the following factors: (i) Delays in the implementation of the actions planned by the PIDACC; (ii) Risk of loss of funding to combat the adverse effects of CC; (iii) The thirteen PIDACC intervention communes do not have an agro-meteorological observation station. (iv) Benin does not have an early warning system on climate risks.

Burkina Faso has a good climate database with observations dating back to 1902 for some weather parameters. Due to its geographical position, its climate is of tropical type with Sudano-Sahelian dominance, characterized by the alternation between a short rainy season and a long dry season. The continental nature of the country and its position at the edge of the Sahara predisposes the elements of the climate to a strong diurnal and annual variability. Traditionally, there are three climatic zones: the Sahelian zone in the north with an average annual rainfall of less than 600 mm, the northern Sudanian zone in the center with an average annual rainfall of between 600 and 900 mm and the southern Sudanian zone to the south with an annual rainfall greater than 900 mm, with a rainy season of nearly 6 months. Projected climate trends and their adverse effects, both real and potential, as well as the analysis of climatological data indicate a marked increase in temperature and a decrease in rainfall. The analysis of climate trends through the use of climate models and scenarios of climate change gives an overall average temperature increase of 0.8° C by 2025 and 1.7° C by 2050. This increase in temperature is accompanied by a seasonal variation: the months of December, January, August and September becoming much warmer than usual, while the months of November and March experiencing small increases in heat.

The rainy season slowly settled from late March to early April in the southwestern part of the country, gradually spreading towards the center in May and June; it reaches the north in June or early July. Rainfall stoppage occurs, the other way round, in a shorter period between September 25th to the North and November in the southern tip (Some and Sivakumar 1994, Some and Sia 1997). In all three climatic zones, rainfall varies greatly from month to month, with August being the rainiest month. Rainfall and temperature are the two climatic parameters that have the greatest impact on resources and the main activity sectors because of their evolutionary trend and especially their inter-annual and intra-seasonal variability. Observations from the population and climate data indicate a marked increase in temperature and a decrease in rainfall. Analysis of climate trends through the use of climate models and climate change scenarios shows the following results. The projections demonstrate an increase in average temperatures of 0.8° C by 2025 and 1.7° C by 2050. The increase in temperature is accompanied by seasonal variability.

The decrease in rainfall will be doubled by a very high inter-annual and seasonal variability. Projections indicate a deterioration of current climatic conditions which will result in worsening climatic shocks on the resources and vulnerable sectors listed in the report. Water resources; forestry / biodiversity; the livestock sector and natural disasters and health. The decline and high variability of rainfall, rising temperatures, will lead to droughts, famines, floods, diseases of various origins that can seriously affect the lives and health of the poorest strata and of the most vulnerable groups of the population. The overall vision of NAPA fits into Burkina Faso's sustainable development strategies like the PRSP and SDGs.

The priority objectives of NAPA are to: (i) identify urgent and immediate needs, activities and projects that can help communities cope with the adverse effects of climate change; (ii) seek synergy and complementarity with existing resources and development activities, while

focusing on the impact component of climate change and; (iii) foster the integration and consideration of climate change risks in the national planning process.

In Cameroon, the PIDACC / BN area of the Niger basin (and especially the northern part) is affected by the vagaries of climate variability. The rainfall deficits observed are roughly between -6% and -12%. These values are relatively low compared to declines in other Niger basins in West Africa where average rainfall deficits are around -20%. This decrease in rainfall combined with the influence of the Lagdo dam has resulted in the siltation, filling and sedimentation of the lake and the bed of the Benue. The chronic drought resulting from climate variability and change plays an accelerating role in desertification, which contributes to the persistence of drought in the northern Benoue basin. This retroaction loop coupled with the strong land pressure in the area is likely to contribute to the acceleration of desertification.

Populations are vulnerable to the effects of climate change due to silting problems, irregular rainfall, poor distribution of rainfall and severe winds that affect the different activities of populations, such as agriculture, livestock, forestry, and fishing, etc. Studies have been carried out and there is a matter of integrating adaptation measures into climate change in the development process. The most illustrative example is the National Program for Participatory Development (PNDP), which in collaboration with German cooperation is in the process of setting up a project to take into account vulnerability factors and indicators of adaptation of local populations and municipalities to the effects of climate change.

Cote d'Ivoire, with its 550 km, Cote d'Ivoire is - after Nigeria - the country of West Africa with the longest coastline. The region is characterized by a rich and unique biodiversity, but suffers from intense pressure generated by human activities such as agro-industry, urbanization, fishing, and tourism, etc. Recently, the effects of climate change have exacerbated the already existing effects of human pressure on natural capital. In particular, coastal erosion caused by a constantly rising sea level has become a real threat to existing infrastructure and economic activities. As forecasts of the global effects of climate change suggest an additional rise in sea level, even more significant erosion is expected in the coming decades in low-lying coastal areas. In this context, the country reviewed its main policies and strategies for poverty reduction, development and economic recovery. These documents unanimously emphasized better management of coastal zones, linked to sea level rise and coastal erosion (National Development Plan 2012-2015).

In the context of the implementation of the UNFCCC in Cote d'Ivoire, climate change vulnerability studies were carried out in parallel with the inventories to determine the potential effects of Climate change in some sectors of economic activity in Cote d'Ivoire. These studies focused on coastal resources and forests. Coastal erosion is an important issue. Efforts made vary in view of mitigating negative economic effects and consequences. In some places, the problem has taken on alarming proportions. Natural factors are numerous but man intervenes on the natural environment by constructing artificial structures on the shore, the extraction of sand on the beaches, the construction of dams on the rivers that previously provided the sedimentary supply of the coast , the anarchic extraction of fluids in coastal

deposits and reservoirs, and the destruction of mangroves. These are some of the factors that have strengthened the impact of natural forces.

The study of the impacts of climate change on water resources in the case of the Bandama and Sassandra river basins was carried out on the basis of the implementation of general circulation models and the sectorial model of water resources management (WATBAL). The exploitation of the GFD3 and UK89 general circulation models on the Bandama and Sassandra watersheds made it possible to measure the impact of the doubling of atmospheric CO₂ concentration on temperature and rainfall. The analysis of these results indicates that the average monthly temperature on these two basins should increase by 2.28°C at the minimum and by 4.10°C at the maximum. Thus, the increase in temperature will be combined with a decrease in rainfall in the savanna zone, whereas in the pre-forest and dense forest zones two scenarios are possible: increase in rainfall according to the UK89 and decrease according to the GFD3. The hydroelectric dams of Buyo, Kossou and Taabo are supplied with water by the rivers N'zo and Sassandra for the first and by the Bandama for the latter two. A decline in water resources would lead to a decline in total electricity production from these dams. Further, it will probably impact on the productivity of rainfed agriculture, especially on rice and soybean crops. Also, a decrease in the volume of surface water could make it difficult to get water into the wells or even dry them.

The forest, in the “Climate Change Impact” study area is deliberately restricted to the wooded areas of the rural area in the northern zone characterized by high land pressure (high population density) in the southwest zone, forest zone, characterized by a rush towards farmland. This choice responds to the dual concern to analyze the combined effects of climate change and anthropogenic activities (agricultural and forestry) on these different ecosystems. These are also ecosystems for which we have some data to use a simple bioclimatic model. On the basis of the trends observed in recent years, the scenario envisaged is an increase in average temperatures in both zones of + 1°C, i.e. + 0.5°C by 2030 and +0.5°C by 2094 (time horizon of 100 years), and a decrease in annual rainfall averages of about 25%. In the assessment of the Ivorian forest sector, it is clear that damage to various types of (anthropogenic and other) have the unfortunate impact today: soil erosion, decreased rainfall, loss of biodiversity, decrease in forest production, etc. The assessment of the state of conservation of Ivorian forest cover, based on the 1990 forest area assessment, shows that despite a good average level of conservation, the area reserved for this purpose is not sufficient. In order to assist the country in developing a robust program for adaptation to the adverse effects of climate change on Cote d'Ivoire's coastal zone, the Ministry of Environment and Sustainable Development requested assistance from an international expert in coastal zone management and climate change in the Instrument for Climate Assistance.

In Guinea, current climate risks that threaten livelihoods can be described in terms of the range of consequences, duration, geographic extent and frequency of occurrence. The trends in the frequency and severity of risks should be noted. In Guinea, the main risks were identified during the regional public consultation workshops organized by the NAPA project in the four natural regions of the country. Studies of vulnerability and adaptation to climate

change in Guinea indicate that the downward trend in rainfall and the increase in temperature observed since 1961, population growth and extreme poverty render the various resources and socio-economic groups very vulnerable to climate change.

Studies of the vulnerability of water resources show that the droughts observed during the period 1961-1990 greatly influenced the hydrological regime of the rivers. The variations in hydraulicity follow the same pattern as those of the rainfall indices, which indicate a downward trend in general and especially during the last decade. This reduction will be common to all regions of the country but very marked for those north of the 10th parallel. From 2050 to 2100, the flow of Niger will decrease by 16 to 28% at the sensitivity 2.5 ° C and from 23 to 54% at the sensitivity 4.5 ° C. The main rivers of the Niger basin are now experiencing phenomena linked to the loss of vegetation cover and soil moisture and to the increase of water erosion by Rainwater and destruction of gallery forests.

The Guinean coastal zone consists of low-lying seafront plains and estuaries (4 to 5 m) that are flooded either by the tide or by river floods. Due to its climate, vegetation, natural resources and strategic geographical position, this area has become a magnet for a growing population. The main socio-economic activities are agriculture, fishing, fish smoking, salt production, logging and livestock. These activities are practiced throughout the zone, but the predominance of each one varies from one sector to another depending on the availability of resources. Several coastal sites are already in a state of vulnerability due to harmful anthropogenic actions. It is established that the Koba site is the one with the most erosion activity. Vulnerability of the agriculture and livestock sector in Guinea, the duration of fallows is becoming shorter (from 8-10 years in the 70s to 3-5 years). This is due to the rapid population growth (3.1% per year) and to the monetization of the rural economy, leading to an extension of shifting cultivation. This system of agriculture results in soil depletion, a fall in production and an increase in cultivated areas at the expense of forests.

In 2005, the National Agricultural Statistics Service (SNSA) estimated the area occupied by the annual crops of rice, fonio, sorghum, millet, corn, groundnuts, manioc, yam, sweet potato, taro and potatoes throughout the country, including 990,045 ha on hillsides. Rice-growing areas would increase from 460,000 ha in 1996 to 714,000 ha in 2005, reaching 780,000 ha in 2007.

There is accelerated degradation of the production potential with the consequent fall in yields. Droughts and floods in Upper Guinea in recent years have led to a decline in cereal food supplies. Changes in crop production and productivity due to climate change will be extremely marked across regions and locations. The livestock system practiced in Guinea is extensive. The frequent overgrazing in Middle and Upper Guinea causes the destruction of the vegetation cover and the soil. The vulnerability of forest formations is dependent on water deficit of the various climatic zones. The projected rainfall deficit and increase in temperature will contribute to a change in the distribution of plant formations by 2025. Thus, the north-east and north-west zones will experience the savannah of trees turning into a dry savannah further to a 200 mm reduction in rainfall. The dense vegetation will disappear in the region of

Foutah and in the prefectures of Kerouane, Beyla, Lola and N'Zerekore. It will gradually give way to the savanna which will advance from north to south. Arid zones will thus increase with a reduction in certain forest species that are less resistant to drought. This will greatly reduce the forest potential of the country. Also, the mangrove will undergo a notorious reduction in the prefectures of Forecariah, Boffa and Boke. The degree of sensitivity highlighted is the result of the confrontation between vulnerable livelihoods and climate risks in different natural regions.

In Mali, climate change is characterized by large variability in the frequency and intensity of annual precipitation with a general downward trend, as well as an increase in temperatures. According to the climate scenarios developed in 2007 by the preparation team of the national action plan for adaptation to climate change in Mali (NAPA) confirmed by the preparation of the Second National Communication submitted in 2012 and the third in preparation; this trend should continue. The recent impacts of climate change have already caused food and water crises in different regions of Mali. Vulnerability to these impacts is further exacerbated by the inadequacy of reliable climate data, especially at the local community level. In the face of the lack of reliable weather forecasts due to inadequate data at the local level, farmers cannot make adequate decisions, among other things, with respect to crop calendar or feed management. The integration of climate change adaptation into policies and investments is also difficult. The resolution of this problem is taken into account within the main lines of Mali's National Strategy for Climate Change, of which the current project is a contribution to its implementation.

In order to make the National Climate Change Strategy (NCCS) effective and its impacts measurable, UNDP and its partners will work to: (i) improve the quality and access to climate information and strengthen monitoring of climate risks and their impacts; (ii) integrate adaptation and maximize co-benefits: rehabilitation of degraded lands, carbon sequestration, and biodiversity conservation; (iii) develop innovative approaches and tools for the systematic integration of climate adaptation into policies and investments in the priority sectors identified by the SNCC and Integration and the Economic, Social, and Cultural Development Plans. The overall objective of the program is to strengthen the climate resilience of ecological systems of production and social systems in vulnerable areas of Mali, as well as the capacity to adapt to climate change through integrated and innovative adaptation approaches.

In Niger, the vulnerability analysis proved that the most frequent risks these areas are facing are: droughts, heavy rains causing flooding with heavy winds, wind storms and /or dust that cause burying of seedlings, high temperatures, dog days, and locust invasions which cause tremendous losses of crops and bush fires/arsons that destroy pastoral lands. It appears that the general trend of phenomena is increasing. As to their frequency, drought remains the most frequent and extreme phenomenon in Niger. Stretching over larger spatio-temporal scales, it also entails tremendous economic crises. Regarding other phenomena, except locust invasions, they cause less damage than drought. Water erosion and silting constitute a serious threat, on the one hand for the down stream flow and the maintaining of the biological balances and natural ecosystems, and on the other hand, for habitats and the whole socio-

economic activities. These phenomena intensified every year by recurrent droughts weaken the living conditions of the population and biodiversity in the Niger basin. Because of the above-mentioned environmental constraints, the living conditions of the population are the most precarious in the Niger basin. They impose adaptation actions aiming to increase the resilience of the populations in order to alleviate poverty, preserve and ensure a sustainable management of natural resources of the basin. The implementation of measures will help to mitigate the side effects of climate variability and changes.

Nigeria is strongly predisposed to severe and negative repercussions of climate change because of the fragility of its economy, its weak resilience and its low capacity of adaptation. Economy, in large, rests on resources dependant on climate. For instance, farming, forestry, and fishing sectors hire up to 70 % of labour. Its economy dependant on fossil fuel will be particularly vulnerable to events derived from climate change, namely flooding and droughts.

All socio-economic development sectors of Nigeria, including natural ecosystems, are vulnerable to climate change. Different analyses and surveys have brought out that the most vulnerable are those in energy, agriculture, water, forests and health sectors. An important impact is also expected in the frequency of natural disasters. The 2011 index of climate change vulnerability (ICCV) places Nigeria among high risk countries. Climate change could cause losses from 6 to 30 % of GDP by 2050 (about USD 100 to 460 billion). According to the survey of DfID (2009), if no adaptation measures are implemented, 2 to 11 % of Nigeria's GDP could be lost by 2020, impeding the objective of national development aiming to pull up the country among the first 20 economies in the world (NPC, 2009). Overall, climate change constitutes serious threats to the achievement of the millennium goals for development, in particular those which deal with poverty and hunger alleviation, and the promotion of the environment sustainability.

The environment of the study area is more and more threatened by natural disasters such as drought, desertification and flooding which have , these last years, undermined farmers' subsistances and have compromised food security, as well as by air and water pollution and a low capacity of adaptation to climate shocks. Pollution due to oil exploitation and gas flaring in the Niger delta remains a source of concern in the country. The high concentration of industries in the regions extremely exposed to the increase of sea level derived from climate change (Lagos and Niger delta, for instance) increase the vulnerability of the project area. The national development programme envisions policies to address climate change. They are namely the Climate Change Policy and Response Strategy (Nigeria Climate Change Policy and Response Strategy) (approved by the federal executive Council on September 13th, 2012) and the National Adaptation Strategy and Plan of Action for Climate Change in Nigeria, NASPA-CNN. Besides, Nigeria is a pionier country of Funds for clean Technologies (FCT) and thus it has designed a plan of investments to commit itself to a sober development in carbon. These initiatives will help for a green growth and the integration of the adaptation to climate change in the government's policies, strategies and development programs. In spite of his efforts, the government needs assistance in the working out of a coherent and strategic approach in order to overcome the challenge of climate change.

Nigeria has seriously considered the challenge of climate change. In addition to some policies and strategic initiatives, nowadays, Nigeria has a national climate change policy and response strategy (NCCPRS) whose strategic objective consists in promoting a mode of a high growth economic development with lower carbon dioxide emission in the perspective of building a society resilient to climate change. Following are the seven pillars for the implementation of a Plan of Action spanning over 10 years (2011-2020): 1) mitigation and a high growth development and lower carbon production ; 2) food security, alleviation of poverty, protection of vulnerable persons and health; 3) integrated and inclusive management of risks of disaster; 4) infrastructures ; 5) research and development ; 6) capacity building and consolidation of institutions; and 7) sustainable and coordinate funding of climate change. The main actors of climate change in Nigeria include the government, research institutions, organizations of civil society, the institutions of the private sector and partners of development.

Chad is facing extreme climate change phenomena, which occur, through droughts more and more severe, or flooding more and more devastating. Vulnerability in the face of such events is all the more worrying that existing administrative structures (ministries, governmental agencies and territorial authorities) lack financial and human resources, capacities and means of action to address this issue. The impacts of climate change are felt in farming, cattle breeding, fishing, health, and habitat and still in other fields.

A program of action for national adaptation to climate change (NAPA) was published in February 2009. However, the means of its implementation are lacking. In general, nowadays the Republic of Chad doesn't have sufficient institutional means to fully resort to CCNUCC financial mechanisms and implement projects and adaptation and mitigation measures. The intervention of AMCC aims at helping the country to remedy these shortcomings.

The main achievements to date are: (i) Support to the preparation of the Expected Contribution estimated at National level in Chad; and the preparation and participation in the Paris conference - COP21; (ii) Support to the Ministry of Energy and oil (MEO) of Chad in the calculation of the factor of carbon dioxide emission; (iii) A call for proposals for pilot projects on the ground has been launched.

The main activities to be implemented can be summed up as follows: (i) Continue to help the accreditation of a national entity of execution of the fund for adaptation; (ii) Prepare the national Strategy for climate change in Chad, (iii) Organize the first national workshops on: the integration of climate change in the sector of farming, livestockbreeding and fishing; international negotiations on climate; access to climate funds, (iv) Create tools for the follow-up and assessment of projects to soil adaptation and programm PANA (v) Elaborate the renewable energy road map and the establishment of a statutory framework and financial incentives (takeover tariffs) for renewable energies (vi) Develop and implement of the project web site.

VI. BRIEF DESCRIPTION OF THE PROGRAM'S SELECTED PROJECTS

6.1. LOCATION OF SELECTED PROJECTS

(i) In Benin

The area of active watershed of the Niger River, which is the subject of the current study, is limited in the North of the Republic of Benin. It gathers ten (10) Communes Banikoara, Bembereke, Gogounou, Kalale, Karimama, Kandi, Malanville, Nikki, Segbana and Sinende) which cover an area of 43, 313 km².

(ii) In Burkina Faso

PIDACC concerns the regions in the East, Center -East, Plateau Central, Center- North, Sahel and Upper Basins including 78 communes divided into 15 Provinces, located in the part of national portion of Niger Basin.

- Eastern Region: Gnagna, Komondjari, Gourma, Tapoa
- Center-Eastern Region: Kouritenga and Koulpelogo
- Plateau Central Region: Ganzourgou
- Center-North Region: Namentenga and Sanmatenga
- Sahel Region: Seno, Soum, Ouadalan and Yagha and
- Region of High Basins: Houet and Kenedougou

(iii) Cameroon

PIDACC will intervene in the following communes: Region of far North:

- Mayo Tsanaga Department (Mogode, Hina and Bourrha communes)
- Northern Region:
- Mayo Louti Department (Mayo Oulo, Guider communes)
- Faro Department (Beka and Poli communes);
- Benoue Department (Lagdo, Bardnake, Bascheo, Gaschiga, Ngong communes)
- Mayo Rey Department (Rey Bouba commune)

(iv) Cote d'Ivoire

The portion of watershed of Niger Basin in Cote d'Ivoire is located North-West of the country and covers an area of 31, 633 km² (about 9.8% of national territory). The division of the area of the Basin per administrative region according to the new 2011 zoning gives 37% to the region of Bagoue, 37% to Kabadougou and 29% to Folon.

(v) Guinea

The program area covers the regions of Upper Guinea and the Forest Guinea. The program concerns ten (10) Prefectures and is located in the national portion of the Niger Basin with an area of about 100 000 km². It is characterized by a vulnerability generally related to the degradation of resources by the accentuation of water erosion due to excessive logging,

inadequate agricultural and pastoral practices causing sandbank and silting up of the main tributaries of the Niger River banks namely: Sankarani (12 700 m³/year), Milo (13 200 m³/year), Tinkisso (19 300 m³/year), Niandan (12 700 m³/year), Niger (11 900 m³/year), Dion (8200km²), Mafou (4300 km²) and Fie (3000 km²).

(vi) Mali

The study area comprises of six basins (Upper Niger, Bani, Delta vif, Delta mort Occidental, Lake Area and the Niger Loop). The intervention area includes the Niger Valley and part of its watershed which actively interacts with the river in biophysical and human environments.

(vii) Niger

The Niger basin in Niger, with an area of 427.300 km² (about 34% of the total area of the basin), includes seven (7) of the eight (8) Regions of the country and totally covers the Regions of Tillabery (22,8% of national basin), Tahoua (26,5%), Maradi (9,8%), Dosso (7,9%) and the urban Community of Niamey (0,06%) ; and partially the regions of Agadez (department of Tchirozerine, the Urban Community of Agadez with 32,9%) and the region of Zinder (Upper basin of Tarka in the department of Tanout).

The African Development Bank preparatory mission identified the regions of Dosso, Niamey, Tahoua and Tillabery as its intervention areas. These areas are situated in the active part of the the Niger Basin characterized by their vulnerability notably related to the degradation of resources with the presence of sandhill causing:

- Wind and water erosion causing silting of rivers and ponds (artificial & natural);
- Flooding of households and irrigated plots;
- Destruction of infrastructures, kitchen gardens and farms and
- Gullies

(viii) Nigeria

PIDACC will intervene in the following regions:

- Upper Niger River basin
- Sokoto Rima River basin
- Upper Benue River basin and
- nambra Imo River basin

(ix) Chad

At the geographic level , the project area covers the southern part (South-West) of the Republic of Chad, in the natural region of Mayo-Kebbi, precisely in the part from North to South between the localities of Domo (9°56'N ; 15°28') and Massang (8° 58'N; 14° 60'E) and from East to West between the localities of Leo (9°45'N ; 15°45'E) and Gegou in the East of Lere (9°36N ; 14°05E). At the administrative level, it covers the whole Region of Mayo-Kebbi-West and the Departments of Mount Illi and Kabbia in the Region of Mayo-Kebbi-East; and the area is bordered in North, South, and West with Cameroon.

6.2. ACTIVITIES FOR THE THREE COMPONENTS– AT COUNTRY LEVEL

a) Benin

The following table shows expected activities for Benin:

Component 1 : Development of the resilience of resources and ecosystems

Sub-component 1.1 : Protection of resources and ecosystems				
Section 1 : fighting against erosion and silting		Quantity	Localization	Observations
Activity 1.1	Achievement of mechanical plans for Defense and Soil Restoration (DRS) in community lands.	1.000 ha		
Activity 1.2	Implementation of biological plans for Defense and Soil Restoration (DRS) in community lands.	1.500 ha	Kandi, Gogonou Banikoara, Kalale and Bembereke	
Activity 1.3	Implementation of the Conservation plan for Waters and Soils (CES) in farmed plots.	32.000 ha	Kandi, Gogonou and Banikoara, Kalale and Bembereke	
Activity 1.4	CES of work of mechanical treatment of ravines in the communes	1.000 m3	Kandi, Gogonou and Banikoara, Kalale and Bembereke	
Activity 1.5	Implementation of biological treatment work of gullies in the departments	1.500 m3	Karimama, Sinende, Bembereke, Kandi and Banikoara	
Section 2 : Sustainable Management of agro forestry and pastoral resources				
Activity 2.1	Improved fallow and agro forestry	2.000 ha	Alibori, Borgou	
Activity 2.2	Materialization of corridors of cross-border transhumance with water points (drilling or pastoral wells)	100 km	Alibori, Borgou	section will be chosen in the list of corridors of cross-border transhumance in the annex 5
Activity 2.3	Participative agro-pastoral plantations in classified forests.	4.000 ha	Gogonou, Kandi, Banikoara, Kalale, and Bembereke	
Section 3 : Protection of biodiversity				
Activity 3.1	Rehabilitation borrassus of Goroubi (550 ha) and the et cynegetics area of Djona (450 ha).		Karimama	
Activity 3.2	Improvement of productivity in the aquatic areas, especially	1 000 ha	Alibori et Borgou	During APS stage, a census of

	ponds, damming up, fish-farming pools, etc.			the set of damming up and plans liable to be developed must be conducted to cover the expected area
Sub-component 1.2 : Reinforcement of shared management of natural resources				
Section 1 : Setting up tools of adaptation and management of water resources				
Activity 1.1	Updating of weather stations on the Niger River and its tributaries in Benin.	04	Malanville (on Niger), Kompogou (on Mekrou), Kande-Bani (on Alibori) and Kouberi (on Sota)	
Activity 1.2	Elaboration and development of a regional adaptation strategy, system of early warning of diffusion of hydro-climatic information, instrument of sustainable and shared water management			
Activity 1.3	Coordination and monitoring of the implementation of regional surveys			
Activity 1.4	Fighting against water pollution, and for quality control of the Niger River waters and its tributaries in Benin		Malanville (on Niger), Kompogou (on Mekrou), Kande-Bani (on Alibori) and Kouberi (on Sota)	
Section 2	Regional Coordination			
Activity 2.1	Capacity Building of NBA executives, partners of technical services and the associations of water users		BE-NBA, SFN/Benin and involved Technical Structures of Benin	
Activity 2.2	Strengthening of Benin GIRE Devices		Involved Technical Structures of Benin	
Activity 2.3	Setting up of PADD assessment system		NBA	
Activity 2.4	Adoption of PSE mechanism		NBA	

Component 2 : Development of the resilience of the populations

Sub-component 2. 1 : Development of multi-purpose hydro-agricultural infrastructures		Quantity	Localization	Observations
Section1 : Development of agricultural and pastoral systems				
Activity 1.1	Construction of multi-purpose dams with development of the Irrigated Perimeter (IP) downstream	05	Kandi, Gogonou, Kandi, Banikoara, Kalale and Bembereke;	Priority Sites to be chosen among 22 sites identified first in the framework of PDISSA.
Activity 1.2	Development of irrigated perimeters downstream of the five multi-purpose dams;	500 ha	Gogonou, Kandi, Banikoara, Kalale and Bembereke	
Activity 1.3	Rehabilitation of hydro-agricultural dams	07	Sombi Kerekou (Banikoara), Gamagou and Zougou Pantrossi (Gogounou), Warra (Segbana) and Gah Guessou (Sinende)	Surveyed Sites within the framework of PREGDE. On this section, it would be advisable to add, in addition to the five already cited dams, the dams of Potoko (Kandi) and Liboussou (Segbana) whose technical surveys are completed. The allocated amount can cover the 7 dams
Activity 1.4	Development of shallows with partial control of water ;	200 ha	Amagou (50 ha ; Karimama), Pegon (25 ha, Kandi), Yabadou (25 ha ; Banikoara), Bagou (25 ha ; Gogounou), Kakakpamon (25 ha ; Nikki), Koure (25 ; Sinende) et Bouca (25 ha, Kalale);	
Activity 1.5	Implementation of spray threshold for shallow perimeters	04	Karimama and Malanville;	

Activity 1.6	Development of shallow perimeters	500 ha	Karimama and Malanville;	
Activity 1.7	Rehabilitation of pastoral dams	10	Sampeto and Gbassa (Banikoara), Gambanin (Kandi), Guene (Malanville), Fannan (Gogounou), Toumbouri (Segbana), Gnandarou (Bembereke), Sansi (Nikki), Basso (Kalale) and Sekere (Sinende).	
Section 2 : Development of fishing and navigation				
Activity 2.1	Construction of wharfs	02	Malanville and Karimama	
Activity 2.2	Construction of fish-breeding center (500000 fries/year)	02	Malanville and Nikki	In order to efficiently cover the whole piscicultural sites of the departments of Alibori and Borgou, it is necessary to set up two fish-breeding centers
Activity 2.3	Improvement of navigation section	65 km	Malanville and Karimama	
Sub-component 2. 2 : Accompaniment Measures and social security				
Section 1 : Accompaniment Measures				
Activity 1.1	Organization and equipment of management committees (CoGes) of hydro-agricultural, pastoral and fish farming infrastructures		Alibori and Borgou	Equipment need to be specified
Activity 1.2	Promotion of fish breeding in floating cage	50 cages	Alibori and Borgou	
Activity 1.3	Control of weeds in water streams	150 km	Tributaries Alibori and Sota	
Section 2 : Social security				
Activity 2.1	Construction of community Infrastructures of adaptation (warehouse for products, product processing units and market sheds)		Malanville and Karimama	

Activity 2.2	Support to vulnerable groups throughout the la promotion of profit activities		Alibori and Borgou	
Activity 2.3	Construction of dyke of protection against flooding in irrigated perimeters	10 km	Malanville	
Section 3 : Adaptation Capacity Building of communities				
Activity 3.1	Elaboration and popularization of good practices and agro-climate information		Alibori and Borgou	
Activity 3.2	Elaboration and implementation of document of hydro-agricultural infrastructure management strategy		Alibori and Borgou	
Activity 3.3	Training of users in the maintenance and management of hydro-agricultural, pastoral and fish breeding infrastructures		Alibori and Borgou	
Activity 3.4	Accompaniment of Users (monitoring and assessment of their activities)		Alibori and Borgou	

Component 3 : Program coordination and management

b) Burkina Faso

The program articulates around three components: (i) Development of resource and ecosystem resilience (ii) Development of the resilience of the populations; and (iii) Coordination and program management.

Component 1: Management and protection of the ecosystems

The aim of this component is to protect the environment. It includes two sub-components: i) The sub-component about the protection of resources and ecosystems and ii) the sub-component strengthening of shared management of natural resources

Sub-component 1: Protection of resources and ecosystems:

This sub-component aims at protecting water, soil and ecosystem resources and includes three sections:

Section 1: Erosion and silting control:

The following activities are selected for i) fixing sandbanks in the sahel regions in 5500 ha in the areas of Seno, Oudalan and Soum ii) recovering degraded lands (RDL) in the areas of Yahga, Soum, Seno, Ganzourgou, Oudalan, Sanmatenga, Namentenga, Gnagna, Komondjari in 3000 ha and iii) Handling ravines in 19 000 m³ and the protection of banks over 500 ha.

Section 2: Long lasting forest management and the protection of biodiversity and marshlands.

Activities include: (i) Practice of improved fallow, agro-forestry, enrichment of forests, plantation, assisted Natural Resource Regeneration (RNA) in 2500 ha (ii) Forest developments, plantations of village forests, palm groves, Prohibiting grazing in different regions in 10 000 ha and (iii) Prohibiting grazing in 1000 ha forests.

Component 3: Protection of biodiversity.

Concerned activities are: (i) the protection of natural parks and terrestrial reserves in 1000 ha and (ii) Development of spawning areas and plains liable to flooding in 1000 ha.

The second sub-component will concern the development of adaptation, management and regional coordination tools.

Sub-component 1. 2: Strengthening of shared management of natural resources.

It has 2 components:

Section 1: adaptation and management tools:

Concerned activities include (i) the elaboration of a national strategy of adaptation, (ii) the elaboration of an early warning system of flood and low waters through strengthening existing hydrometer network stations in Burkina, (iii) the development and diffusion of hydro-climate information to final users, (iv) and the elaboration of water shared management.

Section 2: Regional Coordination.

Component 2: Development of resilience of the populations and ecosystems in the Niger River basin.

This component aims at increasing resources in water and developed agricultural lands in order to significantly increase agricultural output and the protection of resources of the Niger basin ecosystems. This component is subdivided into two sub-components, i) the multi-purpose infrastructure development sub-component and ii) the sub-component about the accompaniment measures and social security.

Sub-component 2.1: Development of multi-purpose infrastructures :

This sub-component has 3 sections:

Component 1: hydro-agricultural infrastructures. They consist in the rehabilitation of dams in Dabesma, Baskoure, Kiemna, Bani, Touro, Manni, Boudieri and Tanga to mobilize, about 7.826 million m³ of water and the construction of 2 dams Coalla (6.13 million m³) and Bambakari (165 million m³), of a work of dam protection of Yacouta, small dam works: 3 spray thresholds, 20 boullis, 3 sewer basins, 60 ha of damps development of the pond of Dori. Thus, the infrastructures which were already surveyed by APS or APD were given priority.

Component 2: Stock-farming infrastructure. They aim at constructing hydraulic pastoral infrastructures (boulis) in Arbinda, Deou and in the grazing area of Kokou. The creation of transhumance corridors and cattle paths in Gnagna, Gourma, Yagha, Seno, Soum and Oudalan provinces as well as the development of forage perimeters.

Section 4: Fishing infrastructures which consist in the purchasing of 120 canoes, Zodiac and fishing equipment (fishing nets, wharfs, smoking and threading units etc.) ; the development of 10 wharfs, which enable the development of fishing and fish-farming activities around big dams of Yakouta, Tapoa and Bambakari, lake of Higa and the pond of Oursi.

Sub-component 2.2: Accompaniment Measures and social security

This component has the following activities: (i) Organization of multi-purpose infrastructure management committees, (ii) Organization and structuring of fishing sub-sector actors and (iii) fighting against invading wild plants.

To achieve these activities, existing stock farming, fishing and hydraulic infrastructure management committees will be strengthened and some new committees will be set up in order to ensure rational management of rehabilitated or new infrastructures. These committees will be trained, organized and equipped. Besides, they will be given responsibilities to manage these infrastructures. Most importantly, they will protect them against invasion by water plants. The users of infrastructures (cattle breeders, irrigators, and fishers) will be members of these associations and will financially participate in the management thanks to the instauration of a community payment system of performed services by hydraulic works.

The construction of crossing dykes in the provinces of Yahga, Komondjari and Gnagna. This sub-component includes the activities detailed below:

- Section 1: Accompaniment measures and fighting against invading wild plants.
- Section 2: Social security.
- Section 3: Adaptation of Community capacity building

In regard to the setting-up of a diffusion platform of hydro-weather information, this activity concerns the upgrading of agro-weather stations to get climate data that could allow an orientation of agricultural calendar and setting of water balance for the forecast of agricultural output. The weather stations to be upgraded are those of Sindou, Orodara, Solenzo, Boulsa, Zorgho, Koupela, Bogande, Diapaga, Sebba, Djibo and Gorom Gorom through the acquisition of measuring and analysis tools and remote transmission device.

Component 3: Coordination and program management PIDACC/BN

The objective of this component is to coordinate the implementation of the program. It consists of ensuring a good technical, administrative and financial management, as well as the program activities assessment. It aims at improving the effectiveness and the efficacy of PIDAAC/BN interventions. This sub-component includes routine management aspects of the

program's administrative and financial domains, the promotion of partnership with structures, the project management and communication aspects as well as the visibility of the program. Operational planning, the strategic and operational monitoring of the program. It also comprises of the assessment/capitalization of the implementation of the program.

PIDACC/BN will be coordinated and managed by a Regional Unit of Coordination set up in SE/NBA and a National Unit of Coordination set up in SFN/NBA in Burkina Faso. This component includes 2 sub-components:

- Sub-component 3.1: Regional coordination of the program
- Sub-component 3.2: National Coordination of the program

d) Cameroon

The Cameroonian portion of the Niger River basin concerns 4 regions with North and North-west regions with respectively 79.3% and 69.31%. The region in the North is located in the northern part of the portion with an area of 75000 km² whereas the North-west region is in the southern part with an area of 12900 km². The northern part is composed of the watershed of the Benoue River and subdivides in three parts: Upper Benoue with Mayo tributaries, Mayo Loti and Tsanaga on the right river bank and Mayo Faro on the left river bank. The Mid Benoue is located up stream of the dam of Lagdo and flows into a large valley with flooded plains and ponds in which water remains the whole year. The lower part downstream of the dam is characterized by well-marked valley separated from areas liable to flood by rolls of banks. The southern side is constituted by Mayo Menchun, Katsena and Donga.

The program is subdivided into 3 components which are:

- Component 1: Development of the resilience of resources and ecosystems
- Component 2: Development of the populations' resilience
- Component 3: Coordination and management of the program

Component 1: Development of the resilience of resources and ecosystems

The majority of the activities which are scheduled in this sub-component concern fighting against soil erosion in order to protect the dam reservoir of Lagdo and dams to be constructed against precocious silting up and sandbank of Benoue River. A large part of sediments which settle in these works come from watersheds of the northern part of the cameroonian portion of the Benoue basin which are affected by ground cover degradation because of the overexploitation and conversion of forests and ways, less preservative agricultural practices and water pollution. Thus, activities are planned to intervene in that sub-component as well as inside forests located in the departments including infrastructures as in farmed private properties in the watersheds of those works. The majority of the activities will be localized and focused in Mayo Faro, Tsanaga and Loti watersheds located in the same departments.

These activities will comprise (i) mechanical and biological works of water and soil conservation, agroforestry and fallow improvement on cropped lands; (ii) community forest plantations integrated to mechanical works of defense and restoration of soils in cleared, degraded and forestry lands (iii) flora and fauna developments in view of the preservation of

biodiversity in national parks of Faro and Benoue and protected areas; (iv) The population control in the dam of Lagdo and the Benoue lower stream and (v) The improvement and the enrichment of ways in which water points are constructed/rehabilitated by the program;

Component 2: Development of the resilience of populations

It is composed of two sub-components:

- S/C 2.1: Development of multi-purpose infrastructures
- S/C 2.2: Accompaniment measures and social security

Sub-component 2.1: Development of multi-purpose infrastructures

It comprises hydraulic multi-purpose infrastructures (irrigation, fishing, drinking water for cattle) and other specific to cattle breeding, fishing and navigation. Multi-purpose dams (irrigation of developed, irrigated perimeters, aquaculture, and drinking water) are almost non-existent in upper Benoue. Developed shallows with total control of water are also non-existent. The construction of multi-purpose dams and the development of shallows and spreading areas with full control of water partly contribute to reduce flood flow and solid waste coming to Lake of Lagdo. Thus, the program proposes to carry out the activities of that sub-component in the northern part of the basin and specifically in the departments of Benoue, Mayo Tsanaga, Mayo Loti and Faro.

The Component of hydro-agricultural infrastructures plans includes: (i) the construction of two multi-purpose dams (one in the northern region, and another in the region of far north), (ii) the development of 10 low lands with full control of water, (iii) the rehabilitation of farming perimeters, and (iv) the development of 2 000 ha of irrigated perimeters on the hydro-agricultural works. The Component of fishing infrastructures is located in several communes and includes the construction of pastoral wells and the rehabilitation of ponds to provide drinking water for cattle.

Sub-component 2.2. : Accompaniment measures

The first sub-component is dedicated to fighting against invading wild plants on 150 km.

Component 2 includes the development of community infrastructures of adaptation which will create income generating activities for the populations of beneficiary communes of the program's activities. It consists in creating market gardening perimeters from surface wells, the integration of short term cattle breeding, apiculture in the agricultural exploitations. These activities are principally intended for women.

Component 3 —Community Capacity Building Adaptation.

This component concerns: (i) the elaboration of good practice guides; (ii) the dissemination of good practices of adaptation, (iii) the diffusion of agro-climate information and (iv) the training of users in the implementation of these practices of adaptation. Thus, the program will reinforce the 8 functional hydrometric stations in the Cameroonian portion of Niger basin and complete them with automatic and manual meteorological stations.

Component 3: Coordination and program management

e) Cote d'Ivoire

PIDACC articulates around the three following components: (i) management and protection of the ecosystems (ii) Development of the resilience of the populations and the ecosystems and (iii) Coordination and management of the PIDACC/BN program. The components' activities of the program in Cote d'Ivoire are detailed as follows:

Component 1: Management and protection of the ecosystems

That component includes two sub-components.

- Sub-component 1.1: Protection of resources and ecosystems. This aims at protecting water, soil and ecosystem resources and includes three Components:

Section 1: Erosion and silting control and treatment of degraded lands.

- Protection of river banks: Removal of sandbank, construction of 50 km of small dykes with 10 km per River and campaign of participative reforestation.

The phenomena of environmental degradation of waterstreams in the portion of the watershed of Niger River in Cote d'Ivoire (erosion and degradation of river bank) principally result from three main factors namely: bush fires, deforestation and overgrazing. All these factors favor the disappearance of ground cover which maintains the soil and protect it against erosion. Bare soil favors streaming phenomena detrimental to infiltration by the modification of the flow regime. In fact, the concentration of the flow and the increase of its intensity cause soil incision and the development of channels, erosion gullies and the loss of cultivable lands.

The consequence of erosion is the increase of trash into the river, is the rapid filling up of dams, damage to cultivated areas in the low lands and disturbance in the aquatic ecosystems (increase of turbidity). Thus, in the watershed sedimentation is very important along the water stream and constitutes a risk of flooding for local populations and an obstacle for the navigation. The actions that will be realized in the framework of the PIDACC program concern the basins of the main water streams of the region.

The small dykes will be built with rocks and used as filter to retain fine particles. The desilting will cover all navigable tracks. Sand can be used as building material. All these activities will create jobs for local populations and protect the environment. This project is initiated by the Directorate of water resource management and protection (DGPRE)

The main activities of the project which spans over five (05) years include the following:

- Building the capacity of the stakeholders involved in the management issues of water and forest resources.
- Setting-up of the project management board, the follow-up systems and organization of meetings at the national level;

- Identification of training needs and organization of sessions on the sustainable management of water and forest resources for national institutions and NGOs
- Development of conscious awareness and campaign materials and organization of sensitization sessions on water and forest resources management and protection;
- Control of hydrological parameters of selected tributaries in relation to the production of sediments ;
- Sensitization campaigns for the creation of local committees to fight against bush fires.
- Restoration and protection of plots of land along water streams through pilot actions:
- Elimination of sediments through dredging of identified river bed areas and restoration of river banks along tributaries;
- Afforestation of wooded regions of the river bank destroyed previously, with fire wood, and development of a plan for to manage them.
- Construction of firebreaks/green belts around reforested land lots;
- The selection of pilot sites for the project implementation will be done with landlords' agreement, in accordance with traditional and customary laws of the affected communities. The facilitation of this negotiation will require the involvement of the representatives of local and national institutions.

The main tributaries of the departments of Boundiali, Tengrela, Odiene, Madinani and Minignan must be selected as sites of the pilot project.

For a coherent exploitation and the development of homogenous areas in the basin, two development areas have been chosen (i) The development area of Bagoue which includes the sub-watersheds of Bagoue and Kankelaba. It covers the departments of Tengrela, Boundiali and Madinani. Its area is 13, 682 km² (59.9 % of the basin) and its perimeter 124.6 km ; (ii) The development area of Baoule which includes the sub-watersheds of Baoule and Kouroukele. It covers the departments of Odiene and Minignan, with an area of 9, 162 km² (40.1 % of the basin) and a perimeter of 728,7 km.

The structures involved in the project management are presented as follows:

- Local steering comitee of the project (CLPP) comprising: Prefects of the Departments; Sub-prefects of concerned areas of the project ; Chairpersons of General Councils; Mayors of communes concerned by the project; Regional Director of Agriculture; Regional Director of Water and Forest Resources (Secretary); Regional Director of Animal Production and halieutic Resources; Regional Director of Industry and Private Sector; Mining and Energy Regional Director; A representative of NGOs from each Department of the national portion of Volta River basin; Representatives of youth and women associations.
- Implementing partners of the Project.
- Water and soil conservation works within cultivated land lots:
- Project of creation of 3000 hectares in the framework of the development of Niger Basin (DNB)

Forest plays an important role in climate and water cycle regulation. It preserves also the biodiversity by constituting a habitat for a great number of animal species and protect soils against erosion. In addition, it plays the role of filter for the protection of water streams against all sorts of pollutions.

Streaming water carries sediments, pollutants such as pesticides and fertilizers. If streaming water flows directly in a water stream, all the pollutants flow therein as well. Many scientific researches demonstrate the effectiveness of the banks and natural waterside strips in preserving water quality. Vegetables enable sedimentation of floating matters and pollutants. Plant roots, as well as bacterial fauna that live in water ingest nutriments dissolved into water, and even pesticides. Vegetation is particularly effective in reducing the concentration of nutriments from agricultural fertilizers, such as phosphorus and nitrates.

The Ivorian forest is got poorer during years as well in area as in quality of essences under the effect of an extensive and uncontrolled agriculture and a mining type logging. The Ivorian forest appears nowadays as a mosaic where scrap of secondary forests, fallows, and village plantations alternate. To regenerate degraded areas the Directorate of public register of lands and Forest development of the Ministry of Water and Forest Resources has planned the creation of 3,000 ha. The reforestation will be done namely at the level of the watersheds of dams to regerate the degraded forest and protect them against silting. Seedlings must be protected against animal grazing. The project is plans the reforestation of 3, 000 ha in rural area in the north of Cote d'Ivoire.

The basic conditions of a successful restoration, rehabilitation or development of degraded and secondary forests are:

- The support and the participation of local actors to the planning, execution and follow-up of the activities. The rights and competencies of ownership, encompassing those conferred by the custom, must be precisely defined and mutually recognized;
- Some short term economic benefits for local users of the forest: these benefits must be added to all the possible future benefits;
- A good knowledge of the complexities and the dynamics of forest ecosystem and socioeconomic and political systems in interaction;
- An analysis of land vocation and an understanding as well as a legal definition of the whole relationships between the different categories of soil exploitation.

Component 2: Sustainable forest management, protection of biodiversity and wetlands

Improved fallow and agro-forestry: Project of creation of 1,000 ha of agro-forestry plantations with 500 ha of Nere and 500 ha Shea.

The supplying urban centers in the north of Cote d'Ivoire with wood for energy (firewood and charcoal) becomes more and more laborious given the pronounced scarcity of ligneous resources.

The department of Boundiali, located in the Region of Bagoue, is not an exception to this situation. This region is characterized by arborous type-savannah vegetation where the populations practice itinerant agriculture. Stock-farming is also carried out in the area. In addition, there is seasonal transhumance of cattle coming from neighboring countries.

These anthropic activities, with frequent bush fires have contributed to a severe degradation of ground cover vegetation, and the generalized impoverishment of soils, which increases strongly fire wood so vital for the populations.

Being aware of this situation, the State of Cote d'Ivoire, thanks to its policy of sustainable management of forest resources, has undertaken various actions. Among them, further integration of trees in the exploitation systems. The project is implemented by the Real Estate Register and Forest Development Directorate and consists in the reforestation of 1,000 ha in the region of Bouandiali with 500ha of Nere and 500 ha of shea.

The major risks which might undermine the project are bush fires and damage caused by transhumance animals. These factors are taken into account through the creation of firebreaks and the sensitization of the populations. The reconstitution of forest through reforestation will improve the living conditions of the population and reinforce the credibility of the State in front of development partners.

Planting in the village and community preserved forests: Development of 3 out of 11 preserved forests in an area of 40,000ha (SODEFOR).

Preserved forests located in the north of Cote d'Ivoire namely the preserved forests of Boundiali, Pale and Nyangboue which are crossed by Niger River tributaries are for the most part in an advanced degradation status. This degradation is due to several factors such as the practice of itinerant agriculture with fire and anarchic over-logging. According to the estimates for the least optimistic, the average rate of forests degradation is gone from 30% in 1994 to 50% today. The project concerns (3) preserved forests in the north region of Cote d'Ivoire and surrounding villages, more precisely in the Management Center of Korhogo: Boundiali, Pale, Nyangboue. The three preserved forests are located in the District of Savanes. They are between the Departments of Boundiali, Madinani, Kouto, Kani, Seguelon and Ganaoni. They are surrounded by about 25 villages; the population varies from 1500 to 4000 inhabitants per village.

Sub-component 1.2: Reinforcement of the shared management of natural resources

Section 1: adaptation and management tools:

The role of the Ministry of African Integration and Ivorians in the diaspora consists in promoting and following the policies and community programs notably by contributing to the development of community infrastructures and by implementing the whole indispensable sectorial policies and by deepening African Integration. This task is carried out in collaboration with several other ministries. Thus, the ministry organized itself in sectoral directorate to overcome the challenge of that collaboration by addressing more operational

issues than institutional ones. In the case of PIDDAC project, in relationship with the ministry of waters and forests, we are responsible for the follow-up and harmonization of technical and economic instruments of sub-regional and African integration, notably the issue of implementing the water charter of the Authority of Niger Basin and its implications and specially, a better coherence of national proposals

The actions include: (i) strengthening the institutional framework for asustainable management; (ii) strengthening public awareness and their knowledge of texts concerning water and environment; (iii) dissemination of the Niger basin water charter and support the enforcement of the texts related to its management and (iv) Design and implementation of a regional program of protection / restoration of river banks and forest galleries upstream;

Strengthening the knowledge of natural resources, which includes (i) economic assessment of the environmental capital and eco-systemic services ; (ii) conducting a socio-anthropological study of Niger River national basin (iii) organizing a workshop on reinforcement of the right of profit sharing of local communities and native populations and ensure access to the genetic resources and a fair sharing of benefits coming from their utilization (iv) development of an adequate retrocession mechanism, of management and control of these financial resources by the native populations and a better risk management for the sustainability of the actions; (v) building the capacity of beneficiary producers and (vi) elaboration and dissemination of specific technical sheets of the implementation of PIDACC activities for each target Group.

Section 2: Regional Coordination

Regional coordination is managed by NBA for the purposes of maintaing coherence of actions to be undertaken per countries without jeopardizing the sustainable management of shared water resources at the basin level. That overall vision allows to strengthen the integration of countries having in common the Niger River basin.

Section 3: Inventories and diagnoses of works and hydraulic developments.

About a hundred of small dams and hydraulic works were identified in the north of Cote d'Ivoire in the Niger River basin by SODEPRA early in 1980. The objective of these works was to develop pastoral activities. The administrations responsible for these works have unfortunately lost progressively the historical memory of their implantation mostly after the dissolution of SODEPRA. Technical structures (ANADER) having participated in their construction and the first years of their exploitation, has only very limited information on these dams.

The sole published inventory is that of the Public Work Board in Abidjan (inventory of dams, 1992), which contains 269 SODEPRA dams for all the north of the country, without providing basic information. Because of the lack of reliable data on dams, the Management and Protection Resources Board is planning to make a geo-reference realization and a diagnosis of the overall works and hydraulic development. Such plans will allow a better

management of dams which are conducive to the region's development and the improvement of knowledge of surface resources mobilized in the region.

Section 4: strengthening project for the sub-basin of the the Niger River meteorological network in Cote d'Ivoire.

The 2002 and 2011 political crisis in Cote d'Ivoire caused the destruction of all the weather measuring posts and stations. Since 2014, a synopstic station and four pluviometrical posts have been rehabilitated in the north part of the Niger River. Despites these efforts, the National part of the Niger basin lack a certain number of weather measuring posts and stations. That is why Cote d'Ivoire is developing the current project of the national part of the Niger River basin's meteorological network strenghtening.

The current strengthening project of the meteorological network aims at improving the meteorological assistance in the national part of the Niger River basin. The current project will be implemented through several activities including:

- Acquisition and installation of 20 automatic weather stations (AWS);
- Regular collection of meteorological data on the Niger basin in Cote d'Ivoire;
- Transfer of collected data by GPRS from the data collection sites of Abidjan, data quality control and keeping the archives in central data base;
- Data processing and development of of products adapted to socio-economic activities of the Niger basin in Cote d'Ivoire;
- Studies and surveys for support to the users of the Niger basin in Cote d'Ivoire.

Component 2: Development of the resilience of the populations and ecosystems

Sub-component 2.1: Development of multi-purpose infrastructures

Section 1: Hydro-agricultural Infrastructures

Large imports of rice by Cote d'Ivoire entails the non-control of purchasing costs because of external factors such as the production of exporter countries, speculation of different actors and the production chain untill exportation. On the other hand, these imports cause a massive flow of currency (235 billion F CFA /year), which favors the deterioration of food security in the country. In such context, the Government has adopted the National Strategy for Rice Development (SNDR) in order to increase national rice production. SNDR can only be achieved through the introduction of modern technology of exploitation and the extension of rice-farming perimeters. Despite the populations' motivation for the project area for rice farming, the lack of infrastructures and agricultural equipment makes work laborious for very low outputs, which favors a bad exploitation of natural resources (lands, waters, forests...), the abandonment of farming activities and the migration of the young populations towards others places.

The program concerns the construction of four hydro-agricultural dams (04) whose objective is to contribute to the intensification of irrigated rice-growing and the development of plain area in order to improve the riparian populations' living standard. The following dams are expected (i) Kouban;(ii) Baya ; (iii) Dimbasso and (iv) Katende.

Section 2: Livestock-breeding Infrastructures

Pastoral dams in the north of Cote d'Ivoire were constructed by SODEPRA, which was aiming at that time, at responding to legitimated food self-sufficiency objectives and at promoting a rural environment, the North kept off the « Ivorian miracle» of prosperous years that the southern regions of the country experienced. First, it was to supply big urban centers of Bouake and Abidjan with meat, while stopping imports, through a volunteer-based policy of settling process of transhumant cattle with the construction of more than 250 dams in the whole north of the country, and many other measures and pastoral supplementary infrastructures. In the period of 1980-1993, the financing of livestock-breeding development projects was estimated to more than 155 billion F CFA (ANCEY, 1997).

A multi-requirement analysis has allowed to keep 37 sites which correspond to the requirement of the watershed, dam capacity and the geographical distribution on the two watersheds. The 37 sites are divided as follows per sub-prefectures: (i) Tengrela : 10 sites (ii) M'bengue : 4 sites (iii) Kouto : 6 sites (iv) Kolia : 4 sites (v) kassere : 6 sites (vi) Gbon : 2 sites (vii) Boundiali : 2 sites and (viii) Odienne : 3 sites

Section 3: Navigation infrastructure

The Ministry of Animal and Fishery Resources is the project owner of these infrastructures (MIRAH). The project deals with the construction of warfs and the purchasing of engine-propelled canoes

(i) Warf construction

MIRAH proposes the construction of 04 warfs in the portion of the Niger basin to contribute to the improvement of hygiene and the conservation of fish products. These infrastructures will be constructed in the 03 departments: Boundiali, Tengrela and odienne. (i) 2 over BAGOE (Boundiali 1 - Tengrela 1) and (ii) 2 over BAOULE (Odienne) after meeting the project owner, the warf will be a center for gathering fish in order to master and control production.

(ii) Purchasing of 15 engine-propelled canoes and fishing equipment

The fishers' equipment of engine-propelled canoe and various equipment will favor the practice of a responsible fishing and will support a sustainable management of fishery resources. The eproject consists in purchasing 15 engine-propelled canoes about 5 per region. The canoes will be made of wood strengthened with epoxy resin and equipped with engine of at least 40hp. The minimum length of the boats is 10 meters and a width of 3 meters. Fresh fish storage equipment will be installed on board of each canoe. There will be a support to purchase fuel. Equipment will be proposed to APS for the modernization of the activity.

Section 4: Fishing Infrastructures

The developer of these infrastructures is the Ministry of Animal and Fishery Resources (MIRAH). These fishing infrastructures concern the creation of fish-breeding stations and the creation of fish pools.

(i) Creation of two fish-breeding (02) stations

The MIRAH program is planning the creation of hatchery in the departments of Boundiali and Odienne to supply good quality fries in order to develop fishing activities and sowing operations through dams and water reservoirs in the national portion of the Niger. It should be noted that the installation of stations will depend on several criteria in view of their positioning such as the quantity of output in the area, the availability of water resources and the geographical distribution. The production capacity of each station is 500 000 fries. Each one of the two hatcheries should, in addition to the dimensions of structures defined in the table below, be able to meet the following requirements to fully ensure their function:

(ii) Setting up of 35 fish-farming pools

MIRAH is planning to set up 35 fish pools in order to develop aquaculture and fish-breeding in order to contribute to the sustainable management of fishery resources and ensure food security in the area. The setting up of fish pools about 20 on bagoue and 15 on Baoule could be done upstream of dams having sufficient water resources in order to satisfy its fishing and fish-breeding needs.

(iii) Stocking with fish 27 dykes

An operation of restocking dykes and hydro-agricultural dams is planned by MIRAH within the framework of PIDACC. That will require a surplus of production estimated at 1 million fries. In alternance with the restocking of 35 fish pools, the 27 dykes will be stocked with fish every two months as well. The four dams of the ONDR sites will be first stocked with fish because of their scope which favors fishing activities. In addition, the other dykes will be stocked because of the importance of fishing on these sites. The fish stocking will concern dams which present sufficient water resources. The classification of dykes according to their capacity has been presented above.

Sub-component 2.2: Accompaniment measures and social security

Section 1: (i) Accompaniment measure (there is no project sheet presented) and (ii) fighting against invading wild plants (there is no project sheet presented)

Section 2: Social security (there is no project sheet presented)

Section 3: Building the capacity of adaptation of communities (there is no project sheet presented)

Component 3: Coordination and program management

a) Guinea

The program evolves around the following three components.

Component 1: Management and preservation of the ecosystems:

It includes two sub-components:

Sub-component 1.1: Resource and ecosystem preservation: it has 4 Components:

Section 1: fighting against erosion and sandbank through:

- The protection of resources and riverbanks in the sub-basins of the Niandan, Tinkisso and Milo on the 2 banks of the Niger River in 100 km.
- The restoration of riverbanks in Faranah on 500 ha.
- Water and soil conservation works in the cultivated land lots (restoration of lands, protection of riverbanks, infrastructures and development against water erosion on Milo in Kankan, Makonon and Forecariah.) on 5000 ha.
- Ravine fixing by physical works for 2 500m³

Section 2: improved fallow and agro-forestry through :

- Agro-forestry in the regions of Kankan, Faranah and the Prefecture of Beyla on 500 ha
- Forbidding grazing of RNA in the sub-basin of Tinkisso on 500 ha.
- Plantation is protected, village communal and community forests through community reforestation on 3000 ha ;

Section 3: Preservation of biodiversity on 3000 ha for the following activities:

- The preservation of ecosystems and the conservation of biological diversity on the sites of Ramsar Niger-Niandan-Milo-Niger and Mafou ;
- The implementation of the management plan in Kankan fauna reserve; Support of planned management of sites Ramsar of Tinkisso, Niger-Tinkisso and Sankarani-Fie;
- The development of spawning areas and plains liable to flood in 1000 ha

Section 4: exploitation activities:

Sub-component 1.2: reinforcement of shared natural water resources and ecosystem management: (i) Section 1: Adaptation and management tools and (ii) Section 2: Regional coordination:

Component 2: Development of the population and ecosystem resilience in the Niger River basin:

This component includes two sub-components

Sub-component 2.1: Development of multi-purpose infrastructures: This sub-component has 4 Sections :

Section 1: hydro-agricultural infrastructures: Consists in constructing works below in the prefectures of Kankan, Kouroussa, Faranah, Dinguiraye, Mandiana, Kissidougou and Kerouane.

- Rehabilitation of dams of average dimension for irrigation and fish-breeding in the valleys of Milo (Kankan) and Niger (Kouroussa and Siguiiri);
- Construction of new dams in the valleys of Milo (Kankan), Niger (Kouroussa and Faranah), Sankarani and Fie (Mandiana), Tinkisso (Dinguiraye) ;
- Construction of barley basins for a multiple uses (irrigation, drinking water for cattle, clean drinking water, fish-farming) in the valley of Milo (Kerouane) and Niandan (Kissidougou).

Section 2: Livestock-breeding infrastructures: This operation consists in constructing pastoral wells, pastoral drillings, access ramps, vaccination corridors, night parks, and material of natural hay conservation in the prefectures of: Dinguiraye, Mandina, Siguiiri and Kouroussa).

Section 3: Navigation Infrastructures: This operation consists of:

Rehabilitating warfs on the Niger River, Tinkisso, Sankarani and Milo; (in the prefectures of Mandiana, Siguiiri, Kouroussa, Faranah, Dabola and Kankan), Constructing dock facility on the Niger, Sankarani and Niandan; (in the Prefectures of Kouroussa, Siguiiri, Mandiana and Kissidougou)

Section 4: Fishing infrastructures: This operation consists of constructing facilities in the prefectures of Faranah, Siguiiri, Kissidougou, Dabola, Dinguiraye, Kankan, Kerouane, Mandiana and Beyla:

- Mini-stations of fish-breeding on the Niger, Milo and Sankarani;
- Buying fries;
- Constructing fish-ponds on the Niger, Niandan, and Tinkisso
- Rehabilitating piscicultural pools on the Niger, Tinkisso, Sankarani and Niandan;
- Constructing new piscicultural ponds on Tinkisso, Sankarani, Milo, Niandan and Mafou.

Sub-component 2.2: Accompaniment measures and social security: This sub-component aims at protecting the populations, cities, villages, infrastructures and crops against flooding and sandbank. It includes three sections:

Section 1: Accompaniment measures which comprise fighting against invading wild plants through weed cutting and valorization of aquatic plants;

Section 2: Social security:

Section 3: Capacity building of adaptation of communities: This Component comprises:

- Constructing works of crossings;

- constructing dykes of protection against flood ;
- elaborating and validating guides of good forestry, agricultural and pastoral practices ;
- organizing sensitization campaigns and vulgarization of the guide of good practices in the whole national portion of Niger basin.
- gathering, processing and broadcasting of hydrological and agro-climatic information.
- building users' capacity to better control natural resources;

Component 3: Coordination and program management

The listed activities for each component and sub-component are detailed below:

Component 1: Control and protection of the ecosystems: this component aims at developing socio-economic infrastructures and protecting natural resources and ecosystems of the Niger basin. It is subdivided into two sub-components:

Sub-component 1.1 : Protection of resources and the ecosystems

This sub-component includes 4 Sections as follows:

Section 1: Erosion and silting control through:

- The protection of water sources and riverbanks in the sub-basin of Niandan, Tinkisso and Milo on the 2 banks of Niger in 100 km.
- The restoration of riverbanks in Faranah in 500 ha.
- Soil and water conservation works in the cultivated land lots (restoration of lands, protection of riverbanks, infrastructures and developments against water erosion on Milo in Kankan, Makonon and Forecariah.) in 5000 ha.
- Ravine stabilization by physical works for 2 500m³

Section 2: Improved fallow and agro-forestry in 1000 ha through:

- Agro-forestry in the regions of Kankan, Faranah and Prefecture of Beyla in 500 ha
- The ban and RNA in the sub-basin of in 500 ha.
- Planting of protected, village communal and community forests through community reforestation in 3000 ha

Section 3: Protection of biodiversity in 3,000 ha through the following activities:

- Preservation of the ecosystems and conservation of biological diversity on the sites of Ramsar Niger-Niandan-Milo-Niger and Mafou ;
- The implementation of the management plan of the fauna reservation of Kankan;
- Support to the elaboration of concerted management of the sites of Ramsar, Tinkisso, Niger-Tinkisso and Sankarani-Fie;
- The development of spawning areas and flood plains in 1000 ha

Section 4: Extractive Activities:

Sub-component 1.2: reinforcement of the shared management of water natural resources and the ecosystems.

Section 1: Adaptation and management tools

Section 2: Regional Coordination:

Component 2: Development of the population and ecosystem resilience in the Niger River basin: This component includes two sub-components.

Sub-component 2.1: Development of multi-purpose infrastructures: it includes four sections:

Section 1: hydro-agricultural Infrastructures: This sub-component consists in rehabilitating seven (7) old dams, constructing seven (7) new dams and seven (7) stormwater basins in the valleys of Milo and the Niger

I-Rehabilitation of 7 dams for irrigation and fish-farming in the prefectures of Kankan (valley of Milo), Kouroussa and Siguiri (Niger valleys)

II-Construction of 7 new dams in the prefectures of Kankan (valley of Milo), Dinguiraye (valley of Tinkisso), Kouroussa (valley of Niger), Mandiana, (valleys of Fie 1) and Faranah (valley of Niger).

Section 2: Livestock-breeding infrastructures: Construction of livestock-breeding infrastructures in the prefectures of: Dinguiraye, Mandina, Siguiri and Kouroussa).

- Pastoral wells: —improved wells with 6—10m depth; equipped with high flow and pressure manual pumps of Fapel brand, intended for large diameter wells. They allow to pump water into tanks set far or high for its distribution in the water-trough for animals.
- Pastoral drilling: —made by drilling machines; and equipped with a Flapel pump and appended by cannals to transport water into disseminated watering places in the pasture.

An access ramp of 20 m x 5 m (stripping, metalling, concreting, barbed wired fence)

As above-mentioned, the objective of the livestock-breeding Department is to ensure a rational feeding of cattle and the stabilization of livestock-breeders with the respect of grazing capacities. Knowing that water and fodders are indispensable for the management issue of pastoral spaces, their development becomes fundamental, for not only it will enable livestock-breeders to settle down, but also to reduce or definitely solve conflicts between farmers and cattle-breeders and the destruction of environment (bush fires, overgrazing...).

The following actions are proposed as indispensable support measures to hydraulic pastoral:

Vaccination Corridors. It is indispensable for the manipulation, the sanitary and zootechnic monitoring of cattle by Agents and livestock-breeders (vaccination, treatment of wounds, killing internal and external animal parasites). The dimensions of the corridors are variable given the livestock size and the livestock-breeder's objectives, and they can be constructed in several ways of which 02 are common in Guinea: (i) Only with fireproof, termite resistant wooden sticks and (ii) with carpentry planks, rafter stakes supported by a U-shape iron above soil. To make easier the manipulation of animals around the corridor, it must be located in a

double-compartment park to avoid confusion between those that passed through the corridor and those that did not. It is the type of corridor which will be used in the livestock-breeding basin areas.

Night Parks

The night park is an enclosure intended to gather livestock after grazing. It allows to prevent animals from nocturnal rambling; it also concurs to ensure a better control of livestock by mitigating losses and theft of animals. During construction, the night park must have a dry soil, well drained or be in slope position to facilitate streaming and prevent mud formation in the park. The area of the park is calculated on the basis of 2.5 to 5.0 m² per adult cattle. In addition, the night park favors important metric ton production of manure which will serve to increase food-producing and market gardening outputs.

Natural or bush hay production kit and valorization of harvesting wastes

The plan evolves around fodder production through valorization of bush hay and harvesting wastes. The plan mainly includes: Drying sheds; Store houses; Baling press equipment, hay-cutter binders, straw-hatchet, and conveyor machine) and to achieve this action, an experienced operator will be identified. NB: There are 17 pastoral wells, 1 access ramp, 1 pastoral drilling, 25 vaccination corridors, 25 night parks and 4 production kits.

Section 3: Navigation infrastructures:

- Rehabilitation of six (6) warfs (3 warfs on the Niger River, 1 on Tinkisso, 1 on Sankarani and 1 on Milo; (in the Prefectures of Kankan Mandiana, Siguiiri, Kouroussa, Faranah, and Dabola)
- Construction of four (4) dock facilities (2 on the Niger River, 1 on Sankarani and 1 on Niandan) (in the Prefectures of Kouroussa, Siguiiri, Mandiana and Dabola)

Section 4: Fishing infrastructures: (in the Prefectures of Kissidougou, Faranah, Dabola, Dinguiraye, Kankan, Siguiiri, Kerouane, Mandiana, Kouroussa and Beyla).

- Fish-breeding station:
- Construction of (3) fish-breeding mini-stations (mini-incubators) with a fish-breeding capacity of 600 000 fries: (1 on the Niger River, 1 on Milo and 1 on Sankarani).
- Construction of fish-ponds for fries: (1 on the Niger River, 1 on Niandan and 1 on Tinkisso).
- Construction of piscicultural pools:
- Rehabilitation of 28 piscicultural pools. (13 on the Niger River, 6 on Tinkisso, 5 on Sankarani and 4 on Niandan)
- Construction of 122 pools. (35 on the Niger River, 25 on Tinkisso, 25 on Sankarani, 17 on Milo, 12 on Niandan and 8 on Mafou).

Sub-component 2.2: Accompanying measures and social security: This sub-component aims at protecting the populations, cities, villages, infrastructures and crops against flooding and silting, it includes three Sections:

Section1: Accompaniment measures and social security: This comprises (i) Accompanying measures and (ii) fighting against invasive weeds at a section estimated at 100 km long through weed cutting and valorization of aquatic plants

Section 2 : Social security;

Section 3: Adaptation capacity building of communities:

This section consists of:

- Constructing crossing works of temporary rivers which prevents inter-village exchanges in flood period.
- Constructing 21.3 km of protection dykes for cities, villages, infrastructures and crops against flood.
- Developing and validating forest, agricultural, and pastoral guide of good practices to protect and enrich soil, increase forest and pastoral ground covers as well as agricultural outputs.
- Organizing sensitization campaigns and popularizing guide of good practices in the whole national portion of the Niger basin.
- Collecting, processing and broadcasting agro-weather and hydrological information.
- Building users' capacity to better control natural resources especially by constructing and broadcasting/popularizing improved fire stoves.

Component 3 : Coordination and management of the Program

a) Mali

Listed and validated activities and their localization proceed from conducted ground missions, results of the African Development Bank and the Niger Basin Authority preparation mission in 2014 (**aide-memoire**) and those of communities, local authorities, civil society and central and decentralized services' consultations, reports of road maps to fight against sandbank ; etc.

Component 1 : Integrated development of water resources in the Niger basin

This component includes the rehabilitation and/or the construction of hydro-agricultural, livestock-breeding, fishing and navigation infrastructures. It is subdivided into three sub-components: (i) Development of multi-purpose infrastructures, (ii) Accompanying measures, and (iii) Reinforcement of shared water resources management.

Sub-component 1.1: Development of multi-purpose infrastructures.

This component aims at developing socio-economic infrastructures and protecting resources and ecosystems in the Niger basin. For Mali component, it includes the rehabilitation and construction of hydro-agricultural, livestock-breeding, fishing, and navigation infrastructures.

It is divided into two sub-components: 1) Development of agricultural infrastructures; and 2) Accompaniment measures.

Sub- component 1.2 : Hydro-agricultural infrastructures:

Section 1: Hydro-agricultural infrastructures. They consist in rehabilitating/constructing 43 small works of shallows regulation and protection (irrigation through controlled submersion) and village irrigated perimeters (VIP, irrigation under full control) in the regions of Koulikoro, Sikasso, Segou, Mopti, Timbuktu and Gao, making 9.871 ha. .

Section 2 : Livestock-breeding infrastructures. They aim at rehabilitating:

- Three (3) drillings equipped with three pastoral spaces (N5, Thonan and Djebougou) in the region of Segou. The construction works will include:
 - The setting up of a solar pump of 3 m³/h run, 50 m³ water tower and two 12 m watering points on N5,
 - The drilling of a well of 5 m³/hour, the installation of 3 m³/h flow solar pump, a 50 m³ water tower and two 12 m watering points on Thonan and
 - The drilling of a well of at least 5 m³/hour, the installation of a 3 m³/h flow solar pump, a 50 m³ water tower and two 12 m watering points on Djebougou.
- The restoration and regeneration of four (4) pastoral perimeters of 88 000 ha in the communes of Niono, Macina, (Region of Segou), Douentza and Tenenkou (Region of Mopti). It is about: (i) the setting of the contract conditions for the utilization of the perimeters; (ii) delimitation of the perimeters with landmarks and; (iii) the regeneration of pastoral perimeters.

The development of 20 Bourgou fields of 2600 ha with firebreaks of safety of ground cover in the regions of Segou, Mopti and Timbuktu and 1000 km of livestock paths and buoyed access in the regions of Koulikoro, Sikasso, Segou, Mopti, Gao and Timbuktu. The construction works will include:

The overdigging of 300 km inflowing water canal in the bourgou fields,
The construction of 100 water regulation works in the entrance of the bourgou fields,
The regeneration of 2600 ha of bourgou fields with *Echinochloa stagnina* and affiliated species: *Vosicia cuspidata*, *Vetiveria nigriflora*, *Andropogon gayanus*;
The setting of concrete landmarks to materialize 1000 km of transhumance paths.

Component 3: Navigation infrastructures which consist in constructing 3 warfs in the prefecture of Ansongo, Bamba and Bourem.

Component 4: *Fishing infrastructures which consist in:*

- Setting up a fish-breeding center with a capacity of 6 -10 million fries in Segou;
- Fish restocking of 20 existing ponds in the regions of Segou, Mopti, Timbuktu and Gao;
- Making 50 floating cages in the regions of Koulikoro, Mopti, Timbuktu and Gao and

- Constructing 2 warfs with related infrastructures (sorting sheds, workshops for canoe repair, offices, store houses, drying places and smoking sheds), in Koriome and Rharous in the region of Timbuktu.

Sub-component 1.2: Accompaniment measures.

This sub-component comprises, organizing the actors in management committees, strengthening their activities and equipment as well as taking stock of existing infrastructure: It includes: (i) Organization of multi-purpose infrastructure management committees, (ii) Organization of structuring actors in fishing sub-sector, and (iii) fighting against invading wild plants. To carry out these activities, management committees of existing hydraulic, livestock-breeding, and fishing infrastructures will be established in order to ensure a rational management of the infrastructures. The users of the infrastructures (stock-breeders, irrigators, fishers) will be members of these associations and will financially participate in the management thanks to the institution of a community payment system of performed services by hydraulic works.

This sub-component includes the activities below:

- Organization of multi-purpose infrastructure management committees
- Organization and structuring the actors of fishing sub-sector: the program will create 40 fisher organizations and fish product processing groups and build actors' capacity (400 persons).
- Fighting against invading wild plants. It concerns manual fighting against invading wild plants in 1500 ha in Niger office area (Macina, Niono), around the dam of Markala and in the lake area in the region of Timbuktu (Lakes: Horo ; Faguibine and Fati)

Sub-component 1.3: strengthening shared management of water resources:

This sub-component includes:

- The development of adaptation tools and resources management (the elaboration of a national adaptation strategy, the elaboration of an early warning system of flood and low waters through the reinforcement of existing hydrometric station networks on the 5 Niger River sub-basins in Mali, the development and broadcasting of hydro-weather information to final users and the elaboration of a water shared management tool) ;
- Adaptation and intervention capacity building (NBA executives' capacity building, Technical Partners services capacity building of water user associations.
- Strengthening of regional integration (Coordination, monitoring of implementation of preparatory surveys following the Pollution control plan and strengthening regional integration).

Component 2: Development of the population and ecosystem resilience in the Niger basin.

This component aims at increasing the population and ecosystem resilience through erosion control and the regeneration of ground cover vegetation. It is divided into 3 sub-components:

Sub-component 2.1: Protection of natural resources and ecosystems:

This sub-component aims at protecting water, soil, and ecosystem resources at the level of watersheds for works to be realized. It will be implemented through three Sections described as follows:

Section1: Fighting against erosion and silting

1.1. Sandhill fixing (8000 ha)

The sandhill fixing works consist in (i) mechanical fixing associated to plantations with watering of plants near sandhills along the river (3 000 ha); and (ii) the mechanical fixing associated to direct sowing of ligneous and herbaceous plant species near sandhill located far from the river and which supply the former (5 000 ha with seeding). Mechanical fixing works include: cutting, collecting, transporting materials and constructing fences. Further to mechanical works and thanks to the rainy season, biological fixing is done by planting and/or sowing local species inside mechanical works.

All fixing and watering works will be carried out by the populations organized in village committees of site management: *Leptadenia pyrotechnica* bough cutting and/or *Euphorbia balsamifera* cuttings, construction of fences, plant growing in village tree nurseries, plantation or direct sowing, watering, caretaking. For the purposes of sustainability and better taking into account the environmental concerns, a social, environmental and management plan (ESMF) will be prepared. A mitigation program will be worked out in order to reduce the potential negative impacts identified within the framework of the environmental assessment.

The building of the populations' technical and organizational capacities will be carried out through the populations' training in simple techniques for fighting against sandbank and the organization of visits between villagers.

The implementation of sandhill fixing activities will help to significantly mitigate silting in the River bed at the level of adjacent hydro-agricultural developments, which results in increased agricultural and fodder productions as well as timber production from existing shoreline protection plantations. Moreover, the pricking out of bourgou along the River will enable not only the protection of riverbanks against erosion, but also will contribute to the extension of spawning areas for fish.

1.2. The Protection of banks with plantation: 200 km

Planting trees along the river with three objectives: Fighting against water erosion on the river banks and its tributaries; protecting neighboring hydro-agricultural developments through their windbreak effects and short and long term timber production. All the works which will be carried out by the populations (collective or private) are: Plant production in village tree nurseries, picketing, hole digging, planting and caretaking (watering, weeding, cutting, caretaking). Incomes generated through timber production (five years after planting) from the first rotation can be estimated at 4 480 000 FCFA with 1120 poles ready for harvesting/km.

1.3. Bank protection with pricking of bourgou :1 000 ha

The pricking of bourgou (*Echinoclea stagnina*) between the riverbank and the river bed, is carried out with cuttings, helps to fight against vertical erosion of riverbanks by stopping the movement of waves on them. In addition, bourgou is a source of income and is used to feed livestock (Sales of dry bundles in dry season) in the program intervention areas. The average output of a hectare of bourgou is estimated by PLCE/BN at 13. 64 tons of dry matter per ha. The expected total production will be 13 640 tons and is worth 2 728 000 000 FCFA (1 bundle= 2.5 kg sold on average 500 FCFA/each)

1.4. The treatment of glacis, banning the grazing areas, and soil restoration/ surface water conservation (DRS/CES) : 4.000 ha :

The treatment of glacis comes within the framework of damaged land recovery for production purpose. The works consist in making simple developments (half-moon, *zaï*, stony strings to improve water catching and infiltration which enable the growing of natural, artificial vegetation or food crop cultivations. These actions, by improving soil fertility, will increase agricultural production more than 30%. The beneficiaries will provide the manpower for the plantation, the development of half-moons, *zaï*, stony strings, the work on the soil, etc.

1.5. The development of 100 simplified management plans on the sandhill fixing sites

The development of 100 simplified management plans will be one of the responses to the problematic of perpetuating stabilized sandhill spaces. It aims at:

- Favoring investment on stabilized sandhill spaces, in order to ensure a good regeneration of ground cover vegetation (ligneous and herbaceous),
- Making communities and local authorities responsible for the sustainable management of stabilized sandhill spaces, in order to contribute to the local development and the protection of the environment.
- Dissemination of site experiences through the implementation of actions and concerted provisions so that they can continue to play their role of protecting the Niger River.

Thus, one must agree, in a participative approach, with all the actors (populations, Mayors Rural Communes, Sub-Prefects, Prefects, Local technical services and program of actions to undertake on stabilized sites and define the roles and responsibilities of each party for the sustainable management of developments.

Component 2: Sustainable forest and damp area management:

Various interventions are planned in the marshlands for their sustainable conservation, restoration and exploitation. It concerns:

- The working out and the implementation of 10 development and management plans of forest formations.
- Restoration of 1 000 ha of habitats in marshlands by forbidding grazing, (Village forest and protected forest rehabilitation in marshlands).
- Planning, rehabilitation and implementation of 10 agro-sylvo-pastoral development plans
- Planning and implementation of 10 local conventions of natural resource management;

- Reafforestation of 500 ha degraded spaces with fodder species in marshlands in the Interior Delta of the River Niger ;
- Planting 1.000 ha of timber production for needs in carpentry, work and firewood;
- Support to the planting of 100 ha of orchards farms;
- Forbidding grazing through the enrichment and assisted regeneration of 20,000 ha of protected, and community forests.

All the manual works will be carried out, in accordance with the conventions, by the populations (planting, sowing/seedling, plant production, surveillance, etc.). The support to the creation of market gardening and orchards will be intended more specifically to group of women. The goal of development plans and conventions is to set a sustainable resources management. Planting/reafforestation, restorations and forbidden grazing areas will enable to improve silvicultural, pastoral productions and biodiversity. A sustainable and concerted management of natural resources is expected: forests and pastoral spaces.

Component 3: Fighting against water pollution:

- Strengthening the existing team of pollution control
- Creating and equipping 3 basins of water decantation from dying in the District of Bamako.

Nowadays, in the district of Bamako, dying proliferate in all the districts and the management of sewer from this activity constitutes an issue for the authorities. Thus, PIDACC is planning to set up and equip 3 decantation basins of sewer from dye-works and support the team responsible for controlling pollution.

Sub-component 2.2. Social security: This sub-component aims at protecting population's cities, villages, infrastructures and crops against flooding. It has two Sections:

Section: 1: Adaptation of Community Infrastructures: This section comprises constructing rain water drainage works and Temporary River crossing which stop inter-villages exchanges during flood. It seeks to construct a crossing work near the middle school of Haïbongo with geographical coordinates (Lat: 16.225°N, Long. -3.245 Est. and a connection dyke.

Section 2: Protection against flooding: This section is about the construction of protecting dyke against flooding in the city of Koulikoro.

Sub-component 2.3. Building community Adaptation capacities:

To implement this component, protocols will be established between PIDACC/BN and partners/institutions specialized in the related fields (agro-weather, communication, popularization, research, training, etc.).

Section 3: Elaboration of good practice guides: It consists in working out and validating a guide for forest, agricultural, and pastoral good practices to protect and enrich soil, to increase

forest and pastoral ground covers as well as agricultural outputs and water and soil conservation techniques.

Section 4: Popularization of good practices of adaptation through vulgarization and sensitization campaigns: It concerns popularization and sensitization campaigns of good practice guides in all the national portion of the Niger River basin.

Section 5: Broadcast of agro-weather information through the collection and processing of information as well as the issuing of agro-weather bulletins: It consists in gathering, processing, and broadcasting hydrological and agro-weather information.

Section 6: Support of users: It comprises building users’ capacities for behavior change and a better approach in the natural resources management and introduction and the spread of improved and resilient technologies in order to better manage natural resources. Civil society will play a greater role in the implementation through their different services.

Component 3: Coordination and program management

c) Niger

In Niger, the following are the activities planned:

Component 1 : Development of resource and ecosystem resilience

Sub-component 1.1 : Development of multipurpose infrastructures

Section	Measures
1	<ul style="list-style-type: none"> • 49 spreading thresholds are constructed on the river tributaries in the region of Tillabery ; • 42 spreading thresholds are constructed on the koris of Maggia in the departments of Bouza and Madaoua ; • 1000 ha are developed around the River Gourouol for low water crops ; • The dam of Aboka is rehabilitated ; • The spreading threshold of Tchankargui (Falmey) is rehabilitated; • The pond of Gobro (Dosso/Tibiri) is dug; • 7 Spikes and bank protection of koris in Azarori are constructed; • The 3 dams’ gates of Galmi are cleaned.
2	<ul style="list-style-type: none"> • The dam of Kaboufo (region of Tillabery) is constructed.
3	<ul style="list-style-type: none"> • 300 Km of navigation Component (between Labzanga and Dole/Gaya) are constructed. • Section 4 : 30 warfs (in the regions of Dosso, Maradi, Niamey, Tahoua and Tillabery) are constructed; • Fish farm at Gotheye is constructed ; • Fish farm at Sona is rehabilitated; • The fish-breeding center of Madarounfa (Maradi) is constructed; • The fish-breeding center of Moli (Tillabery) is constructed.

Sub-component 1.2: Accompaniment measures

Section	Measures
<u>1</u>	20 organizations of COGES committees of infrastructure works (regions of Dosso, Tahoua and Tillabery) are trained and supported.
<u>2</u>	12 organizations of fishing actors (regions of Dosso, Tahoua and Tillabery) are trained and supported.
3	100 Km of invading wild plants (in the regions of Dosso, Tahoua and Tillabery) are destroyed. Sub-component 1.3 : Strengthening of shared water resources management (Niger)
4 :	A tool for sustainable and shared management of trans-border water resources (between Niger and Nigeria) is worked out.
5	Building the capacities of NBA executives and technical service partners is carried out and effective.
6 :	Capacity building for the associations (different actors, COGES) is carried out and effective

Section 2: Development of the population and ecosystem resilience in Niger

Sub-component 2.1: Protection of resources and ecosystems

Section	Measures
1	<ul style="list-style-type: none">• 3000 ha of sandhills (regions of Dosso and Tillabery) are fixed;• 15 000 ha of CES/DRS works (regions of Dosso, Tahoua and Tillabery) are achieved and carried out;• 1000 ha of improved fallows and agroforestry (regions of Dosso and Tillabery) are achieved.

Sub-component 2.2: Social security

Section	Measures
1	<ul style="list-style-type: none">• The opening up of villages (construction of works of crossing koris) in the regions of Dosso, Tahoua and Tillabery is constructed and effective;
2	<ul style="list-style-type: none">• 8.6 Km of dyke of protection against flooding in the commune 5 (city of Niamey) are upgraded and rehabilitated;• 2.0 Km of dyke of protection against flooding of the irrigated perimeters (city of Niamey) is constructed;• 6.0 Km of main sewer to protect irrigated perimeters (city of Niamey) against flooding are constructed.

Sub-component 2.3: Capacity building for community adaptation

Section	Measures
1	<ul style="list-style-type: none">• Guides of good practices are elaborated.
2	<ul style="list-style-type: none">• Guides of good practices are popularized.
3	<ul style="list-style-type: none">• The agro-climate information is broadcast.
4	<ul style="list-style-type: none">• The actors (COGES, users) are assisted

d) Nigeria

The following table presents the expected activities in Nigeria:

Component 2: Development of resilience of the population (Nigeria)

Component/ Subcomponent	Parts	Activities	Sites (State, Local Government, Sub-basin)	Qty
Component 2 : : Development of resilience of the population				
Sub component 2.1 : Multipurpose infrastructures development				
S/C 2.1	Part 1	Construction of multipurpose dams	UNBA (Kurudu dam, Abaji, Abuja); UBBA (Gombe /Bauchi) UBBA (Taraba/Donga)	4
		Construction of irrigation scheme	NBA (Tungo Kawo dam,Wushishi,LGA,NS) UNBA (Agaie/Lapai dam Lapai LGA, NS)	800 ha
		Rehabilitation of multipurpose dams	UBBA (Gombe/Bauchi, Taraba)	4
		Rehabilitation of irrigation scheme	UBBA (Gombe/Bauchi, Taraba)	1300 ha
		Construction of ponds for livestock watering	UBBA (Taraba) UBBA (Gombo/Gauchi)	4
		Rehabilitation of ponds for livestock watering	UBBA (Taraba) UBBA (Gombo/Gauchi)	11
		Construction of fingerlings station	UNBA (Tungun Kawo, Kurudu and Agaie/lapai reservoirs)	3
		Construction of dock facilities	UNBA (Tungun Kawo, Kurudu and Agaie/lapai reservoirs)	3
		River navigation improvement	UNBA (Wushishi LGA, Abaji Area Council and Lapai LGA)	30 km
Sub component 2.2 : Supporting measures and Social protection				
Part 1: Support measures				
S/C 2.2	Part 1	Formation/support for watershed natural resources management association, for fishermen associations ; Wetlands reclamation through control of invading plant species (200 km) Sub-watershed management plans	In Infrastructure intervention areas UNBA (Wushishi, Abaji and Lapai) UBBA (Taraba, Gombo/Bauchi) AIBA	
Part 2 : Community infrastructures development for adaptation to CC				
S/C 2.2	Part 2	Management of communal infrastructures Support of disabled groups Flood protection (20km)	UNBA (Wushishi, Abaji and Lapai) UBBA (Taraba, Gombo/Bauchi) AIBA	

Component/ Subcomponent	Parts	Activities	Sites (State, Local Government, Sub-basin)	Qty
Part 3 : Strengthening of the community capacity for adaptation to CC				
S/C 2.2	PART3	Establishment, research and extension of best practices in adaptation to farmers; Tools for diffusion of agro-meteorologic data Monitoring of farmers in climate information		

Component 3: Coordination and management of program (Nigeria)

NB: UBBA= Upper Benue Development Basin Authorities

UNBA = Upper Niger Development Basin Authorities

e) Chad

The following table presents the activities to be surveyed in Chad by components, sub-components and Sections;

Component 1: Development of resource and ecosystem resilience

Section 1

N°1	Conservation works of waters and soil in cultivated land lots (DRS)	Area, Ha
1	Pont-Carol	417
2	Tagal	417
3	Tikem/ Youe/ Kera	417
4	Holom Game	417
5	Pala Rural	417
6	Torrok	417
7	Gagal	417
8	Lame, Bissikeda	417
9	Lere	417
10	Trene	417
11	Lagon	417
12	Binder	417

N°2	Mechanical and biological Treatments of ravines	Volume, m3
1	Djodo-Gassa/Pont Carol	1 250
2	Tikem/Youe/Kera	1 250
3	Torrok	1 250
4	Gagal	1 250
5	Lame/Bissikeda	1 250
6	Lere/Trene (fighting against embankment of Lakes)	2 500
7	Binder	1 250

Section 2

N°3	Agro-forestry and improved fallow	Area, Ha
1	Domo	100
2	Djaraou	100
3	Leo	100
4	Pont-Carol	100
5	Fianga Rural	100
6	Tikem	100
7	Kera	100
8	Holom Game	100
9	Pala Rural	100
10	Torrok	100
11	Gagal	100
12	Lame	100
13	Lere	100
14	Lagon	100
15	Binder	100

N°4	Development of forests	Number
1	Yamba-Berte Kabbia Forest	1
2	Yamba-Berte Gagal Forest	1

Section 3

N°5	Protection of biodiversity of the fauna reservation of Binder/Lere	Quantity
	Development of two (2) ponds for wild animal watering (m3)	30 000
	Logistic-Support (Ha)	3 000

N°6	Restoration of productivities in aquatic environments	Area, Ha
1	Lake Kabbia	214
2	Lake Boro	214
3	Lake Mouta	214
4	Lake Tikem	214
5	Lake Youe	214
6	Lake Lere	214
7	Lak trene	214

Section 4

N°7	Platform of hydro-climate information diffusion, of early warning system of flood and low waters,	Number
1	Gaya	1
2	Pont Carol	1
3	Fianga	1
4	Tikem	1
5	Patalao	1
6	Mbourao	1

N°7	Platform of hydro-climate information diffusion, of early warning system of flood and low waters,	Number
7	Balani (Torok)	1
8	Lere	1
9	Foulmbare	1
10	Zalbi	1

N°8	Capacity building of the users' association executives
	Construction of offices, equipment, logistic and capacity building of the BN Users' National Coordination

Development of the populations' resilience

Section 1

N°9	Construction of micro dams and development of small irrigated perimeter downstream of the dam	Gross area downstream dam, Ha
1	Micro-dam of N'DJEKETE in N'Djekete/Djodo-Gassa	56
2	Micro-dam of Pala-Gonkaria in the shallow of Mitkim	56
3	Micro-dam of BABALAO in the shallows of Nanaye in Gagat	56
4	Micro-dam of Bipare in Mayo Nefou in Lere	56
5	Micro-dam of Lagon in the watershed El Oya	56
6	Micro-dam of Binder in Mayo Fifago	56

N°10	Rehabilitation of dergs with total control of water	Gross Area to be rehabilitated, Ha
1	Rehabilitation of irrigated perimeter of GAYA-DJIKNA	33
2	Rehabilitation of irrigated perimeter of Borobaye to lake Boro	56
3	Rehabilitation of irrigated perimeter of Boro 1 of Lake Boro	56
4	Rehabilitation of irrigated perimeter of DOMO-KORI	56

N°11	Development of shallows with total control of water	Gross Area to be developed, Ha
1	Development of irrigated perimeter of VOLI in Gounou-Gaya	56
2	Development of irrigated perimeter of Djaraou	56
3	Development of irrigated perimeter of Leo	
4	Development of irrigated perimeter of Fianga in Tapla BARSOYE	56

N°12	Development of 3 ponds for irrigation during off-season	Gross Area to be developed around the pond, Ha	Volume of pond, m3
	Pond of ZAVOU in the shallow of Vounbimbou (100 x 50 x 3 m)	11	15 000
	Pond of Bissikeda in Zemetchine (100 x 50 x 3 m)	11	15 000
	Pond of Trene (100 x 50 x 3 m)	11	15 000

Section 2

N°14	Pastoral development (construction of veterinary pharmacy, parks of vaccination, Store house, argicultural by-products, dam, corridor of transhumance, creation of cattle market coupled to weekly market, training of stock farming agents with kit of products and medicine)	Quantity
1	Gounou-Gaya, Kodegue and surrounding villages	1
2	Pont-Carol and surrounding villages	1
3	Berem-Lassia	1
4	Djodo-Gassa, Djamane-Barissou, N'Gete,	1
5	Fianga and surrounding villages	1
6	Tikem, Bissao 1	1
7	Kera	1
8	Pala, Gonkaria, Vaïlheingue, Sorga, Djiket	1
9	Torrok, Fama, Badjouki	1
10	Gagal and surrounding villages	1
11	Goumadji and surrounding villages	1
12	Vonbipou, Zavou (Lame)	1
13	Lere surrounding villages	1
14	Patcouli (Guegou Bipare)	1
15	Bafou (Mayo-Binder)	1
16	Binder	1
	Total	

Section 3

N°15	Construction/rehabilitation of wharfs	Quantity
	Construction of wharf of Fianga lake Barsoye	
	Construction of fish shed	
	Rehabilitation of wharf of Lere in Fouli	

N°16	Construction of fish-breeding station	Quantity
	Fish-breeding Station in Pala Soudjembaye	

Sub-component 2.2: Accompaniment measures and social security

Section 1: Accompaniment measures

N°17	Support to infrastructure management committees
1	Management committee of Yamba-Berte's forest
2	Management committee of the fauna reserve of Binder/Lere
3	Platform hydro-climate, EWS of flood and low water information diffusion of Gounou-Gaya
4	Platform hydro-climate, EWS of flood and low water information diffusion of Pont-Carol
5	Platform of hydro-climate, EWS of flood and low water information diffusion of Fianga
6	Platform of hydro-climate, EWS of flood and low water information diffusion of Tikem
7	Platform of hydro-climate, EWS of flood and low water information diffusion of Mbourao
8	Platform of hydro-climate, EWS of flood and low water information diffusion of Balani
9	Platform of hydro-climate, EWS of flood and low water information diffusion of Patalao
10	Platform of hydro-climate, EWS of flood and low water information diffusion of Foulmbare
11	Platform of hydro-climate, EWS of flood and low water information diffusion of Zalbi

N°17	Support to infrastructure management committees
12	Management committee of the dam of YALOUM ih N'Djekete/Djodo-Gassa
13	Management committee of the dam of Pala-Gonkaria in the shallow of Mitkim
14	The dam of TORROK in mayo Nagourou
15	Micro-dam of BABALAO in the derg of Nanaye in Galal
16	Management committee of the dam of Bipare in Mayo Nefou in Lere
17	Management committee of the dam of Lagon in the watershed of El Oya
18	Management committee of the dam of Binder in the mayo Fifago
19	Management committee of the irrigated perimeter of GAYA-DJIKNA
20	Management committee of the irrigated perimeter of Borobaye in Lake Boro
21	Management committee of the irrigated perimeter of Boro 1 du lac Boro
22	Management committee of the irrigated perimeter of DOMO-KORI
23	Management committee of the irrigated perimeter of VOLI in Gounou-Gaya
24	Management committee of the irrigated perimeter of Djaraou
25	Management committee of the irrigated perimeter of dam of Leo
26	Management committee of the irrigated perimeter of Fianga Tapla in BARSOYE
27	Management committee of low water farming perimeters of Tikem MBIPORO
28	Management committee of market gardening perimeters of Gounou-Gaya
29	Management committee of market gardening perimeters of Pala
30	Management committee of the pond of ZAVOU
31	Management committee of the pond of Bissikeda
32	Management committee of the pond of Trene
33	Management committee of pastoral infrastructures of Gaya
34	Management committee of pastoral infrastructures of Pont Carol
35	Management committee of pastoral infrastructures of Berem-Lassia
36	Management committee of pastoral infrastructures of Bolhong
37	Management committee of pastoral infrastructures of Fianga
38	Management committee of the dam of
39	Management committee of pastoral infrastructures of Pala Rural
40	Management committee of pastoral infrastructures of Torrok
41	Management committee of pastoral infrastructures of Goumadji
42	Management committee of pastoral infrastructures of Vonbipou (Lame)
43	Management committee of pastoral infrastructures of Lere
44	Management committee of pastoral infrastructures of Patcouli
45	Management committee of pastoral infrastructures of Bafou
46	Management committee of pastoral infrastructures of Binder
47	Management committee of the wharf of Fianga lake Barsoye
48	Management committee of fish shed
49	Management committee of the wharf of Lere Fouli
50	Management committee of fish-breeding station of Pala Soudjembaye
51	Management committee of the market of Pont-Carol
52	Management committee of the market of Tikem
53	Management committee of the market of Sorga
54	Management committee of the market of Binder
55	Management committee of DRS, Ravine and agro-forestry treatments of Domo
56	Management committee of DRS, Ravine and agro-forestry treatments of Djaraou

N°17	Support to infrastructure management committees
57	Management committee of DRS, Ravine and agro-forestry Treatments of Leo
58	Management committee of DRS, Ravine and agro-forestry Treatments of Pont-Carol/Djodo-Gassa
59	Management committee of the dam of DRS, Ravine and agro-forestry of Treatments of Fianga Rural
60	Management committee of DRS, Ravine and agro-forestry of Treatments Tikem/Youe/ Kera
61	Management committee of DRS, Ravine and agro-forestry Treatments of des Holom Game
62	Management committee of DRS, Ravine and agro-forestry treatments of Pala Rural
63	Management committee of DRS, Ravine and agro-forestry treatments of Torrok
64	Management committee of DRS, Ravine and agro-forestry treatments of Gagat
65	Management committee of DRS, Ravine and agro-forestry treatments of Lame/Bissikeda
66	Management committee of DRS, Ravine and agro-forestry treatments of Lere
67	Management committee of DRS, Ravine and agro-forestry treatments of Lagon
68	Management committee of DRS, Ravine and agro-forestry treatments of Binder

Support to fishing Management Committees

	Support to fishing Management Committees	Quantity
1	Organization of the Local Authority of Orientation and Decision-making Covering the two Lakes (LAOD) (Boro et Kabbia)	1
2	Organization of the fishing Management Committee of Lake Boro	1
3	Organization of the fishing Management Committee of Lake Kabbia	1
4	Organization of the Local Authority of Orientation and Decision-making (LAOD) Covering the two Lakes (Mouta et Tikem)	1
5	Organization of the fishing Management Committee in Lake Mouta	1
6	Organization of the Fishing Management Committee in Lake Youe/N'Gara	1
7	Organization of the Local Authority of Orientation and Decision-making de l'Instance Locale d'Orientation (LAOD) Covering the two Lakes (Lere and Traine)	1
8	Organization of the fishing Management Committee of Lake Trene	1
9	Organization of the fishing Management Committee of Lake Lere	1

N°19	Fighting against invading wild plants	Quantity, Km
1	Department of Kabbia	15
2	Department of Mont Illi	15
3	Department of Mayo-Dallah	15
4	Department of Lake Lere	15
5	Department of Mayo-Binder	15

Setion 2: Social security

N°20	Development of market gardening micro-perimeters	Area
1	Gounou-Gaya	3
2	Pala	3

N°21	Construction de marche	Number
1	Pont-Carol	1
2	Tikem	1
3	Sorga	1
4	Binder	1

N°22	Development of Rural path	Number
1	Path Tikem-Dablaka-Mbougui-Djodo-Gassa	40

Section 3: Community Capacity building adaptation

N°23	Elaboration of guide and popularization of good practices; Setting-up of a mechanism of agro-climate information diffusion ; Agro-meteorological assistance of producers (research action) ; Agents and associations Trained in REDD+	Number
	Institution of agronomic research	

VII. ENVIRONMENTAL AND SOCIAL ISSUES DETERMINATION

7.1. THE AREA PROGRAM OF ENVIRONMENTAL ISSUES

The current Component deals with different environmental issues of the areas program PIDACC/BN. The identification of the issues is based on data analysis and available documents in the program area. The thematic issues are identified at the level of the different components.

Issue 1: Knowledge acquisition about water resource and its management.

- Improvement of the aquatic environments and their sensitivity;
- Data control on the available resources and their sampling;
- Making dynamic the institutional and organizational structuring of data control; (Observatory)
- Improvement of notification, consultation or authorization procedures of water taking;
- Development of analysis tools, information diffusion and helping decision-making (in case of crisis).

Issue 2: Fighting against pollution, cleaning up and waste control.

- Treatment of mineral waters;
- Ensure a minimum flow of dilution, Management of fertilizer and pesticide input;
- Development of polluter/ payer principle

Issue 3: Preservation of marshlands and protection of biodiversity

- Identification of sensitive sites ;
- Control of impoundment and draining area;
- Adapted Management of activities in the protected marshlands;
- Fighting against invading plant species.

Issue 4 Development of watersheds.

- Fighting against silting and control of water plan siltation;
- Fighting against deforestation (wood-energy, fires) and reforestations;
- Riverbank protection ;
- Agricultural practices of water and soil conservation.

7.2. SOCIO-ECONOMIC ISSUES IN THE PROJECT AREA

Issue 1: Enhancing the existing perimeters

- Existing perimeters in order to improve the efficiency of water use (irrigation)

Issue 2: Define the combination(s) of major developments & management guidelines

- Guarantee the priority uses of AEP, livestock needs and health flows ;
- Enable equitable and sustainable development of irrigation;
- Minimize the negative impacts of infrastructures on the environment.

Issue 3: Identification of measures to accompany infrastructure development.

- Maximize profits (supports fishing in water reserves)
- Reduce the impacts of infrastructure (prevention of water-borne diseases).

Issue 4: Identification of compensatory measures

- Areas with negative impacts from development;
- Capacity building and stakeholder involvement.

Issue 5: Development of integrated cooperation mechanisms.

- Definition of a legal and regulatory framework for cooperation;
- Establishment of functional bodies to operationalize Integrated Water Resources Management;
- Implementation of simplified procedures for consulting Member States;
- Implementation of simplified procedures for the prevention and management of conflicts.

Issue 6: Creation of a framework for dialogue and stakeholder participation

- Creation of formal forums for consultation / information;
- Creation of basin committees;
- Importance of the involvement of customary or traditional governance (traditional leaders) in the spaces of consultation.

Issue 7: Training of stakeholders and capacity building

Issue 8: Strengthening the existing legal and institutional framework conducive to dialogue and consultation for cooperative action between the member states of the NBA.

VIII. IDENTIFICATION AND ANALYSIS OF PROGRAM IMPACTS

8.1. IDENTIFICATION OF POTENTIAL PROGRAM IMPACTS

The PIDACC / BN projects will have potential positive and negative impacts on the direct and indirect environment depending on their intensity on the components involved. Impacts are linked to the phase of project activities. These phases commonly referred to include: (i) the pre-operational phase; (ii) the construction phase; (iii) the exploitation or operational phase and (iv) the phase of cessation of activity.

8.1.1. Parameters for Assessing the Significance of Impact

8.1.1.1. Intensity of impact

The intensity of the environmental impact expresses the relative importance of the consequences attributable to the alteration of an environmental component. It depends both on the value of the environmental component under consideration and on the extent of the disturbance (degree of disturbance) it undergoes.

The environmental component value integrates both its ecosystemic value and its socio-economic value. The ecosystemic value of a component expresses its relative importance determined by its role and function in the ecosystem. In the method proposed by Hydro Quebec, the ecosystem value of a given component is considered as:

- **Great (Strong)**, where the component is of major interest because of its ecosystemic role or biodiversity and its exceptional qualities the conservation and protection of which are the subject of consensus in the scientific community;
- **Medium**, where the component is of high interest and recognized qualities the conservation and protection of which is a matter of concern but not the subject of consensus;
- **Low**, where the component is of interest and qualities the conservation and protection of which are of little concern.

The socio-economic value of a given environmental component expresses the relative importance that the public, government agencies or other legislative or regulatory authorities place on it. It reflects the will of the local or regional public and political authorities to preserve its integrity or originality, as well as the legal protection it receives.

Hydro Quebec (Canadian Electricity Company) also considers the socio-economic value of a component as:

- **Great (Strong)**, where the component is subject to legal or regulatory protection measures (threatened or vulnerable species, conservation park, etc.) or is essential to human activities (drinking water);
- **Medium**, when the component is valued (economically or otherwise) or used by a significant portion of the population concerned but without legal protection;
- **Low**, where the component is poorly valued or used by the population.

- **The incorporated component value** of both ecosystem value and socio-economic value with the strongest of these two values, as shown in **Table 10**

Table 10: Matrix for determining the component value

SOCIO-ECONOMIC VALUE	ECOSYSTEM VALUE		
	Great (Strong)	Medium	Low
Great (Strong)	Great (Strong)	Great (Strong)	Great (Strong)
Medium	Great (Strong)	Medium	Medium
Low	Great (Strong)	Medium	Low

The degree of disturbance defines the magnitude of the structural and functional changes it is likely to undergo. It depends on the sensitivity of the component to the proposed interventions. Changes may be positive or negative, direct or indirect. The degree of disturbance considers the cumulative, synergistic or deferred effects which, beyond the simple causal relationship, can amplify changes in an environmental component when the environment is particularly sensitive. The degree of disturbance is judged as:

- **High (Great)**, where the intended impact involves the integrity of the component or substantially and irreversibly modifies the component or the use made of it;
- **Medium**, where the impact results in a reduction or an increase in the quality or use of the component, without compromising its integrity;
- **Low**, where the impact only changes the quality, use or integrity of the component in an unlikely manner;
- **Indeterminate**, when it is impossible to predict how or to what degree the component will be affected. When the degree of disturbance is indeterminate, the environmental impact assessment cannot be performed for the component.

The intensity of the environmental impact, varying from low to very high, results from combinations between the three (high, medium and low) disturbance levels and the three major, medium and low value classes. Table 11 shows the different combinations obtained.

Table 11: Matrix for determining the intensity of environmental effect

Degree of Disturbance	Value Of Component		
	Great	Medium	Low
High	Very High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

8.1.1.2. Extent Of Impact

The extent of the environmental impact expresses the spatial scope or radiance of the impacts generated by an intervention on the environment. The notion refers either to a distance or to a surface on which the changes undergone by a component will be felt or to the population that will be affected by these changes. The three levels of extent considered are:

- Regional, when the impact affects a large area up to a significant distance from the project site or is felt by the entire population of the study area or by a significant proportion of it;
- Local, where the impact affects a relatively small space within, close to or near the project site, or is felt by a limited proportion of the study area population;
- Occasional, when the impact affects only a very limited area within or near the project site or is felt by only a small number of people in the study area.

8.1.1.3. Duration of impact

The duration of the environmental and social impact is the time during which the changes in a component will be felt. It is not necessarily equal to the period of time direct source of impact, since the impact may continue after the phenomenon causing ceases. When an impact is intermittent, its frequency is described in addition to the duration of each episode. The method used will distinguish the environmental and social impacts of:

- Long term, for the impacts felt continuously for the lifetime of the equipment or activities and even beyond in the case of irreversible effects;
- Average duration, for the impacts felt continuously over a relatively long period of time but generally less than the lifetime of the equipment or activities;
- Short duration, for the impacts felt over a limited period of time, corresponding to the period of construction of the equipment or the start of activities, a season for example.

8.1.2. Importance of Impact

Table 12: Matrix for determining the importance of environmental effect

INTENSITY	EXTENT	DURATION	IMPORTANCE
Very STRONG	Regional	Long	Very Strong
		Average	Very Strong
		Short	Very Strong
	Local	Long	Very Strong
		Average	Very Strong
		Short	Strong
	Ponctual	Long	Very Strong
		Average	Strong
		Short	Strong

INTENSITY	EXTENT	DURATION	IMPORTANCE
STRONG	Regional	Long	Very Strong
		Average	Strong
		Short	Strong
	Local	Long	Strong
		Average	Strong
		Short	Average
	Ponctual	Long	Strong
		Average	Average
		Short	Average

INTENSITY	EXTENT	DURATION	IMPORTANCE
AVERAGE	Regional	Long	Strong
		Average	Average
		short	Average
	Local	Long	Average
		Average	Average
		short	Weak
	Ponctual	Long	Average
		Average	Weak
		short	Weak

INTENSITY	EXTENT	DURATION	IMPORTANCE
WEAK	Regional	Long	Average
		Average	Weak
		Short	Weak
	Local	Longue	Weak
		Average	Weak
		Short	Very Weak
	Ponctual	Long	Weak
		Average	Weak
		Short	Very Weak

The interaction between intensity, extent and duration determines the extent of environmental and social impact on a component affected by the project. The table below presents the grid for determining the significance of the environmental effect. It distinguishes five levels of importance ranging from very high to very low. The significance of each of the environmental and social effects is assessed taking into account common mitigation or enhancement measures incorporated into the PIDACC / BN projects. The final step in the assessment is to determine the residual significance of the environmental effect following the implementation of specific mitigation measures for optimal integration of projects into the environment. This involves assessing how the mitigation measure alters one or more of the inputs to the assessment process, ie the value or degree of disturbance of the environmental component or the extent and duration of the effect.

8.1.3. Analysis Limitation

At the strategic environmental assessment stage, the impacts of the planned activities can not be analyzed in a precise manner, the impacts that will be presented below remain global and cross-cutting. More detailed environmental assessments will have to be carried out, if necessary, in the framework of the EIES to be carried out (possibly), in order to refine the defined guidelines for the management of impacts locally.

This analysis of the environmental and social issues of the program was carried out through an environmental and social analysis of the objectives and activities of the project with regard to the area of intervention. It was carried out through a participatory approach that allowed a wide consultation of the different social actors concerned directly or indirectly by the project.

It was conducted in compliance with the regulatory texts of the member countries of the Niger Basin Authority (NBA) in the matter of environmental and social assessment and in accordance with the Integrated Safeguarding System (SSI) of the BAD.

8.2. POTENTIAL POSITIVE IMPACTS

The program is an important dimension for the economic and social development of the areas covered by the projects covering the nine (9) member countries of the NBA. The forecasts of the PIDACC Program are:

Fighting erosion and silting;

- 17,000 ha of stabilized sandhill;
- 121,500 ha of degraded land restored;
- 72, 000 m3 of mechanical and biological treatment works of gullies made;

Sustainable agro sylvo pastoral management:

- 26,750 ha of managed agroforestry;
- 94,400 ha of participatorily managed forests;
- 24, 000 ha of managed fauna and flora reserves;
- 36 participatory management plans for the sub-catchment areas developed;

- 1,425 km of transhumance corridors managed;
- 24,000 ha of improved and protected natural habitats;
- 17,000 ha of rehabilitated spawning grounds and 15 sustainable management plans for extractive activities developed.

Projects under the Program components will control surface waters and significantly increase rainfed production (239,000 tons of cereals, 83,000 tons of cash crops) and develop off-season crops (150, 000 tons of market gardening crops). These include the construction of multi-purpose infrastructures such as:

Hydro-agricultural products;

- 198 small multi-purpose dams (396 million m³ of water) rehabilitated / built;
- 89 landscapes developed ;
- 22,500 ha of irrigated perimeters Developed / rehabilitated.

Breeding to reduce the transit pressure of transhumance flocks and secure 6million UBT
161 reservoirs, ponds, wells and pastoral water wells constructed / rehabilitated;

- 1,425 km of marked and managed transhumance corridors;
- Browsing
- 395 km of improved navigation sections;
- 71 docks and docking facilities constructed;

Peaches

- 9 rearing stations rehabilitated / built;
- 16,000 ha of spawning and floodplain areas managed.
- 2,400 tons of fish produced;

In view of all these planned accomplishments, the PIDAC / BN program will certainly have major positive environmental and social impacts.

At the environmental level, the activities of the PIDAC / BN will have major impacts and positive effects on the environment, the most significant of which will be the following:

- improved water availability for agriculture, livestock and fish farming;
- improvement of production systems;
- Preservation of natural resources;
- improved management of resources (soil and water);
- diversification of activities and creation of income and jobs;
- improved living conditions for women and children;
- improved conditions and access to basic socio-economic services and facilities;
- opening up of production areas;
- improvement of market access conditions;
- development of resilience of resources and ecosystems;
- Protection of resources and ecosystems;

- better management of water and land through good water control thanks to adapted and appropriate development (respecting the standards and charter of the irrigated area) and with irrigation and drainage networks;
- better management of the irrigable potential of the program area through the technical supervision of farmers to better manage soil and water resources by limiting their overexploitation and degradation;
- preservation of natural areas and wetlands;

At the social level, the positive impacts of the program's activities mainly relate to:

- improving the resilience of populations;
- accompanying measures and social protection;
- community capacity-building;
- dissemination of good adaptation practices;
- dissemination of agro-climatic information;
- construction of multi-purpose infrastructures in the sectors (IWRM, livestock, fisheries, navigation, crossing, dams, etc.).

At the global level, impacts will include: (i) contribution to food security; (ii) fight against famine; (iii) protein intake (iv) creation and enhancement of jobs (reduction of unemployment and the exodus of young people through the creation of local employment opportunities); (v) improvement of living conditions. The Program will hire unskilled workers from the beneficiary communities as a priority (if necessary after a period of training).

The program will: (i) open up the areas where projects are located by the construction of runways, crossing structures; (ii) integration of development and adaptation to climate change; (iii) implementation of basin-wide actions in each of the 9 member countries of the Niger basin

In addition, the PIDAC /BN program will have positive impacts on gender and on improving the status of women. Indeed, it will target the realization of sub-projects and activities usually valued by women, and for which they have recognized know-how (market gardening, rice growing, small livestock, traditional poultry farming, processing activities, marketing, etc.) and from which they can derive income.

Table 13 : Summary of Positive Impacts of Components

Activities	Impacts
	Environmentally Positive Impacts
Resilient development of resources and ecosystems	Resources and ecosystems will be managed optimally without overexploitation.
Protection of resources and ecosystems	Technical provisions will be put in place for their protection
Better management of water and land and better management of irrigable	The IWRM system will be in place. Irrigation will be optimized. 45 water reservoirs

Activities	Impacts
potential	
Preservation of natural areas and wetlands	Technical provisions will be implemented.
Introduction of modern storage and machining techniques will have the impact of enhancing agricultural production capacities.	An optimal production system will be considered and implemented.
	Positive Social Impacts
Improving the resilience of populations	This is the main objective of the PIDACC / BN program. 18 community action plans for adaptation to CC developed and implemented.
Accompanying measures and social protection	Various measures are indicated to accompany the communities; 9,000 women and 3,000 young people on recovered land
Strengthening the community's capacity to adapt	Technical capacities will be strengthened for 320 managers, 50 managers of professional associations. Capacity building for local technical services
Extension of good adaptation practices	Good practice guides will be developed and disseminated.
Dissemination of agro-climatic information.	a mechanism for disseminating agro-climatic information. Accompanying 30,000 producers for the use of climate information.
Construction of multi-purpose infrastructures in the sectors (Integrated Water Management (GIRE), livestock, fisheries, navigation, crossing, dams, lowland development, etc.).	Several infrastructures will be built in all development sectors (198 small dams, 89 lowlands, 22,500 ha of irrigated and managed / rehabilitated perimeters, 161 reservoirs, 1425 km of transhumance corridors, 395 km of navigation sections, 71 docking facilities , 9 nursery stations, 90 km raised dykes, 16, 000 ha of spawning and floodplain areas, 2, 400 tons of fish produced.
Contribution to food security	Improved agricultural production and land development will increase the area under cultivation and the contribution of fertilizers will contribute to food security.
Creation and valorisation of jobs	The multiple activities that the program creates will generate multiple jobs.
Integration of development and adaptation to climate change.	Main objective of the program. 1, 000, 000 producers aware of adaptation techniques to CC.

8.3. POTENTIAL NEGATIVE IMPACTS

The negative environmental and social impacts resulting from the activities of the PIDACC Program will mainly concern: risks of soil erosion (soil instability) due to agricultural developments, loss of vegetation and biodiversity and degradation of natural habitats in the event of deforestation to prepare agricultural parcels, risks of pollution and degradation of the water table and watercourses linked to the use of pesticides and fertilizers; Construction of dams, development of shallows, development of irrigation perimeters, construction of water reservoirs, sinking of wells, construction of docking facilities, development of navigation sections by means of weed cutting; Delineation of spawning areas of 16,000 ha, 90 km dykes

with enhancement, construction of village protection structures, etc. All these above-mentioned infrastructures require some pre-operational work of Construction, operation and termination.

On the social level, there may be an increase in tensions between farmers, livestockbreeders and fishermen, on land issues or between livestockbreeders and farmers linked to the wandering of livestock that destroy crops; between farmers, fishermen and breeders in the management of water bodies.

Overall, program activities will have a definite negative impact on people's living environments, habitat, socio-economic infrastructures and natural resources, not only because of planned developments and infrastructure.

a) Negative impacts of irrigation schemes and structures

(i) Land and cultural conflicts

The development of agricultural perimeters could lead to land disputes in the event of uncommitted and non-negotiated expropriation and also in case of disturbance / degradation of cultural sites.

(ii) Forest resource degradation and risks of incursion into nature reserves

Agricultural development can contribute to the reduction of forest and biological resources. Land reclamation will increase land pressure in the area with threats of degradation in buffer zones and protected areas (leased areas, biosphere reserves, classified forests). This pressure on the land resource will negatively affect the possibilities of acquisition of land by private owners due to higher bidding; people would also like to take advantage of these new opportunities to upgrade their land or engage in new land clearing. Also, with the proximity of agricultural activities, there is a risk of increased poaching in protected areas. Drainage channels could be used by aquatic fauna (manatees and crocodiles), which would be detrimental to local biodiversity. To avoid these risks, the program will have to establish eligibility criteria and implement monitoring measures for activities to be financed in the surrounding areas of the parks.

(iii) Strong pressure on water resources

Agricultural practices, including irrigation, will most likely require the use of significant quantities of these resources if sustainable, low-consumption techniques and technologies are not implemented. In terms of resource degradation, the main possible cause of water pollution could be the irrational use of fertilizers and pesticides. In addition, poor drainage of agricultural developments could aggravate the state of pollution and the eutrophication process. Poor hydraulic channel set-up could disrupt spawning areas. On the other hand, it will be necessary to emphasize the risks of reduction of the quantities of water available to the users, the exacerbation of the competition even conflicts.

(iv) Environmental risks related to the use of chemical fertilizers

Fertilizers cause pollution in the event of intensive cultivation. They are sources of water pollution when they are applied in greater quantities than crops can absorb, or when they are washed away by water before they can be absorbed. Excess nitrogen and phosphates can be infiltrated into groundwater or run into surface water. This nutrient overload causes eutrophication of the tributaries of rivers, lakes, reservoirs and ponds and causes a proliferation of algae that destroy other plants and aquatic animals.

(v) Development of aquatic plants and invasion of grain-eating birds

The new developments will create favorable environmental conditions for the development of invasive plants in softened water bodies. This development will create the conditions for an increase in the population of these species which will negatively impact agricultural and fisheries production or increase production costs through the development of more intensive fighting methods. The invasion of water bodies in protected areas and in buffer zones could affect the natural habitats of all biodiversity. The mobility and reproduction of animals could be disrupted with negative impacts on biodiversity, the safeguarding of which is a condition for maintaining or developing tourist activities in the area (Niger Basin). Also, the reproduction of fish from these water bodies invaded by aquatic plants will be impaired due to eutrophication of these water bodies (lack of oxygen, illumination, high CO₂ content); Fisheries activities will be affected.

(vi) Land degradation and soil fertility

Land degradation resulting from the use of agricultural technology and practices contributing to land degradation is a factor limiting both the development of the rural sector and the protection of natural resources (land degradation or erosion; Clogging of soil, reduction of arable and pastoral areas).

(vii) Social and health pressures due to hydro-agricultural developments

Irrigation canals could lead to loss of socio-economic activities (fields, grazing, etc.), restrictions on movement of livestock and forest degradation on their routes. Their poor alignment in water bodies could disrupt aquatic fauna, especially in spawning areas. During their exploitation, the invasion by water plants and the presence of vector of water-borne diseases (malaria, bilharzia, diarrhea, etc.) could pose a threat to the health of riparian (riverain) populations, especially children and the sensitive community. On the other hand, agricultural activities could also promote the development of STI and HIV / AIDS with gender mixing (active periods of crops and harvest).

(viii) Environmental and health risks due to pesticides on human and animal health

Agricultural development will necessarily be accompanied by a cultural intensification and will lead to an increase in the use of pesticides and chemical fertilizers, hence the likely negative impacts on human and animal health. In the absence of genuine integrated pest management, increased agricultural production could lead to greater use of chemical pesticides, the effects of which are harmful to the environment.

Pesticides are generally classified according to their target. Insecticides, herbicides or fungicides are the most commonly used designations. There are, however, other categories such as rodenticides (against rodents), acaricides (against mites, etc.), nematicides (against nematodes) or molluscicides (against slugs), etc. These pesticides can spread in the environment contaminating different matrices (water, soil, vegetation, user, etc.).

Pollution may be related to the use, storage of the chemicals concerned, their application and the process of natural transport of pollutants. Treatment of agricultural crops under the PIDACC / BN program may result in pollution of the environment (physical, biological and human). The largest concentrations of pesticides enter the atmosphere after aerial spraying.

Often the method of application of the chemical products results in a dispersion of the residues of these pollutants which can go up to a distance of 5 km from the place of employment depending on their density, thus causing pollution of surface water and soil surrounding. The following risks can be noted on the environment:

- During crop treatment, the majority of pesticide inputs reach the soil, either because pesticides are directly applied to them or because the rain has leached out the foliage of treated plants (crops and / or weeds).
- So the soil occupies a central position in the regulation of the fate of pesticides in the environment and it will have a dual role of storage and purification (Barriuso et al., 1996).
- In the soil, pesticides are affected by different physical, chemical and biological processes that will condition their degradation, transfer to other compartments of the environment (water, vegetation, and atmosphere) and consequently their potential impact on living things exposed. In particular, when the pesticides are present in liquid and gaseous phases they are available to be degraded by microorganisms (scrubbing) but are also transferred to groundwater, whereas in the solid phase, it remains trapped in the soil (Storage).
- Thus, the behavior of pesticides will be more particularly controlled by the retention phenomena on soil constituents (organic matter, clays) and degradation. The greater the retention of the pesticide, the lower its mobility and the lower the risk of contamination of groundwater (e.g. deep). However, in this case, it is likely to be transferred to surface water by particulate transport during runoff or erosion events (Barriuso et al., 1996).
- Risks related to water pollution (surface water and groundwater), and more specifically to herbicides (including glyphosate) that are most present in polluted waters;
- Risks related to atmospheric air pollution. During aerial treatments, the wind favors the dissemination of the product in the atmosphere; O Risks arising from mismanagement of packaging or pesticide storage / handling accidents should also be taken into account;
- Risks to biodiversity with potential impact on biocenosis especially on insects and other crop auxiliary pests. These useful insects
- The persistence of pesticides is directly related to their degradation. This degradation is complete only when the product is transformed into a mineral molecule, such as CO₂, which is completely eliminated. This transformation may be of:

- biotic (degradation by microflora, microfauna and plants), hence the importance of maintaining biodiversity in agricultural soils; or abiotic (by hydrolysis, photolysis).

(ix) Social risks in case of reduced grazing areas

The program area had become the fallback zone for livestock in the winter and dry season. The development of agricultural areas could also lead to the reduction and even loss of pasture, and this can be the source of conflicts between livestockbreeders and farmers. The facilities (channel, irrigation, drains) and plant production activities will drastically reduce pastoral activities. The problem of land management in relation to pastoral activities remains thus posed: area for animal movements, passageway, and access to water bodies for watering, animal wandering, water-related diseases, risks of poisoning by residues from agricultural inputs, drainage waters and potential conflicts with farmers).

The PIDACC / BN Program in the context of its developments and the development of the areas granted must integrate the concerns of agro-pastoralists. It must take measures to safeguard and mitigate the damage that will be induced by its activities of farmers on the life of the breeders and their environment to safeguard social peace and secure its investments.

(x) Risks of social conflicts with the movement of livestock to the new perimeters

An indirect environmental impact could be the movement of livestock through the development of new irrigated and managed perimeters. In search of new pastures, livestock and their owners could invade the new irrigated perimeters. The program will have to take into account the needs of livestock.

(xi) Social risks in the event of a reduction in farming areas

There are also threats to farmers who may see a decline in their areas of activity because of the growing demands of agro-industrial perimeter developers.

(xii) Impacts on the internal and external dynamics of populations

The Program will make a larger production so it will have to use the local or non-local workforce. The Program needs to clarify hiring procedures. This problem of recruiting the workforce external to the population must be analyzed as it may have consequences on population dynamics.

b) Negative Impacts Of Rice Mills

During the works, the negative environmental impacts of the Program will come mainly in pre-operational phases and construction of storage facilities. Tree felling to clear sites; Soil erosion, generation of construction waste; Occupation of private land, etc.

In the operational phase, the risks will mainly concern safety, workplace accidents, nuisance due to dust (fine particles). In general, the impact of the activities of the Program on the Environment is as follows:

- Emission of dust; noise; Risks of dust explosions and fires; olfactory nuisances, to some extent risks of drowning.
- In agricultural areas, in paddy fields, paddy rice (whole grain) is cleaned with vacuum separators, sieves and sorters, husked and whitened (aleurone layer abrasion) then sorted to finally give the white rice ready for consumption.
- Rice mills can be a relatively important source of air pollution when they are not equipped with suction systems or when they do not meet standards. Cyclones are often the only means used for dust removal, while the efficiency of these devices does not exceed 90 to 95%. In these cases, dust emissions are between 70 and 150 mg / m³²⁰. These systems should therefore be supplemented by dust filters. It should be emphasized that rice bran may be valued as a livestock feed.

c) **Negative impacts of dam construction:**

In the implementation phase

This phase will require pickling of the installation area of the stakes. It will have concrete production that will be dumped on the soil that will impact it.

In the phase of setting up a cofferdam

During this phase, the vegetation and the rocky area will be removed, this will cause the vegetation cover to disappear and the soil will be impacted

In preparation for foundations

The topsoil and altered rock must be removed by shovel, pickaxe or mine bar and removed from the worksite. For furniture foundations, the axis of the dam is stripped to a clean surface free of vegetable matter. If the foundations are permeable, a waterproofing screen is made up to the rock (or to the impermeable floor). All these activities will lead to the disappearance of the vegetation cover, soil degradation, the production of rock debris and the emission of gas at the level of shovels, dust at picks and drilling rigs.

In the construction phase

Transport of the materials will generate emission of dust, fine particles, engine exhaust gases, humidification during compaction, which will cause the water to spill on the site, which can infiltrate or drain to the courtyards surrounding the construction site of the dam, emission of gases by the compaction machine, fumes; the noises that will generate the sound impact.

d) **Negative impacts of production line infrastructure**

Thus, the carrying out of 1,425 km of transhumance corridor tracks may require deforestation in some cases, with risks of loss of biodiversity, but also social conflicts and loss of assets in case of crossings of private agricultural estates. During the work, there is a risk of spreading STI / HIV / AIDS with the presence of national and international workers from different

²⁰ Agro-industrial irrigated rice farming program in the Saint-Louis region, 2014

backgrounds. The opening of temporary borrowing sites can also cause stigma on the vegetation and even lead to social conflicts if they are located on private land or fields. In the operational phase, the risks relate to nuisance due to dust deposits.

e) Cumulative negative impacts of program activities

In addition to the negative environmental and social impacts of program activities, this study takes into account the cumulative negative impacts of the many programs and projects that have already taken place in the PIDACC / BN Program areas. Indeed, while most of the activities to be carried out can have negative effects that are not significant, taken individually, the combination of several negative effects on the biophysical and human environment can, in the long run, lead to unfortunate consequences due to their accumulation. Cumulative effects are changes in the environment due to combined action with other past, present and future anthropogenic actions. Two cases may arise: (i) the multiplication of similar (identical) programs, carried out at the same time or successively and having the same minor or moderate negative effects on a given area but whose cumulation may prove detrimental to the environment; (ii) different programs, resulting in minor or moderate negative individual impacts, but whose cumulative effect may be harmful to the environment.

In this sense, for example, the cumulative impacts likely to be generated by the activities of the different programs can be as follows:

- Amplification of agricultural activities through irrigation, which involves greater use of pesticides and fertilizers. These products accumulate in soils and are transported to superficially in watercourses and deep into groundwater. Over the years, non-biodegradable products accumulate in human and animal food chains and can constitute a real health hazard;
- The accumulation in the soil of dissolved salts in irrigation waters, which in the medium and long term lead to soil sterilization and deterioration of water quality;
- Erosion and accumulation of solid particles in the basins: solid deposits reduce the capacity of dams and other feed structures over the years, thus limiting their lifespan.

The cumulative impacts examined in this study take into account direct, indirect and induced impacts. The analysis shows that the proposed sub-projects in the project area will have few cumulative environmental effects. The most important effect would be the intensification of the use of phytosanitary products (fertilizers, pesticides) when operating the developments. In order to avoid this pollution, it will be necessary to subordinate the allocation of agricultural space to compliance with a specification which includes a pest management plan and pesticides and the use of water-saving irrigation technologies.

Table 14: Summary of the negative impacts of the projects on the development of irrigation schemes, rice mills and the construction of dams.

Activities	Impacts
a)- Hydro-agricultural facilities and structures	<p><u>Negative environmental impacts</u></p> <ul style="list-style-type: none"> • Forest resource degradation and risks of incursion into nature reserves • Forest resource degradation and risks of incursion into nature reserves • Strong pressure on water resources • Environmental risks related to the use of chemical fertilizers • Development of aquatic plants and invasion of grain-eating birds • Land degradation and soil fertility • Social and health pressures due to hydro-agricultural developments • Environmental and health risks due to pesticides on human and animal health. <p><u>Negative Social Impacts</u></p> <ul style="list-style-type: none"> • Land and cultural conflicts • Impacts on the internal and external dynamics of populations • Environmental and health risks due to pesticides on human and animal health • Social risks in case of reduced grazing areas • Risks of social conflicts with the movement of livestock to the new perimeters • Social risks in the event of a reduction in farming areas
b) Negative impacts of cultivation of rice mills	<p><u>Negative environmental impacts</u></p> <ul style="list-style-type: none"> • Dust emissions; Noise ; risks of dust explosions and fires; • Olfactory nuisances, to some extent risks of drowning. • Soil erosion, generation of construction waste; • Relatively large air pollution when not equipped with suction systems. <p><u>Negative Social Impacts</u></p> <ul style="list-style-type: none"> • Private land occupations.
Negative impacts of dam construction	<p><u>Negative environmental impacts</u></p> <ul style="list-style-type: none"> • Disappearance of vegetation cover and soil will be impacted; • Stripped to a clean surface free from vegetable matter; • Soil degradation, production of rocky debris and gas emissions from shovels, dust at picks and drilling rigs. • Emission of dust, fine particles, Engine exhaust • Humidification during compaction, which results in the discharge of water to the site, which can infiltrate or drain to the courtyards surrounding the dam construction site
Negative impacts of the infrastructure of the production tracks	<p><u>Negative environmental impacts</u></p> <ul style="list-style-type: none"> • Deforestation, loss of biodiversity, creation of stigma on the vegetation and even social conflicts; the risks relate to nuisance due to take-off ; dust <p><u>Negative Social Impacts</u></p> <ul style="list-style-type: none"> • Social conflicts and asset losses in the case of crossings of private agricultural estates. • risks of spread of STI / HI / AIDS

IX. ENVIRONMENT AND SOCIAL MANAGEMENT FRAMEWORK

The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the Niger Basin Authority and National agencies responsible for addressing project risks and impacts, including on capacity to manage environmental and social risks and impacts.

9.1. MEASURES FOR THE MITIGATION OF NEGATIVE IMPACTS

In order to reduce, eliminate, mitigate or improve the potential effects and impacts of some PIDACC / BN activities, various measures have been recommended, in accordance with the requirements of the national environmental laws of the countries and the environmental and social policies of the African Development Bank.

9.1.1. Institutional measures

At the national level institutional measures include:

- Integration of structures, directorates, agencies or offices responsible for environmental and social assessments into the National Program Steering Committee and
- Integration of local or regional deconcentrated structures responsible for environmental and social assessments in the Sub-Project Selection Committees.

9.1.2. Measures to accompany and optimize the program

- Strengthening the network of agro-meteorological stations for better management of agricultural activities, particularly water resources (country component).
- Development and promoting the use of decision support tools for the management of climate risks: collection of meteorological and hydrological data and the establishment of a reliable, adapted and accessible information system for the different Program actors (regional component);
- Preparation of a communication plan for PIDACC / BN
- Development of a capacity building program for natural resource management actors; Use of decision support tools for climate risk management; Management of pests and pesticides and the use of fertilizers; Good practices in crop management and farm management techniques; Good agricultural practices; Screening, monitoring and environmental surveillance, etc.
- Conflict and litigation management:
- Adapting agricultural practices to climate change (i) Agro-meteorological accompaniment of producers to adopt appropriate agricultural schedules (sowing dates and cropping cycle taking into account the rainfall / hydrological variability, water dosage, etc.), (ii) Dissemination of appropriate methods of water management (irrigation techniques, watershed approach, GIRE, etc.) and (iii) Preparation and dissemination of guides / pesticide management kit and good agricultural practices.

9.1.3. Specific mitigation measures for rural road constructions and rehabilitations

In order to carry out construction work on rural roads without causing damage to the natural environment and the human environment, it is necessary to:

- Acquire land for alignment with the agreement of the people and particularly the owners of fields who must be compensated if necessary;
- Provide information and public awareness on the effects of rural roads on their sites which they must release before work starts (do not sow in the right-of-way) for the case of the work to be carried out in the rainy season;
- Excavate surface materials where possible (laterite and rubble stones on hills) instead of digging new quarries;
- Use of permanent ponds and not wells for the construction (compacting) of rural roads
- Minimize the duration of work in sensitive areas and avoiding deforestation or removal of vegetation cover on the banks of water bodies, steep slopes, water basins;
- Restrict the number of taxiways and movement of machinery to work areas and marked accesses;
- Restore borrow areas that will no longer be used by stabilizing slopes, covering original organic soil and promoting vegetation restoration;
- Plant of trees at sanitation ditches;
- Use of speed bumps in areas where crossings of pedestrians and animals are frequent;
- Undertake watering work sites during construction.

9.1.4. Specific mitigation measures for fisheries development and equipment

The development of ponds for the promotion of fisheries is undoubtedly a positive action because it not only preserves biodiversity but also allows for the fair and equitable exploitation of its resources. To this end, all measures must be taken to ensure that this exploitation of the resource can contribute to the sustainable development of beneficiaries. Thus, the following measures must be taken:

- Organizing, training and equipping local fishing communities around each pond;
- Empowering communities with respect to the resource through the institutionalization of fishing licenses issued by these local fishermen groups (as in the case of timber sales coupons in rural timber markets);
- Avoiding the introduction of predatory fish species, which may attack the eggs of others.

9.1.5. Specific mitigation measures for crop production activities

The practice of market gardening and arboriculture may constitute income-generating activities developed by the beneficiaries. In order to limit and mitigate certain negative impacts and enhance positive impacts, the following measures should be taken:

- Choose fruit trees that are disease free;
- Encourage the practice of grafting locally and avoid especially the importation of trees grafted from outside the country without a phytosanitary certificate;

- Control agricultural practices around ponds in order to avoid erosion in the vicinity of ponds;
- Avoid planting *Prosopis juliflora* trees in the vicinity of gardens and ponds to avoid colonization of space. Instead, use local species on the boundaries between gardens.
- Define passage corridors with appropriate plant species;
- Identify passage corridors and access to ponds for pets in a concerted framework between breeders and farmers.

9.1.6. Specific mitigation measures for forestry activities

Forestry activities are actions to improve the environment, however some poorly conducted techniques can cause inconvenience. This is the case of the uncontrolled exploitation of gum arabic which can lead to the death of trees, the valorisation of by-products and forest products that will not facilitate natural regeneration. To this end, living attenuation measures can be recommended:

- Control the exploitation of forest products and by-products by establishing levy quotas (leave 10% of the fruit on the soil);
- Organize, train and mentor loggers in rural markets.

9.1.7. Specific mitigation measures for livestock operations

Intensive and extensive livestock development activities can have significant impacts. There is a risk of exceeding the carrying capacity of pastures, trampling around ponds and wells, conflicts between breeders and farmers. For this purpose it may be envisaged to carry out the following actions:

- Regulate and enforce the periods of field release at the end of the crop year by establishing frameworks for consultation between communities;
- Promote rationalization in herd management;
- Establish a good network for the distribution of pastoral wells in pastoral areas for rational exploitation of the pasture;
- Develop a program of materialization of passage corridors and grazing areas, wherever they exist;
- Organize the delimitation of passage corridors and grazing areas in a framework of consultation and responsibility of all actors.

9.1.8. Specific mitigation measures for building construction activities

In this particular case, it is a minimum of precautions to be taken in order to avoid social conflicts that may arise during the work and exploitation. These include:

- Make the choice and acquisition of land with the populations and the agreement of the owner of the land according to the legal rules in force, either by using the administrative reserves (in town) or by signing valid donation acts;
- Apply compensation plan if necessary

- Ensure fair and equitable participation of local labor;
- Encourage greater public ownership of its development through participation in the monitoring and maintenance of the building and its operations;
- Manage waste properly.

9.1.9. Specific mitigation measures for hygiene and sanitation infrastructure activities

The most important negative impacts in these scenarios are, among others, the risks of contamination of groundwater, soil, air and increased risk of livestock poisoning. At this level, the possible measures will be:

- construction of latrines with watertight pits to be drained;
- Regulation/compliance with the hygiene/sanitation laid down in the Public Health Code
- Establishment and strengthening of health brigades at the commune level.
- The following mitigation measures are proposed for the preparation, development and operation phase of dams and transhumance corridor trails

9.1.10. Specific mitigation measures for the activities of dams, water reservoirs and other control structures

Mitigation measures include:

- Establishment of a mechanism for consultation with local populations to promote the social and cultural integration of the project;
- Encouraging the employment of local labor and the award of some contracts to local enterprises and cooperatives;
- Establishment of a framework of good environmental practice during construction;
- Selection of installation sites to minimize disruption;
- Use of appropriate road signs;
- Arranging storage areas for toxic products of draining and distributing fuel and lubricant by concreting them.

Table 15: Mitigation Measures for Program Activities

Projects	Potential Negative Impacts	Mitigation Measures
<p>DAMS Pre- operational phase Dam construction</p>	<p>Impacts intrinsic to dams <u>In the implementation phase</u></p> <ul style="list-style-type: none"> • The concrete will be dumped on the ground will impact it and also generate dust. <p><u>In the phase of setting up a cofferdam</u></p> <ul style="list-style-type: none"> • The vegetation and the rocky area will be removed this will cause the vegetation cover and soil to disappear. <p><u>In preparation for foundations, topsoil and rock are removed and evacuated from site.</u></p> <ul style="list-style-type: none"> • Emission of gas from equipment, • smoke from equipment, Noise; • production of dust and particles 	<p>Mitigation measures <u>In the implementation phase</u></p> <ul style="list-style-type: none"> • Water the dam area to reduce dust • In the phase of setting up a cofferdam • Greening the area with fast growing plants, fertilizing degraded soils by bringing fertilized soil. <p><u>In preparation for foundations</u></p> <ul style="list-style-type: none"> • Greening the area with fast growing plants, fertilizing degraded soils by bringing soil • Port of PPE • Water the site during construction, • Use less noisy gear. • Watering the site during construction
<p>Construction phase of the dam</p>	<p><u>In construction phase of structures</u></p> <ul style="list-style-type: none"> • This phase requires the transport of materials which will generate the emission of dust, fine particles, engine exhaust, • Humidification during compaction of embankments will require the discharge of water to the site that will infiltrate or drain to the watercourses surrounding the dam construction site, • Air pollution by gases, fumes from compaction machines, noise impacts and waste oils. 	<p><u>In construction phase of structures</u></p> <ul style="list-style-type: none"> • Watering the ground, wearing PPE, putting in place good moisture management. • Take into account land-related aspects and cultural aspects • Establish good management of watering and humification of backfill materials in order to avoid dumping into surrounding watercourses • Use of the gear in good condition, having the technical visit to days, use of the petroleum products of good quality respecting the normal
<p>Phase of operation of the dam</p>	<p>Phase of operation of development works and structuring hydraulic structures (dams): 00</p> <ul style="list-style-type: none"> • Risks of land and cultural conflicts • Forest resource degradation and risks of incursion into nature reserves • Risk of disturbance of spawning grounds 	<p>Operation phase: of structures and structuring hydraulic structures (dams):</p>

Projects	Potential Negative Impacts	Mitigation Measures
	<ul style="list-style-type: none"> • Deforestation, land degradation through erosion • Loss / reduction of grazing areas • Strong pressure on land and water • Risks of diseases such as STI / HIV / AIDS 	
Environmental and health risks due to pesticides on human and animal health. <ul style="list-style-type: none"> • 	<p><u>Phase of exploitation of the perimeters:</u></p> <ul style="list-style-type: none"> • Strong pressure on water resources • Environmental risks related to the use of chemical fertilizers (water and soil pollution) • Land degradation and soil fertility <p>Impacts on the internal and external dynamics of the projects.</p>	<ul style="list-style-type: none"> • Information and awareness sessions • Identify the boundaries, extent of the lake and establish a monitoring system for the lake. • Control of aquatic plants and birds • Consultation with farmers • Limiting flood zones; • Local employment and basic community infrastructure • Awareness and information session on STI / HIV / AIDS • Setting up an integrated and controlled management system • Establishment of a system for monitoring the use of chemical fertilizers in arable areas along the dam • Implementation of an integrated and controlled management system
	<p>Environmental and sanitary risks due to pesticides on human and animal health.</p>	<ul style="list-style-type: none"> • Properly train officers on safe pesticide use and maintenance of treatment equipment; • Avoid contamination by installing buffer zones, • Make pictograms of danger and prohibition of smoking in front of pesticide storage warehouses or packing depots; • Properly handle empty containers that are highly sought after (rinsing, drilling, crushing and conveying to authorized landfill); • Monitoring pesticide levels on a regular basis through analyzes; • Designate a Health, Safety and Quality Officer • Conduct Information, Education and Communication (IEC) sessions for local

Projects	Potential Negative Impacts	Mitigation Measures
		<p>populations on the risks and dangers of pesticides and fertilizers;</p> <ul style="list-style-type: none"> • Conduct IEC sessions for pesticide applicators; • Carry out cholinesterase tests on all pesticide applicator personnel prior to campaigns, during campaigns and after campaigns; • Require the wearing of Personal Protective Equipment (PPE) of all pesticide applicators (hood, bezel or face shield, mask, gloves, boots, combination).
	<ul style="list-style-type: none"> • Social risks in case of reduced grazing areas • Risks of social conflicts with the movement of livestock towards the new perimeters • Tracks of Transhumance Corridors 	<ul style="list-style-type: none"> • Consultation with livestock keepers, realization of transhumance corridors and water points and sensitization • Delimitation of passage corridors and pastures • Protection of water points Encourage fodder crops to meet the demand of fodder of livestockbreeders.
	<ul style="list-style-type: none"> • Increase in water-related diseases (development) 	<ul style="list-style-type: none"> • Water Disease Control Program
<p>TRACKS OF TRANSHUMANCE CORRIDORS</p> <p>Track Creation Phase</p>	<p><u>Phase of creative work:</u></p> <ul style="list-style-type: none"> • Loss of biodiversity along the route and at the borrowing sites • Encroachment on arable land and socio-economic activities • Obstruction of irrigation and drainage channels and runoff paths • Pollution from construction waste 	<p><u>Work phase:</u></p> <ul style="list-style-type: none"> • Wise choice of sites • Compensatory Reforestation • Focus on existing careers • Rehabilitation after construction • Staff awareness and protection • Ecological management of construction waste and evacuation to the municipal waste disposal site
<p>Track Operation phase:</p>	<p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> • Nuisance due to dust, • Reduction of cultivable areas through the development of corridors • Land use through the corridor • Conflicts related to land occupation and transhumance. 	<p><u>Operational Phase :</u></p> <ul style="list-style-type: none"> • Regular watering of runways and sensitization • Consultation on land and water use • Compensation in case of expropriation • Information / sensitization of populations and work

9.2. ENVIRONMENT AND SOCIAL PROCEDURES FOR SELECTION OF SUB-PROJECTS

The ESMF is designed as a screening mechanism for the unknown environmental and social impacts of investments and activities prior to the evaluation of the Program's projects. It is an instrument for identifying and assessing potential future environmental and social impacts of projects to be funded by the program. As such, it guides the development of Environmental and Social Impact Studies (ESIS) of projects whose number, sites and environmental and social characteristics are still unknown in our case; Sites and projects are identified. At this stage of program preparation, although site identification has been carried out, it remains that some activities of the PIDACC / BN will have to be subject to an environmental selection procedure, the major stages of which are determined in the sections that follow.

All participating countries shall formulate their own ESMFs that are compliant with the AfDB's Integrated Safeguards System (ISS). Country ESMFs shall be reviewed and approved by the African Development Bank to ensure that they are materially consistent with the Green Climate Fund (CGF) environmental and social performance standards²¹. The context of application of the Bank safeguards is elaborated below:

Context of applicability of the Banks safeguard policies to the PIDACC project

- ***Operational safeguard 1 Environmental and social assessment***—Applicable because the program will support investments in the watersheds. Since the Community Driven type-type subprojects and exact locations have not been identified ex-ante, the safeguard instrument used in each country is the ESMF. For larger infrastructure investments, specific ESAs and EMPs will be prepared.
- ***Operational safeguard 2 Involuntary resettlement: land acquisition, population displacement and compensation***—Applicable because the project will support CDD-type watershed rehabilitation interventions that are likely to limit access to land and forest resources by the local communities.
- ***Operational safeguard 3 – Biodiversity, renewable resources and ecosystem services***—Applicable because of threatened ecosystems, and habitats for endemic aquatic species. The ESMFs prepared and implemented at National Level will address issues pertaining to this policy.
- ***Operational safeguard 4 – Pollution prevention and control, hazardous materials and resource efficiency***—Applicable. Pollution control programs are planned within the basin, as part of the silt control measures. The ESMFs, prepared and implemented at national level, will provide a framework for efficient management/ utilization of the project's natural resources, and water quality management to avert pollution concerns.
- ***Operational safeguard 5 Labour conditions, health and safety***—Applicable, the project will involve, construction interventions. This safeguard will ensure protection of workers' rights and protection of the workforce from inequality, social exclusion, child labor, and forced labor; as well as promote compliance with national legal requirements and provision of supplemental due diligence requirements where national laws are silent or inconsistent with the OS;

²¹ <http://www.gcfreadinessprogramme.org/file/environmental-and-social-safeguards-green-climate-fundpdf>

Stage 1: Identification, environmental and social selection and sub-project classification

The first stage of the selection process involves the identification and classification of the activity to be carried out within the framework of the PIDACC / BN, in order to assess its effects on the environment, in collaboration with authorities in charge of environmental and social assessment procedures at the Ministries of Environment of the target countries.

Almost all legislation establishes an environmental classification of sub-projects into categories: (i/a) projects that may have major negative impacts; (ii/b) projects with negative or minor impacts; (iii/c) projects the negative impacts of which are not significant. In parallel with determining the appropriate project classification, the screening process will identify the types of Environment Assessment instruments that may be suitable for the project

Each of the recipient countries, will screen the projects or sub projects for environmental and social impacts—including climate change impacts, potential adaptation and mitigation measures, and the vulnerability of populations and their livelihoods—to determine the specific type and level of environmental and social assessment compliant with national environment policies and procedures and the African Development Bank Group’s ISS.

A screening protocol exists in the form of the African Development Bank ISS—Guidance Materials Volume 3: Sector Keysheets (2014), checklists, which guide the borrowers /grantees in, among others, identifying eligible projects and assessing social and environmental risks and the associated required assessments studies and requirements shall be developed. The ISS sector key sheets determine whether or not an individual proposal requires detailed EA and the level of assessment that should occur. In determining whether a proposal requires further EA, should be rejected, or exempted, screening considers the alignment of the proposal with existing policies and plans, scale of the proposed development, intensity and significance of potential impacts. Other aspects include presence of natural habitats, cultural properties, environmentally sensitive areas, involuntary land acquisition. The screening report/initial environment and social assessment, classifies the project according to its likely environmental and social sensitivity, which determines whether an Environmental and Social Impact Assessment (ESIA) is needed and the required detail.

The screening protocol/African Development Bank-ISS Sector Keysheets, will be used in concert with other instruments like the Interim environmental and social safeguards of the Green climate Fund²², to provide guidance on projects on International Waterways, projects in disputed areas and projects involving large dams²³. These will be addressed at the regional rather than subproject level. The screening protocol /sector sheets provide for negative list of

²² <http://www.gcfreadinessprogramme.org/file/environmental-and-social-safeguards-green-climate-fundpdf>

²³ (a) Small dams are normally less than 15 meters in height. This category includes, for example, farm ponds, local silt retention dams, and low embankment tanks.

(b) Large dams are 15 meters or more in height or reservoirs of more than 3 million cubic meters. . Dams that are between 10 and 15 m in height are treated as large dams if they present special design complexities—for example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials. Dams under 10 meters in height are treated as large dams if they are expected to become large dams during the operation of the facility.

certain types, scales and locations of subprojects that are deemed not eligible for the grant such as large dams

Step 2: Approval of selection and classification

The selection of the sites to receive the sub-projects will be subject to a first screening by the national selection committee, in which the head of the decentralized structure of the country responsible for SEAs will be involved. These sub-projects will be submitted to the Steering Committee, which will also involve the national structure for SEA (Agency, Bureau or Central Directorate), for validation and follow-up. The classification process, from the outset, will involve the administrations responsible for environmental and social assessments. It will continue with the validation of the good environmental categorization;

Step 3: Public consultation and dissemination

Public information and participation should be ensured throughout the process of carrying out the study, in collaboration with the competent authorities, technical services, local and regional authorities, NGOs and the populations concerned. The results of the consultations will be made available to the public.

Step 4: Integration of environmental and social provisions into the tender documents

According to the results of the environmental selection, (i) Environment and Social Impact Studies must be conducted (ii) A simple environmental analysis must be made and (iii) Recommendations and other environmental and social management measures could be incorporated into the tender documents and the execution of works by the companies.

Step 5: Implementation of environmental and social measures

Private providers, businesses, administrations, management units, communities, NGOs, etc. Will be responsible for the implementation of these environmental and social measures.

9.3. LAND USE RESTRICTIONS AND INVOLUNTARY RESETTLEMENT

Land use restrictions and involuntary resettlement mechanisms, will be included as part of the National project ESMFs guided by the National Policy Frameworks, and the African Development Bank Integrated Safeguards System (refer to African Development Bank ISS, Guidance Materials, and Volume 2: Guidance on Safeguard Issues²⁴), in particular Involuntary Resettlement and Operational Safeguard (OS) 2.

Resettlement is considered involuntary when the project affected people are not in a position to refuse the activities that result in their physical or economic displacement. This occurs in cases of lawful expropriation or temporary or permanent restrictions on land use, and in negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail. OS 2 sets out the Bank's

²⁴ https://www.African Development Bank.org/fileadmin/uploads/African Development Bank/Documents/Publications/SSS_-_IESIA_Volume_2_-En.pdf

requirements for the involuntary displacement and resettlement of people as a result of Bank-financed projects. OS 2 ensures that:

- displaced people are meaningfully consulted and given opportunities to participate in the planning and implementation of involuntary resettlement programmes
- that displaced people receive significant resettlement assistance under the project, so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved beyond pre-project levels
- appropriate measures are developed that mitigate the negative impacts of involuntary resettlement, actively facilitate social development and establish a sustainable economy and society and
- sets up a mechanism for monitoring the performance of involuntary resettlement operations and remedying problems as they arise, so as to safeguard against ill-prepared and poorly implemented resettlement plans.

In line AfDB procedures, the Niger basin countries, will be required to prepare a Full Resettlement Action Plan (FRAP) for any project that involves involuntary resettlement of a “significant number” of people or has adverse impacts on vulnerable groups, including Indigenous Peoples. A “significant number” is defined as 200 or more persons who will experience involuntary resettlement effects. In addition, project planners and the Bank shall also determine the “significance” of a project by evaluating the severity of adverse impacts on vulnerable groups, particularly on women and Indigenous Peoples. Any project that has adverse impacts on vulnerable groups shall be considered significant, and shall thus require a Full Resettlement Action Plan

Detailed procedures on i) the Contents of a FRAP ii) Community participation iii) Integration with host communities iv) Socio-economic studies v) Legal framework including mechanisms for conflicts resolution and appeals vi) valuation of, and compensation for, losses vii) outline of the eligibility criteria being used in the project context viii) Identification of alternative sites and selection of resettlement site(s), site preparation, and relocation ix) Shelter, infrastructure, and social services , x) Environmental protection xi) the cost and budget and xii) Monitoring and Evaluation can be accessed in the African Development Bank Integrated Safeguards System; Guidance Materials; Volume 2: Guidance on Safeguard Issues²⁵.

9.4. STAKEHOLDER ENGAGEMENT PLAN (SEP)

In consultation with the Bank, the Niger Basin Authority (regional) and National Governments in the Niger basin, will develop and implement a Stakeholder Engagement Plans (SEP) commensurate to the nature and scale of the project and its potential risks and impacts. The SEPs, will enhance engagement an early stage of the project and development process, and inform project decisions and the assessment, management and monitoring of the

²⁵ https://www.African Development Bank.org/fileadmin/uploads/African Development Bank/Documents/Publications/SSS_-_IESIA_Volume_2_-En.pdf

project’s environmental and social risks and impacts. Draft SEPs will be disclosed as early as possible, and the borrower will seek the views of stakeholders on the SEP, including on the identification of stakeholders and the proposals for future engagement.

The objectives of the SEP will be i) to establish a systematic approach to stakeholder engagement that will help the countries identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties, ii) assess the level of stakeholder interest and support for the project and to enable stakeholders’ views to be taken into account in project design and environmental and social performance, and iii) promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle (iv) ensure that project information on E & S impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format (v) provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances.

The SEP will take the format of a framework approach, outlining general principles and a collaborative strategy to identify stakeholders and plan for an engagement process in accordance with the ESMF that will be implemented once the locations are known. The SEP will set out how communication with stakeholders will be handled throughout project preparation and implementation. It will be revisited and updated as necessary on an annual basis to reflect the changes in stakeholder engagement due to project developments and new stakeholders if any. The information that is required to be disclosed may change if there are changes in the Project design, schedule or area of influence.

A generic programme of public consultation and disclosure activities is presented in the table below. This will be detailed as part of the ESMF development for each of the countries.

Sample generic Stakeholder engagement Matrix

Stakeholders	Communication method	Information to be disclosed	Timeframe
Ministry of Agriculture, Ministry of Water Resources District Departments	Official correspondence	Approval of sufficiency of underpasses and off-ramps, Impact assessment	Before detailed designs and programming is completed
Multiple-stakeholders	Meetings and workshops with different stakeholder groups	Baseline assessment, Findings from regional river basin consultations, issues and opportunities at national and basin level.	Annually
Niger basin Authority basin and region/state level	Meetings and workshops	Identify the key (E&S) issues and opportunities.	Annually

Stakeholders	Communication method	Information to be disclosed	Timeframe
People affected by land acquisition	Information boards	Decisions related to resettlement and livelihood restoration; Grievance mechanism, ESIA, ESIA supplements, timeline of construction etc	Prior to construction During project implementation weekly update on grievances
Local communities , employees of farms, informal land users	Information boards, mass media, internet, documents	Grievance mechanism, ESIA, ESIA supplements, timeline of construction	Prior to construction and during project implementation weekly update on grievances
Regional mass media	Telephone, e-mails	Detailed project information	Quarterly update
Civil Society/NGOs	Telephone, e-mails websites	EIA and supplements	Quarterly update

9.5. GRIEVANCE AND REDRESS MECHANISM

The Bank will require the borrowers to provide a grievance mechanism, process, or procedure to receive and facilitate resolution of concerns and grievances of project-affected parties arising in connection with the PIDACC project, in particular about the borrower's environmental and social performance. The grievance mechanism will be proportionate to the risks and impacts of the project at the regional and national levels.

A grievance and redress mechanism will be prepared as part of the National project ESMFs, compliant with the national safeguards and the AfDB's ISS (Operational Safeguard 1: Environmental and Social Assessment). Such grievance mechanisms will utilize existing formal or informal grievance mechanisms suitable for project purposes, supplemented with project-specific arrangements designed to resolve disputes in an impartial manner.

The grievance and redress system at the AfDB comprises five elements: (i) policies and procedures established by the Bank on addressing requests for dispute resolution in the environmental and social context; (ii) public access to the process through the Bank country office or through the Compliance Review and Mediation Unit (CRMU); (iii) country-level responsibility for receiving and responding to requests for redress; (iv) the CRMU, which provides a corporate window for receiving requests for dispute resolution and mediation process; and v) tracking and monitoring grievances and their resolutions.

Project-affected parties may submit complaints regarding a Bank-financed project to the project grievance mechanism, appropriate local grievance mechanism, or the AfDB's corporate grievance redress service which ensures that complaints received are promptly reviewed in order to address project-related concerns.

At the country-level —The Bank will ensure that borrowers establish credible and independent local grievance and redress mechanisms to help resolve affected people's grievances and concerns regarding the environmental and social impacts of the project. The

independent and empowered local grievance and redress mechanism receives, facilitates and follows up on the resolution of affected people's grievances and concerns about the environmental and social performance of the project. The local grievance mechanism is made accessible to the stakeholders at all times during the project cycle, and all responses to grievances are recorded and included in project supervision formats and reports.

For projects involving the resettlement process, the borrower works with informally constituted local committees made up of representatives from key stakeholder groups and, in particular, vulnerable communities to establish a culturally appropriate and accessible grievance and redress mechanism to resolve, in an impartial and timely manner, any disputes arising from the resettlement process and compensation procedures. This is inline with Operational safeguard 2 involuntary resettlement: land acquisition, population displacement and compensation. The grievance redress mechanism, which is monitored by an independent third party, does not impede access to judicial or administrative remedies, and it informs affected people about the Bank's Independent Review Mechanism (IRM).

Steps in the African Development Banks Grievance Redress Mechanism (GRM)²⁶

The first step is to determine the primary goal of the GRM which would generally be to resolve specific grievances in a manner that meets both project management and community needs, but with important local variations.

The scope of grievances typically include: most, if not all, of the issues raised in a typical Environmental and Social Assessment: natural resources, pollution, cultural property, land acquisition, income of resettled/displaced populations, the welfare of vulnerable groups etc

The second step is to design the GRM by: repairing a preliminary design; selecting ways and means to receive, registering, assessing and responding to grievances; Selection of grievance resolution approaches; Designing a means to track and monitor grievances; Developing the grievance mechanism infrastructure and Review and refine the design. The preliminary design should be ideally carried out as part of the ESIA/ESMP for category 1 or 2 projects.

Implementing a GRM involves: Establishing human resources and logistics; Introducing the GRM to project staff; Communicating with the local communities to build awareness; Training and support to participants and Developing a monitoring programme. A typical GRM is composed of a small team of highly qualified individuals such as lawyers, communication specialists and social scientists

9.6. ENVIRONMENTAL MONITORING AND SURVEILLANCE PROGRAM

Environmental monitoring is an effort to ensure that the proponent of a project meets its environmental commitments and obligations, especially the legal and regulatory requirements throughout the life of the project. The implementation of environmental monitoring is the responsibility of the project proponent, the environmental assessment structures and the competent authority. (i) Environmental monitoring is intended to ensure compliance with

²⁶ https://www.African Development Bank.org/fileadmin/uploads/African Development Bank/Documents/Publications/SSS_-_IESIA_Volume_2_-En.pdf

recommended measures (ii commitments by project owners and project managers and (iii) requirements for applicable laws and regulations.

As for environmental monitoring, it will make it possible to verify, on the ground, the accuracy of the evaluation of certain impacts and the effectiveness of certain measures provided for in the ESMF, and for which there is uncertainty. The knowledge gained from environmental monitoring will make it possible to correct the measures and possibly to revise certain environmental protection standards. The Monitoring Program should describe: (i) the elements to be monitored; (ii) monitoring methods / devices; (iii) monitoring responsibilities; (iv) follow-up periodicity.

The environmental monitoring of the program in the countries will be carried out by the structures and administrations responsible for environmental and social assessments (national agencies, departments, offices, services, etc.), which will involve various other actors (deconcentrated services, Population, etc.) in accordance with the legislative, regulatory and institutional frameworks governing the environmental and social assessments applicable to the program in the targeted countries

Quarterly environmental monitoring missions will be carried out by decentralized and decentralized services; and semi-annual missions by the central services (national level). Environmental monitoring of the activities of the PIDACC / BN in each country will be the subject of a convention to be signed with the national structure responsible for environmental monitoring in the country.

Indicators for monitoring environmental measures

Strategic indicators:

- Effectiveness of environmental and social selection and the implementation of EIES;
- Number of training / awareness sessions organized
- Number of environmental monitoring / evaluation missions

Sub - project indicators:

- Number of projects selected for environmental and social selection
- Number of projects subject to an EIES with ESMF implemented
- Number of tender and execution files that have incorporated environmental and social requirements
- Number of hectare reforested
- Number of projects that have applied environmental and social mitigation measures
- Number of workers sensitized on hygiene, safety and STI / HIV / AIDS measures
- Level of involvement of local authorities and actors in the follow-up of the work
- Number of locally created jobs (local labor used for construction work)
- Number of accidents related to non-compliance with safety measures
- Number and type of claims

- Number of people affected by the projects
- Nature and level of compensation.

The following tables present indicators for monitoring environmental measures

Table 16: Measurement Indicators for ESMF Measures

Measures	Areas of intervention	Indicators
Technical measures	Conducting Environmental and Social Studies	Number of EES carried out
Project Monitoring and Evaluation Measures	Environmental Monitoring and Environmental Monitoring ESMF assessment (internal, mid-term and final)	Number and types of indicators monitored Number of follow-up missions
Training	Environmental and social assessment of projects; Monitoring and implementation of environmental measures	Number and nature of modules developed Number of agents trained Typology of trained agents
Awareness Campaign	Communication and Awareness Campaign	Number and typology of sensitized persons

Table 17: Environmental and Social Monitoring Parameters

Elements	Follow-up actions	Monitoring officer
Waters	<ul style="list-style-type: none"> • Monitoring of wastewater treatment procedures and installation; • Ground and surface water monitoring around inhabited areas and wastewater management; • Monitoring of water resource use activities; Monitoring of erosion control measures; • Visual assessment of stream flow; • Water quality control (well, river, pumps, etc.); • Control of silting mitigation measures in rivers • Physico-chemical and bacteriological control of water in the Niger Basin. 	NBA
Soils	<ul style="list-style-type: none"> • Visual assessment of soil erosion control measures; Monitoring of land reclamation practices. • Monitoring of nuisances and pollution and various soil contamination (pollutants, oils, greases, etc.); • Soil control in the Niger Basin and associated facilities. 	NBA
Fauna and Flora	<ul style="list-style-type: none"> • Assessment of reforestation / plantation measures and regeneration rate; • Control of the level of evolution (fixation, migration, appearance, disappearance) of the fauna • Control of the level of enforcement of regulatory and legal texts on the protection of natural resources. 	NBA

Elements	Follow-up actions	Monitoring officer
Pollution and nuisance of the living environment	<ul style="list-style-type: none"> • Monitoring of waste collection and disposal practices; Control of spills and other residues at the level of the Niger Basin and construction sites; • Control of noise emission thresholds • Visual and technical control of the emission level of fumes, gases and dust; • Control of compliance with hygiene / safety measures; The prevalence of diseases related to project activities; • Land conflict management; 	NBA
Losses of land, crops and dwellings	<ul style="list-style-type: none"> • Losses of land, crops and dwellings Control of the effectiveness of the compensation paid to the population for loss of property or dwellings in the villages and agglomerations affected • Investigations of the administrative and local authorities on the relevance of the awareness campaigns carried out among the local populations; • Control of the occupation of the right-of-way of the line (fields, pasture, fallow, etc.) 	NBA
Social conflicts / Disruption of archaeological and cultural heritage	<ul style="list-style-type: none"> • Control of respect for sacred sites, cultural and archaeological monuments; • Control of the climate of cohabitation of the site staff with the host populations; • Control of the level of integration of newcomers in the project area. 	NBA
Health, hygiene and safety measures	<ul style="list-style-type: none"> • Control of the effectiveness of awareness programs at the community and regional health centers of the localities covered. • Monitoring the effectiveness and efficiency of the advocacy measures recommended • Control of the prevalence of disease vectors related to the NBA Extractive Industries Project 	NBA
Measures for the prevention of hazards, risks and accidents	<ul style="list-style-type: none"> • Rigorous application of health, safety and hygiene regulations; Control of the provision of appropriate safety instructions; • Monitoring compliance with provisions for the prevention of risks, hazards and accidents • Monitoring compliance with labor legislation: provision and wearing of adequate protective equipment for construction site personnel (PPE); • Control of the installation of safety instructions and hygiene measures; • Control of the level of awareness of construction site personnel and local residents. 	NBA

Table 18 : Monitoring indicators for environmental and social components

Elements of monitoring and Indicators	Methods and monitoring devices	Responsibles	Period	
Waters <ul style="list-style-type: none"> • Pollution • Eutrophication • Sedimentation • Hydrological regime 	<ul style="list-style-type: none"> • Ground and surface water monitoring • Monitoring of surface water use activities, • Visual assessment of the flow of rivers • Control of the turbidity of watercourses and bodies of water • Monitoring of mitigation measures. 	Mission of Control	Daily work	
		Specialized Services Research Center Consultants Hydraulic Service Project Environment Service	Half-yearly Start, mid-term and completion of work	
Soils <ul style="list-style-type: none"> • Erosion / gully • Pollution / degradation 	<ul style="list-style-type: none"> • Evaluation of control measures (anti-salt barriers, etc.) against salinization • Visual evaluation of soil erosion control measures 	Mission of Control	Daily work	
		Project Service Environment Specialized Services	Semi-annual Start, mid-term and completion of work	
<ul style="list-style-type: none"> • Vegetation / wildlife • Degradation rate • Reforestation rate 	<ul style="list-style-type: none"> • Visual evaluation of vegetation degradation • Visual evaluation of reforestation / planting measures • Monitoring and surveillance of sensitive areas • Control of damage to wildlife 	Control Mission	Daily work	
		Project Service Environment Service Service Forest Consultants	Quarterly Start, mid-term and completion of work	
<ul style="list-style-type: none"> • Human Environment • Living environment • Socio-economic activities • Occupation space • Hygiene and health • Pollution and nuisances 	<ul style="list-style-type: none"> • Control of the occupation of private land / agricultural fields • Respect for historical heritage and sacred sites • Control of the effects on production sources 	Control Mission	On a daily basis during the works	
		Services concerned Project	Start, mid-term and completion	
	<u>Checking :</u>	<ul style="list-style-type: none"> • The presence of vectors of diseases and the appearance of water-related diseases • Various diseases related to the projects (STI / HIV / AIDS, etc.) • Compliance with hygiene measures on site • Monitoring of waste management practices 	Control Mission	On a daily basis during the works
			Project Health Districts consultants	Quarterly Start, mid-term and completion of work

Elements of monitoring and Indicators	Methods and monitoring devices	Responsibles	Period
	<u>Verification:</u> <ul style="list-style-type: none"> • The availability of safety instructions in the event of an accident • Compliance with traffic regulations • Wearing adequate protective equipment 	Monitoring Mission	Daily work

9.7. CAPACITY BUILDING PROGRAM

Institutional capacity-building is generally aimed at enabling actors to better assume their roles in the implementation of the PIDACC / BN, to identify environmental and social impacts and to plan mitigation measures as well as the financial and human resources likely to make Mitigation and effectively develop and implement the required safeguards instruments for investments planned.

To this end, information, awareness-raising and training activities will be targeted at the various categories of central and local actors according to their roles in the intervention process in urban management in general and the implementation of the program. Awareness training actions will have to start with the program and cover its cycle, from design to commissioning. Field visits and exchanges with local stakeholders highlighted that the "capacity building" component is essential if the expected project objectives are to be achieved. The investment efforts of PIDACC / BN will not achieve its expected economic, social and environmental objectives unless there is a change in environmental behavior on the part of the populations. Table 19 below, shows the Environmental tools training program

Table 19: Environmental Tools Training Program

Training Topics	Description
Environmental and Social Assessment Process	<ul style="list-style-type: none"> • Selection process and environmental categorization; • Good knowledge of the organization and conduct of ESS and EIES; • Objective assessment of the content of EIES reports; • Knowledge of BAD's and other financial institutions' environmental and social procedures; • Knowledge of the process of monitoring the implementation of EIES.
Environmental and social audit of projects	<ul style="list-style-type: none"> • How to prepare an audit engagement (mission); • How to conduct environmental auditing and monitoring; • Good knowledge of risk areas; • Good knowledge of construction site management; • Content of an environmental and social audit report.
Environmental and Social Policies,	<ul style="list-style-type: none"> • Environmental policies, procedures and legislation of the member countries of the NBA;

Training Topics	Description
Procedures and Guidelines:	<ul style="list-style-type: none"> Review and discussion of safeguard policies of development partners (BAD, World Bank, SIFI, etc.); Review of the Environmental and Social Management Plan (ESMF).
Health, hygiene and safety	<ul style="list-style-type: none"> Personal protective equipment (PPE); Risk Management in the Workplace; Prevention of accidents at work; Health and safety rules; Training of personnel in first aid and lifting activities; Training in the use of fire extinguishers.

9.8. PIDACC / BN ENVIRONMENTAL AND SOCIAL MANAGEMENT DEVICE.

It is proposed the recruitment of a regional environmental officer responsible for regional coordination of the implementation of the program's CFSP and the production of the program's annual compliance reports. Given the scope of the tasks and the nature of the program, it is also proposed to recruit an environmentalist from each country in the national coordination unit responsible for implementing the environmental component of the program The PIDACC / BN and the ESMF. The environmentalist (country), in relation with different actors will be responsible for:

- Implementing the measures contained in this ESMF;
- Providing the UGP interface for all aspects of the application of the ESMF and other potential environmental and social studies;
- Ensuring that the construction companies and the inspection mission respect the environmental and social clauses included in the DAO;
- Carrying out site-level checks to ensure that planned environmental and social measures are taken into account;
- Responding urgently to any incident or accident that requires verification and monitoring;
- Notifying any breach of contractual commitments for environmental and social management.
- Ensuring that complaints are properly identified and dealt with;
- Producing annual program compliance reports in the country;
- Ensuring that the BAD's national regulations and environmental policies are respected during the phases of work and implementation of the program.

Table 20: Environmental and social monitoring framework

Valued Environmental Components (VEC)	Follow-up Elements	Types of Indicators and Elements to Collect	Periodicity	Execution	Monitoring Officer
Waters	<ul style="list-style-type: none"> Physico-chemical and biological 	<ul style="list-style-type: none"> water level, duration and extent (area) of the water body 	Quarterly	Promoter	NBA

Valued Environmental Components (VEC)	Follow-up Elements	Types of Indicators and Elements to Collect	Periodicity	Execution	Monitoring Officer
	characteristics of water <ul style="list-style-type: none"> • State of water resources • Hydrometry and water quality 	<ul style="list-style-type: none"> • Hydrological regime and Piezometric level • Presence of physico-chemical, biological and bacteriological parameters of water (pH, BOD, COD heavy metals, germs, pesticides, nitrates, etc. 			
Soils	<ul style="list-style-type: none"> • Physical Properties • Erosion / Gullyng Behavior and land use 	<ul style="list-style-type: none"> • Sensitivity to wind and water erosion (area affected) • Rate of degradation (salinization, alkalization, erosion ...) 	Semi-annually	Promoter	NBA
Vegetation Wildlife	<ul style="list-style-type: none"> • Evolution of Fauna • And Flore Ecology and protection of natural environments 	<ul style="list-style-type: none"> • Degradation rate • Reforestation rate • Evolution of vegetation types 	Annual	Promoter	NBA
Human Environment	<ul style="list-style-type: none"> • Hygiene and health • Pollution and nuisances • Safety during operations and work 	<ul style="list-style-type: none"> • Level of compliance with hygiene / safety measures • Quality of waste management • Prevalence rate disease-related activities • Frequency of epidemiological surveillance • Number of poisoning • Number of land conflicts • Number of people affected by the activities • Number and type of claims 	Quarterly	Promoter	NBA

9.9. IMPLEMENTATION AND MONITORING SCHEDULE

Table 21: Provisional timetable for implementation and monitoring of measures

Activities	Year 1		Year 2		Year 3	
Review of the environmental legislation of the 9 member countries of the NBA	■	■				
Development of the manual of good practice in the implementation of project development activities of the standards and safety program	■	■				
Development of environmental and social guidelines	■	■				
Establishment of an environmental data base					■	■
Provision for environmental and social audits.			■	■		
Mitigation of the effects of previous potential negative impacts of existing projects.			■	■		
Biannual evaluation of the EESS.					■	■
Strengthening the capacity of the NBA of the technical services of the General Administration and the associations of works and water - GIRE devices of countries.		■	■			
Awareness-raising of the riparian populations and the promoters of the projects.	■	■				

9.10. ESTIMATED COSTS OF THE ESMF PLAN

The ESMF is designed as a screening mechanism for the environmental and social impacts of unknown investments and activities prior to program evaluation. It is therefore an instrument for identifying and assessing potential future environmental and social impacts of projects to be funded by the program. As such, it serves as a guide for the preparation of Environmental and Social Impact Studies (ESIS) specific to projects the number, sites and environmental and social characteristics of which are still unknown. In addition, the ESMF should define the monitoring and surveillance framework and institutional arrangements to be taken into account during program implementation and realization of activities to mitigate adverse environmental and social impacts, remove or reduce them to acceptable levels. The costs of the Environmental and Social Management Framework Plan include the costs related to capacity building on the one hand and those relating to the implementation of the Social and Strategic Environmental Assessment which are considered environmental costs on the other hand, and social and physical capacity building activities of the NBA. They are shown in the tables below.

Table 22: Implementation and Capacity Building Costs

Proposed actions	Description	Costs in CFAF million
Recruitment of an Expert in EESS	Expert with extensive experience in environmental and social assessment (ESMF, CPR, EIES/ESMF and PAR),	5, 000

Proposed actions	Description	Costs in CFAF million
	recruited part-time, for approximately 2 years	
Documentation of EIES Previous projects	Compendium compilation of EIES, ESMF by consultants	10, 000
Information and awareness-raising before and during the works	Program development and information, awareness and advocacy campaigns on the economic, environmental and social issues of the sub-projects by Administration supported by consultants	200,00
Strengthening the capacities of the NBA managers and the technical services of the Administration and of the user and water associations. GIRE systems (Country)	Elaboration of a program of training modules in (EIES), PAR, Environmental Audit, Environmental and Social Monitoring,	682,000
Strengthening community coping capacities		600,605
Environmental Monitoring and Monitoring of Strategic Social Environmental Assessments by the NBA	Follow-up during the implementation and monitoring by the State Secretariat of the Environment, the communities; NGOs and Civil Societies, etc.	80,000
Mid-term evaluation of projects	Mid-term and final	50,000
Technical inspection of rehabilitation work	Before rehabilitation works	Included in the rehabilitation of micro-dams
TOTAL		1,627.605

Table 23 : Costs of technical measures

Activities	Quantity	Costs in FCFA
Review of legislation on extractive industries	-	50 000
Development of guides to good practices and safety standards	2 manuals	200,000
Development of environmental and social guidelines	2	30,000
Establishment of an environmental data base	2	100,000
Provision for environmental and social audits		50,000
Mitigation of past effects of existing projects		150,000
Biannual evaluation of the EESS (after two years)	1	20,000
Strengthening of NBA equipment and sector capacities (logistics, analytical instruments, kits, etc.)	-	666,000
TOTAL		1,266,000

Table 24 : Environmental Awareness and Extension Costs (Establishment of Environmental Cells in the Administration Technical Services)

Actors involved	Quantity	Costs in FCFA
Extension Regional and National Coordination Cells and Social and Other Technical Services Private operators and civil society	-	1,776,000
Awareness and dissemination of information Riparian populations Local Associations	-	666,000
TOTAL		2,442,000

The estimated cost of the EESS Environmental and Social Management Framework Plan amounts to five billion three hundred and thirty five million six hundred five (5,335,605) FCFA francs.

X. PUBLIC CONSULTATION DURING SESA PREPARATION

10.1. OBJECTIVES OF PUBLIC PARTICIPATION

The United Nations Conference on Sustainable Development, held in Rio de Janeiro in June 2012 on the theme "The Future We Want", reaffirmed the importance of the principle of participation as a mechanism for consolidating good governance and Sustainable development. The Declaration states in paragraphs 43 and 99, on the one hand, "that broad public participation and access to information, as well as to judicial and administrative bodies are essential to the promotion of sustainable development" and, On the other hand, that "the promotion of access to information, public participation in decision-making and access to justice in environmental matters must take place at all regional, national, subnational and local " levels. As an integral part of the Strategic Environmental and Social Assessment (EES) process, public participation aims to enable citizens to participate in making decisions that have a real or possible impact on their quality of life. In addition to taking into account the concerns of communities in the realization of development policies and projects, the principle of participation also allows these policies and projects to benefit from the local and traditional knowledge of the populations in relation to the physical environment and the social fabric. This mutual benefit reinforces the credibility and acceptability of policies and projects, especially since public consultation takes place at the earliest stage of their design. The public participation procedure thus makes it possible to: (i) Present the project to different stakeholders and population and (ii) Appreciate impacts on the human environment; and • Gather the concerns of affected people.

10.2. NATIONAL PUBLIC CONSULTATION PROCESS

In each of the member countries of the Niger Basin concerned by the PIDACC, the approach used to carry out this study included: (i) interviews with the National Focal Structures (SFN); (ii) prior information from administrative authorities; (iii) interviews with local administrative authorities; (iv) interviews with the representatives of the technical ministries involved in the projects and (v) Consultation sessions with traditional authorities and local communities to host the various projects.

10.2.1. Public consultation process in Chad

In order to allow stakeholders to better understand the activities planned under the PIDACC / BN to better refine their concerns and possible expectations, the consultant initiated a series of meetings from 1 to 9 April 2016 in the various localities concerned , Namely Gounou Gaya, Carol Bridge, Tikem, Fianga, Pala, Galal, Lere and Binder.

At each of these various meetings, the Consultant first presented the sub-projects foreseen under the PIDACC / BN before allowing the populations to express their concerns and expectations as presented in the attached report.

Concerns were, among other things, related to: (i) Defending the aquatic environment in Kabbia Lake; (ii) The phenomenon of bush fires that destroy the vegetation cover and deplete the soil by initiating split-fire practices and (iii) The absence of livestock transhumance corridors that encourages recurring conflicts between farmers and livestock keepers;

Inadequate ponds or water reservoirs and lack of maintenance of existing ones which causes their silting. Stakeholders and project beneficiary communities also expressed their expectations as follows i) Initiate reforestation programs and community development projects; ii) Provide technical support for soil restoration, nursery production for reforestation, and drilling; iii) Remove the sand from the Mayo so that they can return to their beds and become more fishy; Plan the construction of the banks to better fix the Mayo but also reduce the speed of the winds that cause wind erosion and water erosion and iv) Encourage forage crops for livestock feed.



View of public consultation in Fianga



Public Consultation in Gagat

Photo 1: View of the various interviews and public information meetings organized by the Consultant in Chad

10.2.2. Public consultation process in Niger



Photo 1 : View of various interviews and public information meetings organised by the Consultant of ID SAHEL in Niger

As part of the implementation of the Public Information and Outreach component of the PIDACC / BN, the Consultant held discussions with the project beneficiaries on 17 December 2015 in the locality of Tara (Department of Gaya) 25 and 29 January 2016 respectively in OuroSawabe (Department of Torodi) and in Talkoboye Koira Tagui (Department of Ouallam). Concerns raised by the populations of each locality include (i) Financing of development projects in the localities to host the projects; (ii) Strengthening the technical and material capacities of the actors (iii) Recruiting the local workforce and (iv) Support to Income Generating Activities (AGRs).

Table 33 : Concerns expressed by the populations encountered in Niger

Date of consultation	Village / Department	Population position	Concerns expressed
17 December 2015	Tara/Gaya	Support project	<ul style="list-style-type: none"> • Treatment of the four (4) Koris threatening the village and crop fields; • Rehabilitation / construction of the small bridge that connects the village of Tara with the city of Gaya; • Construction of a dike to protect the irrigated perimeters; Strengthening the capacity of irrigators in advisory support (training and school fields) and technical (motor pumps, small equipment and agricultural inputs); • Purchase of a generator for the supply of the mini AEP for the village of Tara; Support for women's AGRs; Development of fish farming in the area through the development and stocking of ponds; Recruitment of unskilled local labor
25 January 2016	Ouro Sawabe/ Torodi	Project-friendly	<ul style="list-style-type: none"> • Construction of market gardening wells for irrigators; • Donation of equipment and agricultural equipment to farmers (motor pumps, small equipment, rakes, wheelbarrows, etc.); • Advisory and technical support (agricultural inputs, pesticides, fertilizers, improved seeds, etc.); • Development of Habanaye in the area; • Distribution of livestock feed to livestock farmers in the area; • Development of CES / DRS activities; • Support for AGRs; • Recruitment of unskilled local labor.
29 January 2016	Talkoboye Koira Tagui /Ouallam	Project-friendly	<ul style="list-style-type: none"> • Donation of equipment and agricultural equipment to irrigators (motor pumps, wheelbarrows, rakes, etc.); • Construction of a dike to protect the village and irrigated plots against flooding by Kori waters from Mali; • Development of CES / DRS activities in the area to create employment for young people and women; • Construction of wells for gardening for farmers; • Support for agricultural inputs (pesticides, fertilizers and improved seeds); • Extension of the drinking water supply network in the

Date of consultation	Village / Department	Population position	Concerns expressed
			village with the creation of additional standpipes; Strengthening the capacity of farmers' organizations in the development of irrigation; <ul style="list-style-type: none"> • Support for AGRs.

10.2.3. Public consultation process in Burkina Faso

Public consultations were held in the Regions of Intervention of the PIDACC to address the concerns of stakeholders and beneficiary actors in the Sahel, East and Central East Regions. They are essentially structures represented at the local level, namely, on the one hand, public bodies such as DREDD, DRRA, DRAASA and DRIDT, and the town hall of Tenkodogo; and non-governmental organizations (NGOs) such as Reach Italia, AGED, ADELE and ARFA on the other hand. These meetings served as a framework for discussing the expected actions of the program and its impact on the environment and society. In all the Regions visited, the planned activities met the consent of the local actors, who found the program an opportunity for effective environmental management and a genuine commitment in the fight against climate change. Adequate mitigation measures and increased resilience of the populations of the Niger Basin. Concerns have been raised that can be summarized as follows: (i) Inclusion of young people in the recruitment of staff for the implementation of the PIDACC projects; (ii) Supporting the endogenous knowledge of different localities for the implementation of the projects and (iii) Strengthening the capacities of deconcentrated technical services of the state and other local actors.

10.2.4. Public Consultation Process in Mali

In Mali, the public participation component consisted in initiating an information and exchange meeting with various structures (Representative of the Prefect, CR of Koulikoro, DRACPN, DRA, DRPIA, DRP, DREF, DRGR, DRH, GEDEFOR, SFN-NBA, CAFO) gathered in an Inter-ministerial Consultative Committee on 1 February 2016 at the deliberation room of the Regional Council of Koulikoro.

This meeting served as a framework for the Consultant's team to present the project's promoter and its consistency. After which, the participants were able to express their concerns, which are recorded in the attached minutes and summarized in the following lines:

- Initiate information and awareness campaigns on project activities prior to their start in collaboration with local radio stations;
- Integrate projects in the livestock sector;
- Establish the forage perimeter system for rational and sustainable management;
- Associate research structures to facilitate the introduction of bourgouculture in the Koulikoro region;
- Provide floating cage to communities or train them in floating cage techniques;
- Add watersheds to avoid water currents for better soil conservation and gully treatment;

- Rehabilitate rural roads to facilitate the flow of products;
- Clarify the institutional anchorage of the project in relation to decentralized communities such as the Regional Council;
- Carry out studies at various APS, DAO (APD) and implementation levels to enable people to take ownership
- Initiate awareness activities on bushfires, reforestation and agroforestry activities;
- Disseminate forestry texts through local elected representatives;
- Establish a system to promote water availability for agricultural activities;
- Clarify the land situation of the sites before project starts;
- Protect classified forests;
- Provide for pastoral areas;
- Fight against the silting of the river in the project;
- Comply with national environmental protection policy and regulations and BAD guidelines in the implementation of mitigation measures;
- Strengthen the capacities of elected representatives and populations in the implementation of the project.

10.2.5. Public consultation process in Benin

As part of its stakeholder consultation on the project, the Consultant initiated a series of meetings with several structures and organizations involved in various sectors. For example, information and exchange meetings were held with:

- the National Focal Structure, on 11 and 12 January 2016 in Cotonou for the framing of the activities and the mission;
- the CARDER BORGOU-ALIBORI executives and the technical services and the representatives of the BORGOU-ALIBORI Department, on 25 January 2016 in Parakou;
- Mayors, RDRs, farmers, processors, breeders, traders, communal producer unions and market gardeners in Nikki, Kalale, Bembereke and Sinende communes, on 26 January 2016 in Bembereke;
- Mayors, RDRs, farmers, processors, breeders, traders, communal producers' unions and market gardeners in the communes of Banikoara, Gogounou, Kandi, Karimama, Malanville and Segbana in Kandi, ATACORA, 27 January 2016;
- representatives of mayors, representatives of RDRs, farmers, processors, breeders, traders, communal unions of producers and market gardeners from the communes of Kerou, Kouande and Pehunco in Kerou, on 28 January 2016.

The Consultant carried out a documentary review from 12 to 13 January 2016 with the team of national consultants in charge of preliminary technical studies and the Directorate General of Water, the Directorate General for Forestry and Natural Resources, the Benin Environmental Agency and the Directorate General of Rural Development and Equipment.

At each of the meetings, the Consultant initially presented the SAHEL ID Cabinet and its missions within the framework of the PIDACC / BN, namely the conduct of environmental

and social assessments in APS and DAO phases. Then the consistency of the activities planned in the different regions and localities was described in order to situate the issues and the populations to express their views and express their concerns and expectations, which are recorded in an attached report. At the level of the issues of the PIDACC / BN, the following points were noted by the participants:

- Plan for afforestation of forests with shea butter to increase shea butter production and increase honey production;
- All this will increase the income of the populations in order to reduce the pressure on the forests (the abusive cutting of the wood);
- Build a nursery center to promote the stocking of fish ponds and deal with problems of fish shortages during lean periods;
- Establish fish ponds to reduce the pressure on water reservoirs and dams that lead to their silting and then disappearance;
- Implement DRS mechanical and biological work, soil and water conservation work in cultivated plots, mechanical and biological treatment of ravines, improved fallow and agroforestry to promote the maintenance of biological balance Ecosystems;
- Increase the resilience of populations through the establishment of (AGR) (beekeeping, fish farming, small livestock farming, irrigation schemes) in order to contribute to raising the living standards of populations;
- Establish an adequate institutional framework for the implementation of the PIDACC / BN;
- Construction of protective dikes to prevent flooding.
- With regard to the participants' concerns, they relate to the following points:
- The construction of a hydro-agricultural dam at Nikki to compensate for the lack of water and an inter-communal dam between Nikki and Kalale on the OLY river;
- The financing of Income Generating Activities (AGR) for women and young people to build resilience and fight poverty;
- The definition of an implementation and operationalization approach for PIDACC / BN with the involvement of local actors;
- The definition of a clear monitoring and evaluation mechanism;
- clarification of the sites and beneficiary localities of the projects, while taking care not to favor discrimination in their choices;
- The establishment of forage plots to settle livestock farmers;
- Capacity building of actors on integrated soil fertility management techniques;
- The possibility of proposing activities other than those already identified, in particular the construction of grazing areas and nurseries which must be accessible to the populations of the various communes;
- Strengthening the human and technical capacities of the people in the production, conservation and processing of agricultural and market produce;
- Identifying opportunities for wood and non-wood products;
- Securing sites, taking into account the new federal land code;
- Updating seeding periods in relation to climate change;

- Consideration of the Integrated Water Resources Management (GIRE) principle in the construction of multi-purpose dams;
- Consideration of short-cycle varieties in adaptation measures to climate change;
- Creation of a conflict management component.
- The consultant provided clarifications and answers to the various concerns of the participants. Contributions were made by some participants to better substantiate the concerns raised.

10.2.6. Public consultation process in Cote d'Ivoire

In order to enable the project stakeholders to be sufficiently imbued with the project and to express their concerns and expectations, the Consultant initiated various meetings in Abidjan and the three regions concerned, namely KABADOUGOU, FOLON and Bagoue.

These sessions also helped to prepare the field mission to visit the sites and to meet with the administrative authorities, the heads of the local structures involved in the project (Regional Directorate for Animal and Fish Resources and Water and Forests, National Office for The Development of Rice Farming) and the populations coming from the beneficiary localities and likely to be affected. Afterwards, the Consultant carried out a mission of reconnaissance of the sites in the regions of FOLON (2 February), KABADOUGOU (3 February) and BAGOUE (4 and 5 February), and, together with representatives of technical stakeholders.

In each of the regions, prior to the commencement of site reconnaissance visits, the Consultant held working sessions with administrative and customary authorities, farmers and breeders, NGOs and Associations. The main points addressed were: (i) Recurrent conflicts between farmers and breeders; (ii) The provision of a site to serve as a drinking trough for animals; (iii) The need to protect a classified forest in the area; (iv) Inadequate involvement of populations in the implementation of projects and programs; and (v) The lack of knowledge of the nature of the projects to be carried out. In the light of the grievances expressed, the populations wanted the PIDACC / BN to contribute to the financing of development projects.

10.2.7. Public consultation process in Cameroon

In order to implement the public consultation process the ID SAHEL Consultant initially proceeded with the identification of the stakeholders, namely: (i) sectoral managers of the administrations concerned by the program and (ii) beneficiary populations potentially impacted by the projects. Subsequently, the Consultant conducted a mission to the program area (Annex 1), during which he conducted interviews with the administrations concerned and meetings with the beneficiary populations / potentially impacted by the projects program. For the administrations concerned, meetings were held with their officials. Specifically, they are:

- at the central level, the PIDACC / BN program manager at MINEPAT;
- At the regional level, the MINEPAT Regional Delegate, the MINDCAF Delegate, the MINEE Delegate, the Head of the Northern Region Planning and Development Study

Mission (MEADEN) and the Regional Chief of Wildlife and Protected Areas of MINFOF; At the departmental level, the MINEPIA Delegate, the MINOCAF Delegate of Mayo Louti, MINFOF Delegate of Mayo Louti, the Prefect of Faro and Deo, the MINEPAT Delegate of Faro and Deo, the Delegate of MINADER of Faro and Deo, The Delegate of MINADER of Benoue and the Delegate of MINEPDEP of Benoue;

- At the local level, the District Delegate of MINEPIA of Lagdo, the Mayor of Hina, the District Delegate of the MINEPIA of Rey Bouba and the Head of the Fish Rearing and Control Center of Alpha.

During these meetings, an interview guide was administered to each manager. The persons consulted filled in the form of the people met. With regard to the beneficiary populations and potentially affected by the projects, the Consultant held several information and exchange sessions on the following points: (i) knowledge of the program by the populations; (ii) population perception of the program (iii) the concerns and fears of the populations with regard to the projects of the program; (iv) the expectations of the population.

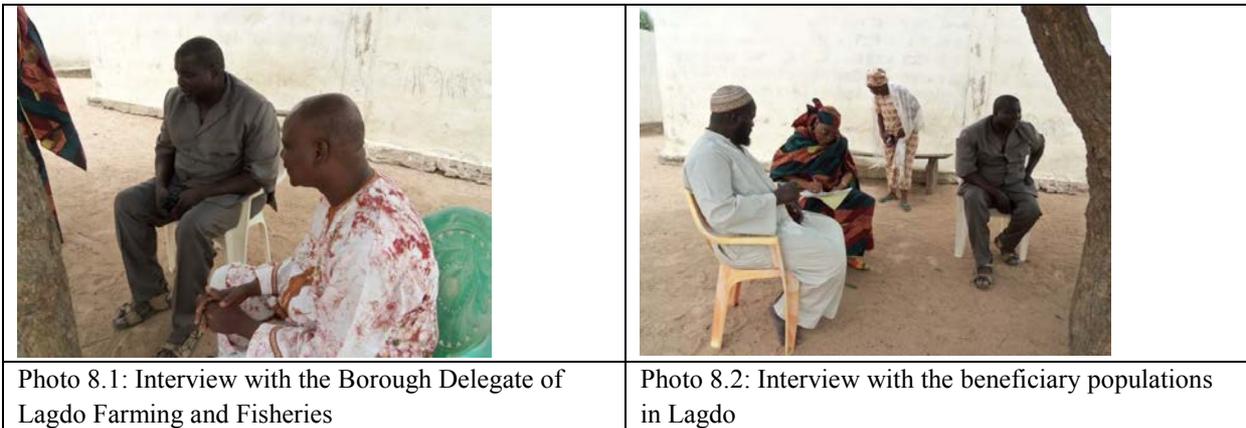


Photo 4: View of the various interviews and public information meetings organized by ID Sahel Consultation in Cameroon

At the end of the public consultations, it appears that the stakeholders are enthusiastic and fully adhere to the various projects identified within the framework of the PIDACC / BN. Indeed, the sectoral managers of the administrations and the beneficiary populations consider that the PIDACC / BN constitutes an opportunity for the socio-economic development of the zones concerned and the strengthening of the resilience of the local communities. However, in terms of environmental and social issues, the activities of the PIDACC / BN have some risks, particularly with regard to the sustainable management of fishery resources, water resources and the agricultural potential of the areas concerned, which are of concern to stakeholders and beneficiary communities. These risks include: (i) destruction of a few dwellings located on the project sites and a potential increase in the crime rate in some areas (Dami case); (ii) overexploitation of fisheries resources and water resources and (iii) inadequate consideration of the environmental specificities of the project areas.

At the level of expectations, stakeholders and beneficiaries wish to: (i) improve communication around the activities of the PIDACC / BN (ii) establish a maintenance system for existing infrastructures in the areas concerned (Hina case);(iii) transfer of the management of the various works to the beneficiary populations; (iv) construct additional infrastructure to develop economic activities in project areas (buildings for restaurants); (v) Implement projects to open up and supply electricity and (vi) establish a coordinating body for the activities identified in the framework of the PIDACC / BN.

10.2.8. Public Consultation Process in Nigeria

The public consultation process initiated by ID SAHEL Consultant for the conduct of PIDACC / BN activities in Nigeria enabled the organization of meetings between 17 February and 5 March 2016 with the National Focal Point, as well as with the administrative authorities. The representatives of the participating technical ministries and the communities of the beneficiary localities.

With the SFN, the meeting consisted of the presentation of the mission assigned to the Cabinet ID SAHEL and an exchange on the various projects identified by the PIDACC / BN as well as the beneficiary localities. Information and exchange meetings were also held by the Consultant in the states of Upper Niger River Basin, Abuja, Upper Benue River Basin and Anambra-Imo River Basin as detailed in the following table.

Table 25: The public consultation program developed with the SFN

N°	Date of public consultation	State
1	23 February 2016	Upper Niger River Basin
2	24 February 2016	Abuja
3	26 February 2016	Upper Benue River Basin
4	1st March 2016	Anambra-Imo River Basin

Photo: 25: View of the various interviews and public information meetings organized by ID SAHEL Consultant in Nigeria



ANNEXES

ANNEX 1: MINUTES AND ATTENDANCE LISTS AT PUBLIC INFORMATION MEETINGS HELD IN CHAD

ANNEX 1.1 SUMMARY OF EXPECTATIONS AND CONCERNS OF USERS IN CHAD

Date de la consultation publique	Lieu de la consultation publique	Préoccupations des usagers
Le 1 ^{er} avril 2016	Centre de formation féminin de Gounou Gaya	<ul style="list-style-type: none"> • La mise en défend du milieu aquatique dans le lac Kabbia ; • Prendre des mesures de régulation des feux de brousse, car les feux de brousse incontrôlés et très destructeurs deviennent de plus en plus généralisés dans la zone. Les usagers proposent la pratique des feux fractionnés qui à leur avis, est une technique efficace pour lutter contre la destruction de la nature et protéger les ressources ; • La non délimitation de couloir de transhumance cause de conflit entre les agriculteurs et les éleveurs et ce, de manière récurrente dans le département de la Kabbia ; • Aménager les marres dans le département de la Kabbia et cet aménagement devrait être accompagné des travaux de reboisement afin de limiter les érosions; • Les populations rurales du département de la kabbia sont en majorité des agriculteurs et les pratiques agricoles telles que observées pour l’instant ne sont pas de nature à favoriser une bonne productivité : on détruit beaucoup de l’espace pour cultiver et cette pratique contribue largement à la destruction du couvert végétal et rend les sols agricoles infertiles. Alors il serait mieux de penser au reboisement et de restaurer les terres infertiles ; • S’agissant des travaux d’aménagement des forêts, les usagers souhaiteraient avoir une précision sur la catégorie de la forêt qui sera aménagée. Selon eux, il existe trois catégories de forêts dans la zone : il s’agit de la forêt communautaire, la forêt classée et de la forêt conventionnée ; • Le président de groupement des pêcheurs du département de la Kabbia a soutenu l’idée selon laquelle il serait bien de prendre en compte le projet de la pisciculture. Il y a en plus du lac Kabbia qui constitue un potentiel halieutique important et qui est menacé par des pratiques d’exploitation inappropriées. Ce projet apporterait de la valeur ajoutée dans le secteur de la pêche, a-t-il précisé. • La non prise en compte des projets tels : aménagement des infrastructures à but multiples, la construction des micro barrages dans les deux Mayo Kebbi (Est-Ouest), aménagement des périmètres irrigués à partir de ces barrages, aménagement des trois marres pour l’irrigation en contre saison dans les Mayo Kebbi Est et Ouest, aménagement de périmètres de cultures de décrue de maïs et du sorgho dans les deux Mayo Kebbi Est (Tikem, dans les cantons Goumou et Djaro puis Hollom/Gamé dans le département de Mont Illi). Dans la sous composante 2.1. volet 2 : les usagers ont émis le souhait de la construction de retenues d’eau d’abreuvement de bétail dans les deux Mayo Kebbi (Est-Ouest), création de parc de vaccination dans le Mayo

Date de la consultation publique	Lieu de la consultation publique	Préoccupations des usagers
		<p>Kebbi Est précisément dans le département de Mont Illi, et dans le Mayo Kebbi Ouest ;</p> <ul style="list-style-type: none"> • Volet 3 : construction des débarcadères dans le département de la Kabbia, la construction d'une station d'alevinage dans les deux Mayo Kebbi (Est-Ouest), appui aux paysans pour la production des pépinières permettant le boisement et le reboisement.
Le 02 avril 2016	Centre de formation de l'Eglise catholique de Pont carol	<ul style="list-style-type: none"> • L'accent a été beaucoup mis sur la baisse des productions agricole constatée ces dernières années dans la zone ; selon les usagers, cette baisse de rendement est due : infertilité des terres agricoles, l'irrégularité et le retard des pluies, les mauvaises herbes, les chenilles, la destruction de la couverture végétale et la hausse de la chaleur. Tous ces risques climatiques entraînent l'érosion et l'ensablement des réseaux hydrographiques dans le département de la Kabbia. • Les usagers souhaiteraient un accompagnement technique dans ce sens pour leur permettre de restaurer les terres infertiles, la production des pépinières pour le reboisement et également le forage puisqu'il y a une baisse des nappes phréatiques dans la zone et cela pose un réel problème de ressources d'eau. Il a été aussi question de prévoir la construction des latrines publiques puisque dans le cadre du PIDACC/BN, il a été prévu la construction d'un grand marché dans le chef-lieu de la sous-préfecture (Pont carol); les usagers souhaiteraient que le projet prenne également en compte la construction de la clôture dudit marché afin qu'il soit mieux sécurisé. Enfin, les usagers ont beaucoup insisté sur le manque de couloir de transhumance qui serait à l'origine du conflit entre les agriculteurs et les éleveurs dans la zone.
04 avril 2016	Centre de formation de la PRODEPECHE de la commune de Tikem	<ul style="list-style-type: none"> • La menace que représente le changement climatique a été largement partagée par presque tous les usagers (ères) de la portion nationale du bassin du Niger. Ces risques énumérés par les usagers (ères) sont : le retard et l'irrégularité de la pluviométrie, indisponibilité des semences améliorées et adaptées, érosion des ravins constatée un peu partout dans les villages de la sous-préfecture de Tikem ; face à la dégradation avancée du couvert végétal, les usagers proposent comme solution la mise en place de pépinière afin de reboiser l'espace dégradé ; désensabler les Mayo afin qu'ils reprennent leur lit et redeviennent plus poissonneux surtout que ces dernières années, l'on assiste à un tarissement du lac de Tikem et devient de moins en moins poissonneux ; prévoir la construction des berges pour mieux fixer les Mayo mais surtout réduire la vitesse des vents qui causent l'érosion éolienne et l'érosion hydrique. • Pour les usagers, Tikem a un problème d'eau potable, alors il faut penser à la construction de forages pour renforcer ceux existant ; sensibiliser les usagers à une prise en compte des feux de brousses qui représentent une menace réelle, empêche la régénération de la végétation naturelle et même source de conflit ; encourager les cultures fourragères pour la nourriture de bétail.
05 avril 2016	Instance Locale d'Orientation et de Décision (ILOD) de Fianga	<ul style="list-style-type: none"> • Les usagers ont émis la plainte pour la construction des retenues d'eau d'abreuvement de bétail, aménagement des marres dans le département de Mont Illi; • Mettre en place un plan de formation sur les techniques de restauration des sols agricoles afin de réduire la peine des producteurs qui utilisent de vastes champs pour les cultures.

Date de la consultation publique	Lieu de la consultation publique	Préoccupations des usagers
		<ul style="list-style-type: none"> • L'agroforesterie qui a pour but d'intégrer des plantes ligneuses (arbres, arbustes, arbrisseaux, bambous et palmiers) aux systèmes de production paysannes permettra de prévenir l'érosion et fournit de l'ombre pour d'autres écosystèmes. • Certains usagers ont demandé à leurs collègues du groupement maraîcher de revoir la proximité de leur site par rapport au niveau du fleuve. Ils leur conseilleraient de fixer le site maraîcher à au moins 30 m du fleuve. Ceci éviterait que les hippopotames viennent détruire leurs jardins comme c'est le cas maintenant. Mais aussi limiterait la contamination du fleuve Fianga par les engrais chimiques qui ont été utilisés par les maraîchers pour traiter les jardins et qui se retrouvent dans le lit du fleuve en saison des pluies par le phénomène d'érosion hydrique.
06 avril 2016	Centre de formation Diocésain de Pala	<ul style="list-style-type: none"> • Selon les usagers agricoles, l'agriculture est la base de tout développement et donc demande beaucoup d'investissements. Par conséquent, il faut un soutien efficace dans ce secteur en ce moment où la menace que représente le changement climatique se précise et le perturbe. Pour ces usagers présents à cette consultation publique, la hausse généralisée des températures, la pauvreté des terres, la déforestation, la variabilité accrue de la pluviométrie et des caractéristiques de la saison des pluies et une recrudescence des phénomènes extrêmes (sécheresse et pluies diluviennes) perturbant fortement le cycle des cultures. Les usagers ont affirmé dans leur ensemble que l'impact de la hausse des températures, de la variabilité de la pluviométrie, les perturbations sur les cycles des saisons et le raccourcissement de la durée de végétation, auront pour répercussions une réduction des pâturages, un déficit du bilan pastoral et fourrager, une détérioration des conditions d'abreuvement. • Il est donc urgent d'agir : appuyer la mise en place des plantations forestières avec pour but de protéger les sols cultivables contre les érosions éolienne et hydrique, protéger les bassins versants des points d'eaux divers (barrages, lacs, sources d'eaux etc.). • La protection des points d'eaux par ces plantations forestières en combinaison avec des pratiques anti-érosives en amont, gardent généralement plus longtemps de l'eau et stabilisent ainsi les fonctions régulatrices de l'eau. Les usagers attestent que certaines sources d'eau, au bout de quelques années pourraient regagner leur capacité à grader l'eau pendant toute l'année, grâce à l'effort de réhabilitation de leurs bassins versants. Ceci représenterait un impact très important pour les usagers, habitués d'y mener les cultures de contre saison nécessitant d'importantes quantités d'eau.
07 avril 2016	Centre de Formation de l'Eglise Catholique de Gagal	<ul style="list-style-type: none"> • Dans cette commune, les usagers du bassin du Niger n'ont pas perdu de vue l'aspect changement climatique qui est une menace réelle pour les différentes activités (agriculture, élevage et la pêche) qu'ils mènent. Ils ont cité entre autre la déforestation, la baisse de la fertilité des terres, le retard et le raccourcissement de la durée de pluies, le manque de fourrage, le manque de semences améliorées et adaptés ainsi que les feux de brousse. Tous ces risques contribuent à la baisse des rendements agricoles constatés ces dernières années dans leur zone et donc à l'insécurité alimentaire.
08 avril 2016	Centre d'Epargne et de Crédit de	<ul style="list-style-type: none"> • Les inquiétudes des usagers de cette zone ont porté sur : la non prise en compte des travaux d'aménagement des marres dans les bas-fonds du village

Date de la consultation publique	Lieu de la consultation publique	Préoccupations des usagers
	Léré	<p>Berliang (1250 ha); la construction du barrage hydroélectrique pour la signalisation à la station de Zalbi, Fouloumbaré, Piparé et Bolloro; il y a un réel problème de ressources en eau; les usagers de Lagon ont insisté sur l'insuffisance de ressources en eau dans toute la zone alors ils ont plaidé en faveur des travaux d'aménagement des trois marres qui ont été identifiées (les marres d'Eparjouli et la marre de Fiwoura);</p> <ul style="list-style-type: none"> • Pour les usagers du village Bolloro, ces dernières années ils assistent à un phénomène niveau : la destruction de la forêt par un incendie par les personnes qu'ils ne connaissent pas, le manque de ressources en eau. Ils souhaitent qu'on reboise certains sites qui ont été détruits par les feux. Un forage, de la pépinière et puis le reboisement. • Il y a aussi la déforestation pratiquée par des personnes qu'ils connaissent bien. Ces dernières pratiquent cette activité pour subvenir à leur besoin car n'ayant pas d'autres sources de revenus que la destruction de l'environnement. Un autre problème soulevé par les usagers est celui de la forte croissance démographique qui n'est pas en adéquation avec la production vivrière. • Il y a encore l'usage des engrais chimiques qui détruisent suffisamment les champs. Ils ont besoin d'être formé aux techniques de récupération des terres car elles sont pauvres; les usagers de Biparé ont aussi insisté sur l'insuffisance des ressources en eau dans leur terroir. La pratique de déforestation est la cause du phénomène d'érosion hydrique qui entraîne à son tour l'ensablement du lac Léré. • Conséquence : le lac devient de moins en moins poissonneux, le bétail s'abreuve très loin et lorsque l'éleveur traverse la frontière pour aller au Cameroun pour permettre au bétail de s'abreuver, il est contraint de payer 200 francs CFA par tête de bétail. Les usagers proposent le reboisement des berges afin d'éviter l'ensablement du lac; ils proposent le reboisement des sites qui abriteraient les travaux de construction des barrages; il a été aussi question de mettre à la disponibilité des usagers des semences améliorées et adaptées afin de faire face aux risques climatiques constatés dans la zone; encourager la pratique de l'agroforesterie, surtout les espèces adaptées au milieu; les usagers de Tikéré affirment que la déforestation avance à grand pas. • PADEL : Il faut prendre des mesures telles que la sensibilisation, la formation des femmes et des jeunes à se tourner vers d'autres activités comme la formation en at plastique par exemple; projet de restauration et de protection des écosystèmes des lacs Tréné et Léré. Ceci permettrait aux lacs de redevenir poissonneux.
09 avril 2016	Sous-secteur de l'Office National de développement Rural de Binder	<ul style="list-style-type: none"> • Les usagers de la zone de Binder ont d'entrée de jeu pointé un doigt accusateur sur le changement climatique comme étant la principale cause des difficultés auxquelles ils sont confrontés ces dernières années. Ils ont expliqué cela par les risques climatiques tels que la sécheresse, la pauvreté des terres cultivables, la déforestation et la hausse de la température. • Ces risques climatiques entraînent une baisse de la production agricole surtout l'oignon, le tarissement précoce, l'érosion hydrique et l'ensablement des Mayo, le manque de fourrage pour le bétail, la disparition de certaines espèces végétales, les éléphants ont tendance à venir nuitamment dans les villages à la recherche de l'eau détruisant à leur passage quelques espèces

Date de la consultation publique	Lieu de la consultation publique	Préoccupations des usagers
		<p>d'arbres existant.</p> <ul style="list-style-type: none"> • Les usagers de cette zone ont aussi mis l'accent sur le manque de semences adaptées et améliorées, bref le manque d'intrants pour soutenir leurs activités agricoles. Il y a aussi le phénomène de feux brousse qui accentue la dégradation de l'environnement dans la zone. • Comme stratégie d'adaptation développement par les usagers il y a entre autres la fabrication de compost et le parage du bétail dans les champs en vue de l'utilisation de leur déjection comme fertilisant sur ce site. Ils ont dit que l'État a mis à leur disposition des tracteurs pour les travaux agricoles mais cela n'a pas de sens puisqu'il faut adresser la demande aux chefs qui se trouvent à N'Djaména. La demande aura toujours une suite après la saison pluvieuse et du coup cela décourage. Alors ils sont abandonnés à leur triste sort. • Les usagers de Binder souhaitent bénéficier de la formation en matière de technique de restauration des sols, mettre en place un projet de reboisement des berges des Mayo, la construction de barrages et leur reboisement, la construction des points d'eau car il en manque trop dans la zone, trouver une autre activité pour une bonne insertion des ceux participant à la coupe abusive de bois de chauffe comme sources de revenus etc.

ANNEX 1.2: ATTENDANCE LISTS AT PUBLIC INFORMATION MEETINGS HELD IN CHAD

LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EES) dans la région de : *Nayo Kelli Ouest*

Date : *09/04/2016.* *Commune de Binder*

N°	Nom et Prénom	Structure	Contact	Emargement
1	HATIKI DAIRAM	MINIMBAWAN	99710080	<i>[Signature]</i>
2	OUMAROU DJINGUI	ASSOCIATION NARRAL	93531566	<i>[Signature]</i>
3	Toumba KAMATEU	ASgla	98702656	<i>[Signature]</i>
4	Boubakar Amadou		99727114	<i>[Signature]</i>
5	Abdoumaman Hamadou	Djan-Djan	99369721	<i>[Signature]</i>
6	DIFFISSA HAMANE	Rozail	91895163	<i>[Signature]</i>
7	Tchijalé Pilibka	BADjalki	68267400	<i>[Signature]</i>
8	RAISSIDA Banda	KACoutar	90603954	<i>[Signature]</i>
9	DEURBEULAH	ABOW		<i>[Signature]</i>
10	AWAH Hamadou	Lagabka	90882630	HB
11	MOUSSA GONG-DAB	GLUCOP	669033215	ff.
12	NEBAI né Peline	Capelit		-
13	Chenka Toumba	YAH Capelit		
14	Doulatou RARGA	BEBAL-Ristak		<i>[Signature]</i>

Binder
(2)

33	Bousta Pierre	LAAKI	BT	95618322
34	HOWA Hamadou	Tinare	BT	-
35	DAOU DA OUMAR	NARRAL	BT	99915770
36	DJIBE gagou Roger	Jeunes producteurs Pouébo galagala	BT	
37	FATA	tiniri	BT	
38	MANA-Badi	Kadard		
39	OUMAROU	Hinche		
40	Him-yanké François	Sokoye	BT	63442177
41	HINYANBE ANDRE	Runota	BT	
42	Rayard Joseph	NAGAPELE'	BT	68477706
43	MASSA OUMAROU	- 11 -	BT	- = -
44	NAMAKOUA	CELINE	BT	95002564
45	MASSOU BOUBA	ADEZA	BT	63960141

Binder (3)

15	AISSATI YAYA	BARKAATI		Ai
16	SAN DAMALIKI	Moulassoum	663908660	Suf
17	Vondou HAMATEU	Heri YADAR Jesam mabmba	65695304	Am
18	Tonbou HAMATEU	MoussAPKA		
19	Siou Maounde'	Moulasseme	-	10 11
20	Ignanone'che	Zagnabia	99727716	12
21	Kanah bé Benija	Paiya	99727180	13
22	Meddi Pahina	Minnectou	66357768	14
23	Liaké Oka ssang	Riakika	99722928	15
24	Yétchimbé Norbert	TAIKI	-	16
25	Sin heho Jean	LANTA	99565555	Suf
26	PAZATEGUERE	NAGAZANKA	98766994	17
27	GWIMBE RLAU	ASGOVINA	99727795	18
28	Yahchie Tapika	- - -	95498213	19
29	Akunatroune	Moussali Toummeurké	63442177	20
30	Richaene'ESSAIE	Rounota	99369724	21
31	Wochiakibé Susane	Sobkika	93491094	22
32	Quadane M.	KA BAPÉLÉ	93814786	23

Binder ②

LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EES) dans la région de : *Mayo Kebbi Ouest*

Date : *08/04/2016*

Commune de LERE

N°	Nom et Prénom	Structure	Contact	Emargement
1	Brakim-Adoum	AGF	66664627 9257-5857	<i>[Signature]</i>
2	Houlkebmo Magai	ADESOR	91446798	<i>[Signature]</i>
3	Balleumo Tiro	DVRZ		<i>[Signature]</i>
4	DOUFENE	Foubeuki	93038423	<i>[Signature]</i>
5	Beugnibi Luc	Od-B	62053909	<i>[Signature]</i>
6	Itchere' Narcisse	PADEL/B.	66-46-54-12	<i>[Signature]</i>
7	Zol'di Kado	GSFAEKA	695689490 675471141 660400572	<i>[Signature]</i>
8	Houmame Hartine	Présidente Wechéo		<i>[Signature]</i>
9	GBAhdgo bo jeroine	Secrétaire	60116961	<i>[Signature]</i>
10	WATTON Madbi deus	SB ADESOR	95.46.98.17	<i>[Signature]</i>
11	ERNEST SANDEBIA	Secrétaire taiki	90919560	<i>[Signature]</i>
12	BOFABE Ni co- dème	Tresorier, Ept Fiki de Guebanaé	63645191	<i>[Signature]</i>
13	Kanoune Pambro	Président PADEL de Najamena	66 66 4617 99539987	<i>[Signature]</i>
14	Toufaya Beline	Présidente		<i>[Signature]</i>

lere (2)

15	Wouloujeon de Bernadette	Dougalka		
16	DEVERRE Jean	Lidouh	66371589	
17	PEUFFNE PAUL	Secrétaire	60-12-51-00	
18	Douféné Zanki	SCMS	66371807 99709736	
19	MAI MOUNIA	présidente Thourba		
20	ehindanni E	Bpt Na-Pouloung	63475974	C.ouf
21	MAKPOU-MAWE	Yachakya	62-24-70-37	omv
22	Koupra	Présidente	6039622	
23	KOUCHAKBA	Présidente. Joubeuki	92038333	
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LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EESS) dans la région de :

*Prayo Kibbi' Ouast,
Département Prayo
Dallah
SIP Gagah*

Date : *07/04/2016*

N°	Nom et Prénom	Structure	Contact	Emargement
1	<i>Mbeikassam Jossias</i>	<i>gpi Neteankon</i>	<i>90227950</i>	<i>[Signature]</i>
2	<i>Djirayom Jean</i>	<i>U.P.A.G</i>	<i>92249147</i>	<i>[Signature]</i>
3	<i>Madjam Felix</i>	<i>ARABA</i>	<i>95932325 62257388</i>	<i>[Signature]</i>
4	<i>TEYON Justid</i>	<i>AREMAJIBEY</i>	<i>93.66.68.34</i>	<i>[Signature]</i>
5	<i>Pemikon PATrobes</i>	<i>Sangba</i>	<i>92889251</i>	<i>[Signature]</i>
6	<i>MBai audoum PAT</i>	<i>AREMAJIBEY</i>	<i>9244935</i>	<i>[Signature]</i>
7	<i>Goullou Raymond</i>	<i>SANGTAKA</i>	<i>9536.65.08</i>	<i>[Signature]</i>
8	<i>Djetabedem</i>	<i>SANGBA</i>	<i>95739268</i>	<i>[Signature]</i>
9	<i>MBAIDOU-ANSARON</i>	<i>AMADJIBEI</i>	<i>92238960</i>	<i>[Signature]</i>
10	<i>Djakilabel EG-ERON</i>	<i>AREMAJIBEI</i>	<i>92784395</i>	<i>2</i>
11	<i>naissam jaquelin</i>	<i>NARROI</i>	-	<i>u</i>
12	<i>Moun Bo</i>	<i>MASBANG</i>	<i>95646760</i>	<i>[Signature]</i>
13	<i>Gogo</i>	<i>Simon</i>	<i>92840407</i>	<i>[Signature]</i>
14	<i>M Bai Golem</i>	<i>KADITAKA</i>	<i>95646760</i>	<i>[Signature]</i>

Gagah (2)

15	Jongllem Jacques	Gpt da Referona	91395451	94
16	Hbaiguédem Elias	Gpt Aremadja	95718760	off
17	Koi Justin	Gpt Kambea	90227936	Kjust
18	TAO Lam Fouos	Gpt Djindri	95816611	off
19	Guinea Norbert	STATIONNAIRE	63559557 91983463	off
20	ROMAYE DILLAH NATHAN	Gpt Nérouba	95203998 62987092	Rome
21	LAOTADE DENIS	GPT SANGTAKA	98916631	S.
22	Djenaissem Timothée	Gpt Hbayalalem	65231883	off
23	BAWIA VAI TCHEDE	GPT. BARSINMI	91450502 63730566	off
24	DIMANCHE ELYSEE	GPT KIKI	90268999	DE
25	YOUSSEUF MOUZA ALMOUTA GADAN		95182540	off
26	Volungam Samuel	GPT Djindri		VBS
27	Kiteo Daniel	GPT Djindri	92158446	2p
28	Amadjibeye Jackson	GPT Helom	92571925	off
29	Mingamoudji Esth	GPT Aladjibe	83822277	Mud
30	Lonoudji Berthe	GPT DENERAM		A
31	Vai'tchimé Valentin	GPT. MAGIESSA		TT
32	Lonoudji Lalem Normand	GPT. FOUELBOUDJI	62150883	M

Gagal (2)

LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EES) dans la région de :

Prayo Kibbi Ouest
 Département Prayo Dallah
 SIP Pala.

Date : 06/04/2016

N°	Nom et Prénom	Structure	Contact	Emargement
1	MBAIKIRI Alexis	C.E.L.S	66106976	<i>[Signature]</i>
2	TCHIMBI Adani	gpt des Nden Tahou P.E.	62159034	<i>[Signature]</i>
3	Alladoun marek	LODVI SORGA	66.7295.18 95.67.45,18	<i>[Signature]</i>
4	PAHINI Baigou	C.NU/BN ABN	66146947	<i>[Signature]</i>
5	MBAIADOLM-LUC	Jadormassi ABN	66371262	<i>[Signature]</i>
6	Koi Simon	Djinbo	66599775	<i>[Signature]</i>
7	Mai mouna WABU	PEPROMO DEV	66378069	<i>[Signature]</i>
8	Pakagne Etienne	G MVL	66 47 22 74 93 33 39 64	<i>[Signature]</i>
9	NETON JIBDAYE	GpT Sang moussa	63808130	<i>[Signature]</i>
10	MASBABAYE DIMANI CHE	GpT MADJE MBÉ	60-30-3149	<i>[Signature]</i>
11	DOUNIA DAMARIS	GMT Batatei	66398309	<i>[Signature]</i>
12	ALI ISSAKA	GpT Heniya	99 25 37 95	<i>[Signature]</i>
13	Yousseuf Moussa	Association Etoile Moussoro	99 89 02 56	<i>[Signature]</i>
14	Tchackhou Richard TAO	GpT Tchackhou	95 37 65 76 66 37 79 42	<i>[Signature]</i>

Pala (2)

15	Mbras Marcel	GPI Tchaciri	83 38 23 17	<i>[Signature]</i>
16	VOUARE JOSUE	GPT: HAT-TOU	63 30 06 88	<i>[Signature]</i>
17	VAIMBRAO KENDI	HEB KESIN	62 34 39 70	<i>[Signature]</i>
18	RAPI Helene		60 99 93 51	<i>[Signature]</i>
19	Voissoulouze	the tu detext	625 196 93	<i>[Signature]</i>
20	BAI MA HARLAJE			<i>[Signature]</i>
21	Voiljoua	HEB Tel	66 48 92 23	<i>[Signature]</i>
22	GIAB DOULBE	GPT BANZARD		<i>[Signature]</i>
23	MADJIMTA IRENE	ATLCS	66.92.12.45	<i>[Signature]</i>
24	Saleh Hht Zene	A. Adama	99 21 40 84	<i>[Signature]</i>
25	Quin Reie	the feukatwa Bissi-Elina	68 46 45 35	<i>[Signature]</i>
26	NDOLENA LAZAR	the feukatwa	68	<i>[Signature]</i>
27	MBini Thomas	Vice-Pdt CNU/BN	91678600 62 33 48 91	<i>[Signature]</i>
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LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EES) dans la région de : *Mayo Kebbi*

Date : *le 05/04/2016* Département *Mont Ithi* Commune de *Fianga*

N°	Nom et Prénom	Structure	Contact	Emargement
1	DJIBRI RAK NDAIROU	Groupe ment mise en place	66.75.23.03 91.98.51.28	<i>[Signature]</i>
2	NDAFO DANIEL	Groupe ment flux de J Dama mai-nananga	62962216	<i>[Signature]</i>
3	ABLAO Mathieu	Groupe ment		<i>[Signature]</i>
4	YOUNOUS SAMBIN	Groupe ment	60999535	<i>[Signature]</i>
5	Tebokte Brindon	<i>Kaïkenda</i> groupe ment	6666594	<i>[Signature]</i>
6	Komaiwa Dieu dmn	Gpnt sur bo	65282292	<i>[Signature]</i>
7	Paita Lessantara	ILod <i>Madu</i>	6244374	<i>[Signature]</i>
8	KONSO	Guepyang MARTE	62253472	<i>[Signature]</i>
9	Faldi Josephine	<i>Uyogin</i>	60107576	<i>[Signature]</i>
10	Alliana Laura	Gpt "Kaina"	65011217	<i>[Signature]</i>
11	DANOUA Jacq	GpF. Daola	63240760	<i>[Signature]</i>
12	Baponwa Jacqueline	G-PT Soula	63552520	<i>[Signature]</i>
13	Haiyang Bernadette	Gp Hix Nara F	63969858	<i>[Signature]</i>
14	maillion terese	Gpement <i>taïbon</i> Gara	63655328	<i>[Signature]</i>

Fianga 2

15	WIBADA Charlotte	Kaotal Gpement	66 47 85 53 90 12 21 96	
16	TCHOKKREO FRANÇOIS	GRUPEMENT DJON-EWA	66 76 93 10 90.11.21.43	
17	EGIRAH NAIDANDI	Groupement NGABA		
18	Farrina Andie	EP Kroumbay	66626781	
19	DJOBOYANG FRANÇOIS	President COOPAMI	66 330512	
20	TESWE Theodore	president TAIBON	63 96 97 35	
21	DJAISSOUNA BENOIT	President ADG GAMES	62 97 32 65	
22	ABBA Thairou	secrétaire gén VAYTAVAG	66 05 26 61	
23	Bounvang Augustin	secrétaire MADIBANA	63 16 63 90	
24	Dungzetha Bernard	President MOLIKATION IN PFIU	98 93 70 30 66 05 83 82	
25	DARIBICQUE Hlaci	Ept HALVA	66 59 44 76	
26	SOUAÏNA-VANDÉO	Synglos	66 08 28 26	
27	TCHOUKIE RAPHAÏL	Agro-Eleveur	63.73.27.37	
28	TINKREO FOUNDANI	CTBN	68 44 25 14	
29	DELSIA BAÏDANDI	Agro-Eleveur	66 71 02 64	
30	Alaigenga Thérèse	President Gp	68 54 30 88	
31	DAN-NAM Rontouh	BC-150/ELR	68 69 44 16	
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LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EESS) dans la région de : *Nayo Kelli Est - (Département de Niakhar, S/P Tiken)*
 Date : *le 04/04/2016*

N°	Nom et Prénom	Structure	Contact	Emargement
1	<i>BLAKTOIN</i> <i>Mang-ra</i>	ADLM	63819673	<i>[Signature]</i>
2	<i>DISANDOU</i>	Chief de Village	65895360	<i>[Signature]</i>
3	<i>DUANGBAKRO</i> <i>GORANDI</i>	REPROSAMI (COVADIA)	66386469	<i>[Signature]</i>
4	<i>Duangriébili Lue</i>	<i>gp RAWA</i>	65 22 5817	<i>[Signature]</i>
5	<i>HIGUIMEL</i> Frank <i>NDOUMBAYE</i>	SI	68 172327	<i>[Signature]</i>
6	<i>TEHONBE</i> Clement	Gr. KANJAKWA	68829700	<i>[Signature]</i>
7	<i>NIDIKDANDI</i> <i>Lene</i>	KAIYANG	-	<i>[Signature]</i>
8	<i>Kalajacua</i> a <i>suzua</i>	Kouinara	63030647	<i>[Signature]</i>
9	<i>Dai'fouli</i> <i>Tikem</i>	Gpt Nare'	-	<i>[Signature]</i>
10	<i>Braosala</i> <i>Dabal</i>	Gpt DEELE	62228847	<i>[Signature]</i>
11	<i>Mai'Kagué</i>	Ka'Gué	-	<i>[Signature]</i>
12	<i>Mai'taira</i>	-11-	-	<i>[Signature]</i>
13	<i>Tai'ssala</i> serandi	pdh <i>ILOD</i> <i>Tikem</i>	60932546	<i>[Signature]</i>
14	<i>Dai'ndouwe'</i>	Ka'igué	-	<i>[Signature]</i>

Tikem
(2)

15	Wainouare Dabaka Kaigui	-	-	-
16	Okine Heine	-u-	68236609	h
17	Taine	-u-	-	h
18	Yang-BE	Dissandou P. G. P.	62.97.24.22	h
19	Boliele Gnotino	Ngasou	66821930	h
20	Abaki Dakissan	BIE	6303227	h
21	Kigmon Niga	W. O. N. S. O. J. A.	60299572	h
22	LAKREO SIRANI	gpt. jamaise Youe NIGARA	66.19.14.13	h
23	DJARBANKRED T. K. A. B. O. N.	gpt. T. A. I. B. O. N. NIGARA	62.83.91.50	h
24	Mrs KIDOU NEE RACHEL	gpt. femme de BAKOUSSA Youe	62.24.27.41	h
25	Basmangassou Joseph	gpt. V. O. L. L. A. S. D. A.	62.01.61.11	h
26	HINMARA CAMANU	Damtonne	63363072	h
27	NEKOU JONAS	Damtonne	63881678	h
28	Aoutree Joseph	H. O. O. M. P. E. M. E. N. e. A. F. R. I. C. A. I. N.		h
29	DJAOBÉLÉ SENG	G. P.	B. F.	60850025
30	Naukico	Pédre Kaigui	62920986	h
31	Kakua	Dablatza		h
32	Taidauoli	babah	63786578	h

Tiken (2)

33	Gnankoro Lemay	Petchou	63.72.5036	---
34	DJEDEHAIR ISSAC	Kaïam		Duff
35	KANWEYADHA	S. G. ^{Piñaut} _{Tikem}	68.87.9889	Fayot
36	Djorolouin	Pechent		
37	Himale Daniel	èlèxew	63-52-3458	Stoumef
38	ADAMOU SAÏOEU	L'HAGOLO	68-23-6981	---
39	LAKREO GABRIEL	Tai'bon LALLE	-	SRM
40	Ouangkréo Gaston	Kaïgue	-	---
41	Rindaudi	Tchoinwawé Dablaha	-	---
42	DOURBA GA Tcheu	Dallaka	6345.114 8237320	---
43	DJAKPA THOMA	Civayndé	63674460	---
44	NGABWA Jacqueline	Kaïgue	63438067	---
45	Djouma Naudi	-u-	-	w.
46	Maidjoureba AÏSSA	-u-	-	89
47	Ferdai'go Brigitte	-u-	-	---
48	GOUNDAYE-KORONGA	CNIU/BN ETBN	66527949	---
49	TINKREO.FOUMDANDI	CNIU/BN ETBN	68442514	---
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52				Tikem (3)

LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EES) dans la région de : *Mayo Kébi Est.*
 Date : *14/04/2016* *Département de la Kabba, Gounou-Gaya.*

N°	Nom et Prénom	Structure	Contact	Emargement
1	Vangmatua Nestor	<i>Grpt Volontaire</i>	66467313	<i>[Signature]</i>
2	KONA Joseph	ORILELON	63204898	<i>[Signature]</i>
3	Tahanat Ahust FADOU	ENVIRONNEMENT	62024223 90944246	<i>[Signature]</i>
4	Mu Walmi Elisabeth	<i>Grpmtékéla</i> G/Gaya	66554220	<i>[Signature]</i>
5	DAVID Grobaye	APAD STODO GRASSA	99700454 62526757	<i>[Signature]</i>
6	MONIQUE ISSA	<i>Grp ASSOCIATION</i> Kouloula	63837572	<i>[Signature]</i>
7	Hat-HouRoungui	ASSOCIATION Woulla G/Gaya	LAYGUYA	<i>[Signature]</i>
8	PAUL MAVOURA	BALIANGUY	68628668	<i>[Signature]</i>
9	Mbarissou Benoit	Union sol fog Goli-han-ha	66465457	<i>[Signature]</i>
10	Adoukoumouna Ezechiel	AJDLB	62135752 91942110	<i>[Signature]</i>
11	MAHLO ROBERT	Bitudi de Baïdou III		<i>[Signature]</i>
12	YAN-INGA NESTOR	Bitudi de Baïdou III	62775546 68218826	<i>[Signature]</i>
13	L'hekna Dallid	Bitudi de Baïdou III		<i>[Signature]</i>
14	GANDEODI JEREMIE DOMONALPO			<i>[Signature]</i>

Gaya
(2)

15	LANGA VA KASSOU	Union Kikwira Golo II	65479079	
16	Djounna yaouSou	Groupement Djounintaya	63558433	
17	TCHIDISENGOU	Olivier	65233638	
18	TECKAMMA Benoit	Divoungouha	63376481	
19	TCHISSOUNA	Groupement TCHOUMA Domo Tégou	68845644	
20	Sakaki Fatsou	Groupement Kakadjiré	6636904	
21	KOUSSOUNGUES.	Radio Gaya T.	66026701 93611975	
22	GOLKANGA HAWA	groupement So-ouraga		
23	MBOUTMAISSOU KALIDI	Président AJGG	66687248 90734048	
24	PATAUAMOU PAUL	Association pour le dévelo- pement Golo 2	63557660	
25	KOSSANA NDIMMA	Groupement des pêcheurs "NDEGUERA"	92162778 6095284	
26	Huu Sakadi née Eladjima Kaden	ENUI BN	66221906 99280529	
27	Hawa Kolkanga	So-oura		
28	GVarga Boudjou	Radio Gaya	62805001	
29				
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Gaya
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LISTES DE PRESENCE

PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER (PIDACC/BN)

Etude pour l'Evaluation Sociale et Stratégiques (EESS) dans la région de : *Gayo Kelli Est - Département de la Kolda, S/P Pont Carol*

Date : *02/04/2016*

N°	Nom et Prénom	Structure	Contact	Emargement
1	<i>Mua Sakadi ne</i> <i>Eldjima Kaden</i>	<i>CNU/</i> <i>BN</i>	<i>66 22 19 06</i> <i>99 28 05 29</i>	<i>Heus</i>
2	<i>NBafogo Ayoub</i>	<i>Gp Lhaptou</i>	<i>62 16 73 39</i>	<i>DA</i>
3	<i>NGaltangou Marie</i>	<i>Gp Laiguia</i>	<i>AP</i>	
4	<i>DASIA ROUTH</i>	<i>Gp Femme</i>	<i>W</i>	
5	<i>Guemessou Gilbert</i>	<i>Gp Kakouli</i>	<i>W</i>	
6	<i>Vigati Silas</i>	<i>Ajouytaya</i>	<i>606 27 35</i>	<i>Heus</i>
7	<i>HINNAMGOU</i>	<i>HALLA LAK</i> <i>JACOUES</i>		<i>Heus</i>
8	<i>Sakadi Antoine</i>	<i>Lissoude Lakou</i>		<i>Heus</i>
9	<i>Banani Antoine</i>	<i>HAP Kotha</i>		<i>Heus</i>
10	<i>Lamigue Lambert</i>	<i>Hbadja</i>		<i>Heus</i>
11	<i>Mabum FELIX</i>	<i>Jeune</i>		<i>Heus</i>
12	<i>Bounglangou Dongo</i>	<i>Jeune</i>		<i>Heus</i>
13	<i>DJagao Celestin</i>	<i>Halouba Akha</i>	<i>62-32 08 75</i>	<i>Heus</i>
14	<i>Bongou Ndjouma</i>	<i>Tchoulona</i>	<i>66 93 52 48</i>	<i>Heus</i>

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15	KADRE GAGUE	Amihouwa p. Carol	66062471	
16	HABALAO Philippe	63973081	perrol	H PH
17	Berko Leon		68073914 92/8 20 81	PE 91
18	FILINA GARINA	Go Logo	60944968 NDOLO I	PE
19	Tehoffoksia Linagdo	Böh	ndolo I	PE
20	KODAYE PAULINE.	—	—	PH
21	ASTA VERONIQUE	—	—	PH
22	YIMANGA Bai Kanga DIBERT	Hallay Kig	66601445 Port. Carol	
23				
24				
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ANNEX 2: MINUTES AND ATTENDANCE LISTS AT PUBLIC INFORMATION MEETINGS HELD IN NIGER

Dans le cadre de l'EESS du PIDACC, des entretiens avec les parties prenantes au niveau national et dans les départements de la zone d'intervention du programme ont été organisés pour recueillir leurs préoccupations, attentes et recommandations formulées par les acteurs rencontrés. Les résultats de ces consultations sont résumés comme suit.

ACTORS AT THE NATIONAL LEVEL

African Center of Meteorological Applications for Development (ACMAD)

Lors de l'entretien avec l'ACMAD, Monsieur Mbaiguedem MIAMBAYE, Senior Thematic Expert on Drought and Seasonal Climate Forecast a fait les suggestions ci-dessous dans le cadre la mise en œuvre du PIDACC:

- mettre en place un système d'alerte très efficace et efficient pour informer à temps les populations sur les probabilités d'inondations et/ou d'étiage sévère ;
- mettre en place des échelles qui sont simples à lire à fin de faciliter les relevés par les communautés ;
- impliquer les communautés dans la mise en œuvre du programme à travers la collecte des données hydrologiques et métrologiques ;
- transformer si possible les plantes envahissantes, particulièrement la jacinthe d'eau en aliment bétail au-delà du compostage prévu dans le programme;
- faire une gestion durable des plantes envahissantes puisqu'elles constituent un biotope pour les ressources halieutiques.

Haut Commissariat à l'Initiative 3 N (HCI3N)

Lors de l'entretien avec le HCI3N, le Secrétaire Général a suggéré que les programmes et projets régionaux et internationaux doivent être intégrés dans le programme national pour leur prise en compte dans le budget programmes quinquennal qui est en cours de révision.

Pour mieux échanger sur le PIDACC, le SG du HCI3N a donné rendez-vous à l'équipe du consultant pour rencontrer son personnel concerné par l'environnement et le changement climatique. Les préoccupations soulevées par les cadres du HCI3N concernent principalement l'alignement des interventions avec le cadre national qui est l'Initiative 3 N et l'harmonisation des interventions ciblées avec les approches déjà en cours de mises en œuvre dans les projet financés par le même bailleurs de fonds.

Ministère de l'Agriculture (MAG)

Lors de l'entretien avec le MAG, le Directeur des Etudes et de la Planification (DEP), Monsieur Abdou Chaïbou a fait le constat que plusieurs projets et programmes (PAM, BAD, PGRC, FIDA.....) font déjà les activités prévues dans le PIDACC comme : (i) les digues de protection des inondations ; (ii) les petits barrages à buts multiples ;(iii) les aménagements des bassins versants (iv) les aménagements des couloirs de transhumance (v) le renforcement des capacités and (vi) la réalisation des points d'eau pastoraux.

Ministère en charge de l'Environnement

Les entretiens au niveau du Ministère de l'Environnement ont été effectués. A cet effet, il a suggéré de capitaliser les études environnementales et sociales de ces projets et programmes lorsque leurs zones d'intervention et celles du PIDACC sont les mêmes.

Il a également suggéré de capitaliser ce qui est prévu dans le plan d'action de l'I3N pour la réalisation des stations pour les alevins.

Enfin, il a montré sa disponibilité pour aider l'équipe du consultant pour l'identification des projets et programmes qui réalisent les mêmes activités que le PIDACC en cas de besoin.

ACTORS AT REGIONAL AND LOCAL LEVEL

Région de Dosso

Préfecture de Gaya

Pour le préfet de Gaya Monsieur Bagué Yacouba, le programme PIDACC/BN vient à point nommé pour les populations du département de Gaya. En effet, il constitue non seulement une solution à toutes les difficultés environnementales que rencontrent le département tels que les inondations, le problème lié à l'ensablement du fleuve Niger; mais aussi une grande opportunité pour combattre l'insécurité alimentaire et le changement climatique. Il a aussi évoqué des préoccupations et souhaits dont les plus importants sont : (i) La construction d'une digue moderne comme celle de Mallanville pour protéger le périmètre irrigué aux abords du fleuve; (ii) La construction d'un deuxième pont sur le fleuve Niger reliant le département de Gaya à Mallanville pour faciliter les échanges; (iii) La création des plusieurs centrales d'approvisionnement en eau tout au long du fleuve en générale et de Dollé près du village de Sia en particulier; (iv) La possibilité de continuer avec les actions de désensablement dans le fleuve Niger; (v) Le traitement de tous les bassins versants du département; and (vi) La mise en valeur des tous les forêts du département.



Photo 3 : Meeting with the Community of Gaya

Commune Urbaine de Gaya

Selon les autorités communales de Gaya en occurrence le Maire et le Vice-Maire, la mise en œuvre du PIDACC permettrait de lutter contre l'insécurité alimentaire à travers :

- la rehabilitation de la digue et l'aménagement du périmètre irrigué au niveau du village de Sakongui Birni;
- la possibilité de la construction d'un canal principal en béton au niveau de ce périmètre;
- la facilité de la construction des trois (3) forages aux villages de Kessa, Kofo et ses environs;
- la possibilité du traitement de koris de Tounga Baley

La CU de Gaya souhaite être informée et impliquée autant que possible le long de processus de mise en œuvre du programme;

Direction Départementale de l'Agriculture de Gaya

Le Directeur Départemental de l'Agriculture (DDA) de Gaya a salué le programme et souhaite vivement sa concrétisation car il est porteur de beaucoup d'opportunités dans le secteur de l'Agriculture. En effet, d'après le DDA du département de Gaya :

- ce programme peut aider les producteurs de la zone du fleuve à la construction d'une digue car plus de 3600 ha de rizières sont inondés et détruits en 2014 par manque d'une digue adéquatement construite ;
- La possibilité de moderniser les pratiques qui sont jusque la rudimentaires dans le département ;
- La possibilité d'aménager toutes les mares du département en générale et celle de Sia en particulier pour promouvoir le maraichage et d'autres activités allant dans le cadre de la lutte contre l'insécurité alimentaire ;
- La réorganisation et la promotion des organisations paysannes en maillon notamment les coopératives, les groupements, les unions et les fédérations ce qui permettra d'évoluer vers la professionnalisation de l'Agriculture ;
- La facilité de mettre en valeur les aménagements à travers l'usage des variétés qui s'adaptent au terrain ;
- La facilité de mobilisation de l'eau pour l'abrévement des animaux et la production de fourrage ;

Direction Départementale du Plan de Gaya

Le personnel de la Direction Départementale du Plan de Gaya, après avoir salué l'approche du Consultant, a rappelé toutes les difficultés qu'elle rencontre souvent dans le cadre de la mise en œuvre de certains projets. Ainsi, la DDP souhaite être informée et impliquée autant que possible le long de processus de mise en œuvre du programme et reste ouverte pour accompagner le projet durant toutes les phases. Elle souhaite l'appui du programme pour :

- L'aménagement des forêts du département notamment la forêt de Gaya, Tanda, Gorou Bassougou et celle de Bana;
- La mise en place d'un mécanisme permettant de valoriser les zones humides et certaines espèces forestières dans la zone notamment le site RAMSAR et la zone de rôneraie à travers la finition du site historique de Albarkaysé et la construction des bungalows pour permettre aux visiteurs de bien passer leurs séjours;

- La possibilité de développer le tourisme par la construction d'un pont pour relier le village d'Ouna à l'Ile de l'été;
- La possibilité de rechargement/Réhabilitation de la route Gaya-Dollé (65km), la route Guiwa-RN1 et la route Sia-Albarkaysé (15km) pour faciliter l'écoulement des produits agro-sylvo-pastorales;

Direction Départementale de l'Environnement de Gaya

Après avoir pris connaissance du programme PIDACC/BN, le Directeur Départemental de l'Environnement de Gaya DDE de Gaya, a relevé que la plus part des sites/mares de pisciculture dans le département ne sont plus en activités notamment ceux du village de Tara. Selon le DDE/Adjt la réhabilitation et ou l'aménagement des nouveaux sites vas permettre le développement de cette activité dans la zone. Ainsi, la Direction Départementale de l'Environnement de Gaya souhaiterait:

- La possibilité de faire des traitement biologiques au niveau des berges de koris pour bien les fixes et des traitements mécaniques au niveau des zones de collectes des eaux sur les plateau a travers des ouvrages antiérosifs.
- La construction des petits barrages qui donnent des résultats meilleurs dans la zone pour lutter contre les ravinements;
- La maitrise totale des plantes envahissantes afin de les transformer en bio gaz ou en aliment bétail au-delà du compostage prévu dans le programme;
- La facilité de maitrise des inondations aux abords du fleuve à travers non seulement des actions de désensablement du fleuve et des bassins versants mais aussi à travers le traitement des berges des koris
- La possibilité de faire des actions de CES/DRS et plantation d'arbres pour restaurer et préserver l'environnement



Village de Tara

Le village de Tara est riverain du fleuve Niger. Lors de la réunion de consultation publique, les populations du village de Tara ont salué l'arrivée du programme PIDACC et souhaitent sa concrétisation. Elles ont souligné que ce programme constitue une réelle opportunité pour l'amélioration de leurs conditions de vie. Les préoccupations de ces populations se résument comme suit:

- Traitement des quatre (4) Koris qui menacent soient le village soient les champs de cultures ;
- Réhabilitation/construction du petit pont reliant le village de Tara à la ville de Gaya ;
- Réhabilitation et aménagement de deux périmètres irrigués de Tara;
- Construction d'une digue pour protéger les périmètres irrigués;
- Renforcement des capacités des irrigants en appui conseil (Formation et champs écoles) et technique (motopompe, petits matériels et intrants agricoles);
- Achat d'un Groupe Electrogène pour la mini-AEP servant à l'approvisionnement d'eau potable du village ;
- Appui au financement des activités génératrices de revenus (AG des femmes ;
- Développement de la pisciculture dans la zone à travers l'aménagement et l'empoissonnement des mares.
- Recrutement de la main d'œuvre locale non qualifiée lors des travaux.



Photo 4 : Public consultation meeting in the Village of Tara (Gaya)

Région de Tillabéri

Direction régionale de l'hydraulique

Selon le DRH par intérim Monsieur Ali Ibrahim l'intervention du programme PIDACC constitue une réelle opportunité pour apporter des solutions sur les questions relatives aux changements climatiques notamment:

- La possibilité de préserver le fleuve Niger contre son ensablement et son envahissement par des plantes aquatiques;
- La possibilité de mobiliser l'eau à travers la construction/réhabilitation des ouvrages hydrauliques;
- La possibilité de maîtriser les inondations et les modifications du débit des eaux de surface;
- La possibilité de recharger les nappes à travers la construction des ouvrages (seuils, petits barrages....) dans la région de Tillabéri;
- La facilité de conduire des désensablements des cours d'eau et la dépollution des eaux.
- En termes des attentes et préoccupations par rapport à la mise en œuvre de ce projet, le Directeur par intérim s'est exprimé sur les points suivants :
 - Exploitation de l'eau du fleuve traitée pour alimenter les villages sur un rayon de 5 à 10 km
 - Un système de regroupement des villages pour une alimentation globale accompagnée par des actions d'assainissement.
 - Pour les îles avoir un système indépendant pour l'alimentation
- La direction sera disponible à accompagner le projet pour l'identification des villages potentiels,
- Disponibilité de la ressource humaine nécessaire compétente pour accompagner le projet.

Direction régionale de l'agriculture

Pour la DRA de Tillabéri, la variabilité de la pluviométrie est l'un des impacts majeurs des changements climatiques dans la région de Tillabéri. Il ressort de la rencontre avec le DRA que des mesures idoines doivent être prises lors de la mise en œuvre du programme PIDACC/BN dont entre autres:

- Une étude qui détermine par zone les impacts de changement climatique sur les zones de la région.
- Utilisation des semences améliorées qui peuvent boucler les cycles des semences.
- Utilisation des variétés résistantes à la sécheresse
- Pratiques pour réduire le ruissellement et gérer la fertilité des sols.

Au moment de la mise en œuvre du programme, la DRA est prête à appuyer le programme pour sensibiliser les producteurs par rapport aux stratégies d'adaptation aux changements climatiques. En fin, la Direction peut aussi appuyer le programme pour sensibiliser les producteurs à utiliser des variétés améliorées à cycle court, et résistantes à la sécheresse par les producteurs dans les champs.

Direction régionale génie rural

Dans la région de Tillabéri, les changements climatiques sont la cause principale de certaines catastrophes naturelles notamment les inondations, la sécheresse etc. a affirmé le DRGR Adjoint Monsieur Boubacar Alassan lors de l'entretien. En termes des attentes et des préoccupations, la DRGR exhorte le programme à conduire des actions telles que :

- Prendre des mesures de prévention des catastrophes;
- Réaliser des ouvrages de mobilisation des eaux et de recharge de la nappe;
- Doter les services techniques avec des moyens pour bien accompagner le programme;

La DRGR dispose des ressources humaines compétentes pour accompagner le programme lors du processus de mise en œuvre.

Direction Régionale de l'environnement

Après avoir pris connaissance du programme PIDACC/BN, la Direction Régionale de l'Environnement de Tillabéri s'est exprimée comme suit:

- Informer et impliquer la DRE le long du processus de mise en œuvre du programme PIDACC/BN
- La possibilité de faire des traitements biologiques au niveau des berges de koris pour bien les fixer et des traitements mécaniques au niveau des zones de collecte des eaux sur les plateaux à travers des ouvrages antiérosifs.
- La construction des petits barrages pour lutter contre les ravinements;
- La maîtrise totale des plantes envahissantes afin de les transformer en bio gaz ou en aliment bétail au-delà du compostage prévu dans le programme;
- La facilité de maîtrise des inondations aux abords du fleuve à travers non seulement des actions de désensablement du fleuve et des bassins versants mais aussi à travers le traitement des berges des koris
- La possibilité de conduire des actions de CES/DRS et plantation d'arbres pour restaurer et préserver l'environnement

Pour la Direction départementale de l'environnement de Tillabéri (DDE de Tillabéri), les raisons principales des changements climatiques sont : (i) Extension incontrôlée des sols (ii) Coupes abusives de bois (iii) Surpâturage (iv) Disparition de certaines espèces halieutiques (v) Envahissement de points d'eau par des espèces aquatiques nuisibles (vi) Envahissement des terres par des espèces nuisibles terrestres (vii) Tarnissement des mares and (viii) Ravinement

Ainsi, pour mieux mettre en œuvre le programme PIDACC/BN, la DDE exhorte au programme de conduire des actions telles que : (i) La réalisation des actions de conservation des eaux du sol et défense et restauration des sols (CES/DRS) (ii) Le creusement et l'empoisonnement des mares (iii) Le reboisement (iv) La lutte contre les plantes aquatiques envahissantes (faucardage) et la lutte contre les plantes nuisibles terrestres (v) Le traitement des berges de koris. La DDE dispose des ressources humaines compétentes pour accompagner le projet lors du processus de mise en œuvre.

Préfecture de Torodi

Après avoir salué l'initiative du programme PIDACC/BN, les autorités départementales en l'occurrence le préfet de Torodi ; monsieur Alassan Salaou et le secrétaire général monsieur Abdoulaye Mossi souhaitent sa concrétisation et donne leur assurance pour leur parfaite collaboration dans le cadre de la réussite du présent programme porteur de plusieurs opportunités pour l'ensemble de la population du département.

Selon le préfet, le programme PIDACC va s'en nul doute contribuer au développement des activités agro-sylvo-pastorales et à la préservation des écosystèmes naturels d'une part et à l'amélioration des conditions de vie des populations de la zone d'autres part. Ainsi, un cadre de concertation avec les services techniques et les autorités administratives et coutumières doit être créé pour confirmer ou infirmer toutes les informations qui seront présentés dans le rapport lors des études de faisabilités. En fin, il a rappelé que les services techniques et les autorités administratives et coutumières doivent être informé et impliqué pleinement durant tout le processus du programme.

Mairie de Torodi

Selon le Secrétaire Générale de la mairie de Torodi Monsieur Moumouni Hassan, le territoire de la commune de Torodi se trouve sur une zone de socle avec deux (2) grands affluents à savoir la Sirba et le Goroubi alimenté respectivement par le Foga et le Digué Bani. Il a aussi rappelé que ces cours d'eau sont liés à plusieurs contraintes environnementales telles que l'ensablement, la dégradation de leurs berges par les erosions. En effet, le SG a souligné que le programme PIDACC permettrait non seulement de contribuer au développement de la commune de Torodi mais aussi de lutter contre le problème d'insécurité alimentaire dans la zone à travers des actions de développement à savoir:

- La construction des mini-barrages sur les deux affluents notamment la Sirba et le Goroubi;
- La possibilité de recharger la nappe phréatique dans la zone a travers la construction des seuils;
- Mettre en place des COFOB pour préserver les différents points d'eau et les rendre opérationnels;
- La sensibilisation des populations sur les textes qui régissent la gestion de ressources naturelles et à la prise de conscience sur les valeurs de ces ressources mais aussi facilité la cohabitation entre agriculteurs et éleveurs;
- Mener des séances de sensibilisation sur la préservation de l'environnement notamment la commercialisation du bois vert favorisant ainsi la destruction de nos forêts;
- La possibilité d'appuyer à la création d'enclaves pastorales évitant le défrichement;
- Au niveau des villages, il s'agit-là d'amener les populations à faire des travaux communautaires tels que: la maitrise des ravinements, travailler les glacis à travers les activités de CES/DRS et à une prise de conscience.

2Village de Ouro Sawabé

Au niveau du village de Ouro Sawabé situé dans la commune rurale de Torodi, les populations ont précisé que ce programme contribuera à l'amélioration de leurs conditions de vie à travers le développement des activités agro-sylvo-pastorales. Ainsi, les préoccupations et souhaits suivants ont évoqués par les populations:

- Appui au maraichage des irrigants à travers l'aide des équipements et matériels agricoles tels que les groupes motopompes, petits matériels et intrants agricoles;
- Développer le système de Habbanayé et accompagner les éleveurs avec la distribution de son dans la zone;
- Renforcer les capacités des producteurs : Appui conseil et Technique (Intrants, semences améliorées et pesticides/engrais etc. ;
- Développer les activités de CES/DRS dans la zone ;
- Distribuer des aliments bétails aux éleveurs de la zone ;
- Construire des puits maraichers au niveau du périmètre irrigué ;
- Recruter la main d'œuvre locale non qualifiée ;
- Appui aux AGRs pour les femmes



Photo 5 : Meeting with Residents of Ouro Sowabé Village (Torodi Municipality)

Direction Départementale de Génie Rural de Torodi

Selon le Directeur Départemental du Génie Rural, le département de Torodi dispose d'un potentiel des terres irrigables qui nécessite d'être valorisés à travers les activités prévu par le programme PIDACC/BN. En termes de préoccupations liées au programme PIDACC, le DDGR s'est exprimé en ces termes :

- La facilité de recharger la nappe à travers la construction des seuils ;
- Une grande opportunité pour réhabiliter et ou construire des nouveaux ouvrages notamment des seuils et barrages ;
- La possibilité de mobilisation de l'eau a de fin agricole et d'élevage

Direction Départementale de l'Agriculture de Torodi

Pour le DDA de Torodi Monsieur Idrissa Gamatché, le programme PIDACC/BN est un grand programme qui peut résoudre un certain nombre des problèmes que rencontre l'agriculture dans le département de Torodi. Il a ensuite ajouté que ce programme permettra à :

- la création des conditions d'accompagnement, de suivi et de supervision des investissements;
- La maîtrise de l'eau dans la zone à travers la construction et l'aménagement des seuils de retenus d'eau, leurs stockage, leur utilisation a des fins agro-sylvo-pastorales;
- La possibilité d'équiper les producteurs et de renforcer leurs capacités sur des techniques agricoles modernes;

La DDA souhaite être impliqué le long du processus de la mise en œuvre du programme PIDACC et souhaite aussi un appui en renforcement de capacité d'ordre matériel et d'ordre professionnel et technique en direction des tous les acteurs de la mise en œuvre.

Direction départementale de l'Environnement de Torodi

La Direction départementale de l'Environnement de Torodi a souhaité après avoir pris connaissance du programme PIDACC/BN:

- Le service de l'environnement exhorte le programme PIDACC à veiller à la prise en compte des impacts qui seront engendrés dans le cadre du projet et en faire un point de surveillance et de suivi.
- De faire des actions de CES/DRS et plantation d'arbres pour restaurer et préserver l'environnement ;
- La construction des petits barrages dans la zone;
- La conduite des actions de désensablement des bassins versants notamment la Sirba et le Goroubi et le traitement de leurs berges
- L'empoissonnement de certaines mares du département

Prefecture de Ouallam

Au niveau de la préfecture de Ouallam, le préfet Monsieur Ounteini Kondjou a rappelé dans un premier temps le contexte socioéconomique et environnemental dans lequel vivent les populations de son entité. Comme tous les autres acteurs, il a ensuite apprécié l'arrivée du programme PIDACC qui a travers ses actions de développement permettra à l'amélioration des conditions de vie des populations. En fin, il a exhorté le PIDACC de:

- Veiller pour une prise en compte des toutes les préoccupations des différents groupes cibles;
- Identifier les activités qu'il faut réaliser à la place qu'il faut;
- Ressortir les différentes contraintes et défis environnementaux que rencontre les populations du département de Ouallam;
- Consulter les communautés a fin de prendre en charge leurs avis et préoccupations le long du processus de mise en oeuvre;

Mairie de Ouallam

Mme Djibo Maimouna Maire de la commune de Ouallam a précisé que sa commune rencontre d'énorme difficultés climatiques et environnementales telles que les problèmes liés aux inondations, la dégradation des terres qui sont parfois transformées en glacis,

l'ensablement des koris et des mares etc. Par la suite, elle a souhaité la bienvenue au programme PIDACC et a aussi donné son assurance pour la collaboration des autorités communales dans le cadre de la réussite des activités de ce programme. En fin, elle exhorte le programme à développer des actions de développement a fin de relever tous les defies tels que: (i) Les activités de recuperations des terres dégradées ; (ii) Le traitement des koris à Ouallam et dans toute la commune; (iii) La construction et la rehabilitation des ouvrages hydrauliques au niveau de la commune; (iv) Le désensablement et le ré-empoissonnement des grandes mares de la commune;

Village de Tolkoboye koira Tagui

Pour les populations du village de Tolkoboye Koira Tagui, l'arrivée du programme PIDACC constitue une réelle opportunité pour l'amélioration de leurs conditions de vie. Ainsi en termes des préoccupations, les villageois ont évoqués plusieurs souhaits dont les principaux sont : (i) Construire une digue pour protéger le village et les parcelles irriguées contre les inondations par les eaux de kori provenant du Mali; (ii) Aider les irrigants en particulier les groupements des femmes et les hommes en générale en appui conseil et technique : motopompe, petits matériels et intrants agricoles; (iii) Renforcer les capacités des organisations paysannes dans le développement de l'irrigation: Appui conseil et Technique (Intrants, semences améliorées et pesticides/engrais etc. ; (iv) Développer les activités de CES/DRS au niveau du village et dans toute la zone ; (v) Faire une extension du réseau d'approvisionnement d'eau potable dans le village ; (vi) Construire des puits maraichers au niveau du périmètre irrigué ; and (vii) Appui aux AGRs pour les femmes



Photo 6 : Public consultation meeting in the Village of Tolkobèye (Ouallam)

Direction Départementale de Génie Rural d'Ouallam

Au niveau du Génie Rural de Ouallam, plusieurs préoccupations liées à la mise en œuvre du programme PIDACC, ont été soulevés par le directeur départemental par intérim Monsieur Omar Hima dont être autres:

- Implication du service de Génie Rural dans tout le processus du programme PIDACC/BN ;
- Pendant la phase d'exécution, le DDGR propose au projet de signer un protocole d'accord avec les acteurs de la mise en œuvre;
- Le programme PIDACC doit s'intégrer au cadre de concertation existant au niveau départemental pour faciliter les activités de suivi de mise en œuvre.

Direction départementale de l'agriculture de Ouallam

Pour le service de l'agriculture, selon le DDA Monsieur Adamou Bouhari le projet PIDACC vas aider considérablement à la lutte contre l'insécurité alimentaire a travers les actions prévues par le programme telles que:

- La possibilité d'apporter un appui conseil et technique aux agriculteurs de la zone;
- La possibilité d'aménager des périmètres irrigués au niveau du department;
- La faciliter de restaurer les terres dégradées dans la zone d'intervention du programme;
- La possibilité de sensibiliser les producteurs et les organisés en mayon de production, commercialisation et transformation;
- Selon lui pour que ce programme atteint ses objectifs, il faudrait:
 - Informer et impliquer pleinement les services techniques le long du processus de la mise en oeuvre du programme;
 - Signer et respecter des engagements vis à vis des différents services techniques;
 - Définir les roles des différents acteurs de mise en oeuvre du programme.

Direction départementale de l'Environnement de Ouallam

En ce qui concerne la Direction Départementale de l'Environnement de Ouallam, l'intervention du programme PIDACC vas contribuer non seulement à la lutte contre la désertification et le changement climatique mais aussi à l'amélioration des conditions de vie des populations. Selon le chef de brigade Monsieur Yahaya Boulwaidou, le programme doit focaliser ces actions sur des activités telles que:

- Les activités des CES/DRS dans le département;
- Le traitement de plusieurs koris qui menacent les habitations et les terres agricoles ;
- Les actions de plantation d'arbres dans le département ;
- L'ensemencement des sites traités
- Des de sensibilisations des populations sur le changement climatique et sur la préservation des écosystèmes naturels ;
- L'aménagement et l'empoissonnement des mares.

List of actors met at National, Regional and Departmental level

Nom et Prénom	Structure	Fonction	Contact
Mbaiguedem MIAMBAYE	ACMAD	Senior Thematic Expert on Drought and Seasonal Climate Forecast	+22794150832
ABDOU CAHIBOU	Ministère de l'Agriculture	DEP	+22790321147
Secrétaire Général	HCI3N	SG	
Bagué Yacouba	Préfecture Gaya	Préfet	96 46 28 77
Elh Modi Magadji	Préfecture Gaya	SG	96 43 51 38
Hamidou Amadou	Mairie de Gaya	Maire	98 16 26 26
Elh Boureima Mounkaila	Mairie de Gaya	Vice-Maire	96 87 37 44
Abdoulaye Djallo Boubacar	DDA/Gaya	DDA	96 07 80 81
Ousseini Harouna Souley	DDE/Gaya	DDE Adjoint	96 58 25 29 / 90 24 36 78
Karidjo Oumarou	DDP/Gaya	DDP	96 12 52 09
Alassan Salaou	Préfecture Torodi	Préfet	96 88 70 66
Abdoulaye Mossi	Préfecture Torodi	SG	96 99 52 23
Idrissa Gamatché	DDA/Torodi	DDA	97 59 40 94
Mahamadou Tankari	DDGR/Torodi	DDGR	96 87 78 52
Moumini Hassan	Mairie de Torodi	SG	97 26 54 94
Mahaman Ibrahim Hamidou	DDE/Torodi	DDE	90 12 26 51
Ountaini Kondjou	Préfecture de Ouallam	Préfet	96 27 08 16
Mme Djibo Maimouna	Mairie de Ouallam	Maire	96 46 84 50
Adamou Bouhari	DDA/ Ouallam	DDA	97 30 27 04
Omar Hima	DDGR/ Ouallam	DDGR pi	96 50 99 96
Yahaya Boulwaidou	DDE/ Ouallam	Chef de brigade	96 33 28 15
Adamou Souley	DRA de Tillabéri	DRA pi (service régional de la vulgarisation et transfert de technologies)	96286125
Boubacar Allassane	DRGR de Tillabéri	DR adj. Génie rural	96282613
Dr Boubacar M.	DRElevage de Tillabéri	DRE /adjt Élevage	96626892
Cdt Hamssa	DDE de Tillabéri	DDE	96295632
Ali Ibrahim	DRH de Tillabéri	DRH pi(Chef division hydraulique urbaine et semi-urbaine	96493696
Amadou yacouba	CU de Tillabéri	SG	96983119
Goudia Ben Yazid	DRE de Tillabéri	DEESE	96586145

Nom et Prénom	Fonction	Contact
Faron Badou	Chef de village	
Hamidou Souinna	Cultivateur	
Moné koyhantchi	Cultivateur	
Amadou Ousmane	Cultivateur	96 90 46 93
Hassoumi Ibrahim	Cultivateur	97 46 38 58
Garba Amadou	Cultivateur	
Amadou Djaouga	Cultivateur	
Zakari Amadou	Cultivateur	96 57 42 29

Nom et Prénom	Fonction	Contact
Abdou Mounkaila	Cultivateur	
Yahaya Adamou	Cultivateur	
Ousmane Djibo	Cultivateur	
Abdoul Razak Namata	Cultivateur	
Yahaya Dandakoye	Cultivateur	
Adamou Boubacar	Cultivateur	
Himadou Badou	Cultivateur	96 95 15 09
Ayoubou Issa	Cultivateur	96 40 09 23
Namata Roufai	Cultivateur	96 90 19 45
Moussa Tinni	Cultivateur	
Namata Sama	Cultivateur	
Abdou Gouda	Cultivateur	92 77 22 65
Bouhari Boubacar	Cultivateur	
Chaibou Tahirou	Cultivateur	97 82 43 60
Oumarou Hamani	Cultivateur	97 48 88 31
Attikou Niandou	Cultivateur	
Oumarou Labo	Cultivateur	92 50 52 07
Hamissou Seyni	Cultivateur	
Ousmane Sama	Cultivateur	
Seydou Koira	Cultivateur	88 83 18 17
Hadjara Ali	Ménagère	
Hadiza Namata	Ménagère	
Fati Moumini	Ménagère	
Younoussa Gozi	Chef de village	94 13 89 47
Idé Abdou	Cultivateur	96 75 36 28
Zakari Mamoudou	Cultivateur	
Karimou Asmane	Cultivateur	
Mamoudou Moumouni	Cultivateur	94 69 88 07
Hassan Madou	Cultivateur	
Fiti Saadou	Cultivateur	
Soko Younoussou	Cultivateur	
Zakari Hima	Cultivateur	
Oudou Zakaye	Cultivateur	96 41 68 43
Zakari Younoussou	Cultivateur	
Issaka Mamoudou	Cultivateur	
Issaka Mamoudou	Cultivateur	
Issaka Saadou	Cultivateur	
Younoussou Moumouni	Cultivateur	
Garba Soumana	Cultivateur	
Abassa Harouna	Cultivateur	
Mintou Younoussaou	Cultivateur	
Gambi Ali	Représentante Gpt des femmes	
Balki Hassan	Représentante Gpt des femmes	
Hani Gozi	Présidente Gpt/Fédération Bonferey	
Kadi Adam	Ménagère	
Ayoubou Idé	Cultivateur	96 32 04 20

Pour servir et valoir ce que de droit

Fait à Ouro Soubati le 25-01-2016

Ont signé

Pour le village
Hama Hassan
Représentant du chef



Pour le consultant

Moussa Bachir



Talkoboye K. Tagui le 29-01-2016

Études Environnementales et Sociales (EES, EIES) du
Programme Intégré de Développement et d'Adap-
tation aux Changements Climatiques dans
le Bassin du Niger (PIDACC/BN).
Village: Talkoboye Kora Tagui
Commune/Département: Ouallam

Procès Verbal de la réunion de Consultation
Publique:

L'an deux mille seize, et le 29 janvier, s'est
tenue à Talkoboye Kora Tagui une réunion
de consultation publique chez le chef de
village Monsieur Younoussa Gozi dans
le cadre des EES et EIES du programme
PIDACC dans le bassin du Niger. Cette
rencontre a regroupé les populations et
l'équipe du consultant en présence
du chef de village et des groupement
féminins.

En effet, l'ordre du jour a porté sur
la zone d'intervention du programme,
ses activités, les impacts potentiels négatifs

atténuer, bonifier ou supprimer les impacts selon leur nature.

En effet, tout le village a donné son assurance pour sa collaboration dans le cadre de la réussite du programme PIDACC et souhaite sa concrétisation.

En fin, les populations ont évoqué leurs préoccupations et attentes dans le cadre de la mise en oeuvre de ce programme à savoir :

1. Construire des puits maraichers aux irrigants
2. Donner des équipements et matériels agricoles aux paysans (motopompes, petits matériels : râteaux, brouettes etc.)
3. Appui Conseil et technique (intrants agricoles : pesticides, engrais, semences améliorées etc.)
4. Développer le Habanayé dans la zone
5. Distribuer des aliments bétails aux éleveurs de la zone.
5. Développer les activités de CESTORS.
6. Appui aux AGRS
7. Recruter la main d'œuvre locale non qualifiée.

En foi de quoi ce PV est établi

Ouro Sawabé, 25-01-2016

Etudes Environnementales et Sociales (EES, EIES) du
Programme Intégré de Développement et d'Adapta-
tion aux Changements Climatiques, dans le
Bassin du Niger (PIDACC/BN).
Village de Ouro Sawabé
Commune / Département de Torodi

Procès Verbal de la réunion de consultation Publique

D'un deux mille seize et le 25 janvier, s'est tenue une réunion de Consultation des parties prenantes à Ouro Sawabé devant la maison du chef de village dans le Cadre des EES et EIES du programme PIDACC dans le Bassin du Niger. Cette réunion a regroupé les populations et les membres de l'équipe du consultant en présence de Monsieur Amadou Sambo représentant le chef de village.

L'ordre du jour a porté sur le programme PIDACC/BN et sa zone d'intervention, ses activités, les impacts potentiels positifs et négatifs qu'il peut engendrer ainsi que toutes les mesures qui seront mises en œuvre pour prévenir,

et positifs que le PIDACC va engendrer ainsi que toutes les mesures qui seront mises en œuvre pour prévenir, atténuer, bonifier ou supprimer les impacts selon leur nature. En outre, le village a donné son assurance pour sa collaboration dans le cadre de la réussite du programme et souhaite sa concrétisation. Ils ont en fin évoqué des préoccupations et attentes dans le cadre de la mise en œuvre de ce programme dont les principales sont :

1. Don des équipements et matériels agricoles aux irrigants (motopompes, brouettes, râteaux)
2. Construire une digue pour protéger le village et les parcelles irriguées contre les inondations par les eaux de bord provenant du Mali.
3. Développer les activités de CES/DRS dans la zone pour créer de l'emploi aux jeunes et aux femmes.
4. Construire des puits maraîchers aux exploitants.
5. Appui en intrant agricole (pesticides, engrais et semences améliorées).
6. Extension du réseau d'approvisionnement d'eau potable du village avec création d'autres bornes tant en

7. Renforcement de Capacités aux organisations paysannes dans le développement de l'irrigation.

8. Appui aux AGRs.

En foi de quoi ce PV est établi pour servir et valoir ce que de droit.

Fait à Talkoboye K. Tagui le
29 Janvier 2016.

Ont signé

Pour le chef de village
Younoussa Gozi



Pour le Consultant
Moussa Badit



Tara le 17 décembre 2015

- o -

Etudes Environnementales et Sociales (EES, EIE)
du Programme Intégré de Développement et
d'Adaptation aux Changements Climatiques
dans le Bassin du Niger (PIDACC/BN)
Village de Tara
Commune / Département de Gaya.

Procès verbal de la réunion de Consultation
Publique.

Dans le cadre des EES et EIES du Programme
PIDACC/BN s'est tenue au village de Tara
une réunion de Consultation des parties
prenantes le 17 décembre 2015 chez le chef
de village Monsieur Faron Baobou qui a
regroupé les populations et l'équipe
du Consultant en présence du chef de
village.

L'ordre du jour a porté sur le programme
PIDACC et sa zone d'intervention, ses
activités, les impacts potentiels négatifs
et positifs ainsi que toutes les mesures
d'atténuation, de prévention, de bonification

et / ou de suppression des impacts selon leurs natures.

En effet, tout le village a donné son adhésion par rapport à la mise en œuvre du projet et souhaite sa concrétisation.

En fin, les populations ont évoqué leurs préoccupations et souhaits dans le cadre de la mise en œuvre du programme PIDACC dont entre autres :

1. Traiter les quatre (4) bois qui menacent soit le village soit les champs de cultures.
2. Réhabiliter / construire le petit pont qui relie le village de Tara et la ville de Gaya.
3. Construire une digue pour protéger les périmètres irrigués.
4. Renforcer les capacités des irrigants en appui Conseil (Formation et champs écoles) et technique (motopompes, petits matériels et intrants agricoles).
5. Achat d'un Groupe électrogène pour l'équipement de la mini-AEP du village de Tara.
6. Appui aux AGRs des femmes.
7. Développer la pisciculture dans la zone à travers l'aménagement

et l'empiisonnement des mares
7. Recruter la main d'oeuvre locale
non qualifiée.

En foi de quoi ce PV est établi
pour servir et valoir ce que de
droit.

Fait à Tara le 17-12-2015

Ont signé

Pour le chef de village
Faron Bador
H

Pour le consultant
Moussa Bachir


ANNEX 3: MINUTES AND ATTENDANCE LISTS AT PUBLIC INFORMATION MEETINGS HELD IN BURKINA FASO
ANNEX 3.1: DETAILED REPORT ON CONSULTATIONS AND MEETINGS WITH STAKEHOLDERS

N°	INSTITUTIONS/ ACTEUR	POINTS DISCUTES	PREOCCUPATIONS / SUGGESTIONS ET RECOMMANDATIONS
1	DREDD DU SAHEL	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Les impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Risque de saupoudrage des actions du projet - Un projet juste pour le politique et non les besoins des acteurs
2	DRRA du Sahel	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<p>Le programme doit intégrer l'ensemble des actions agricoles, sylvicoles et pastorales. Il ne doit pas épargner un domaine de développement donné</p> <ul style="list-style-type: none"> - Appui des agropasteurs dans leurs activités de production
3	DRAASA du sahel	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<p>Le programme doit intégrer l'ensemble des actions agricoles, sylvicoles et pastorales. Il ne doit pas épargner un domaine de développement donné</p> <ul style="list-style-type: none"> - Renforcer la mobilité des populations du bassin - Risque de saupoudrage des actions du projet - Prendre en compte les pistes rurales dans le programme PIDACC
4	DRIDT du Sahel	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<p>Un projet juste pour le politique et non les besoins des acteurs</p>
5	ONG AGED	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Prendre en compte le volet récupération des terres dégradées - Promouvoir le projet carbone au niveau des villages du bassin
6	DRED du Sahel	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme 	<ul style="list-style-type: none"> - Renforcer la mobilité des populations du bassin

N°	INSTITUTIONS/ ACTEUR	POINTS DISCUTES	PREOCCUPATIONS / SUGGESTIONS ET RECOMMANDATIONS
		<ul style="list-style-type: none"> • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Risque de saupoudrage des actions du projet - Un projet juste pour le politique et non les besoins des acteurs <p>Ce projet doit contribuer à l'amélioration des revenus des populations</p>
7	ONG Reach Italia	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Prendre en compte le volet récupération des terres dégradées - Promouvoir le projet carbone au niveau des villages du bassin
8	DREDD de l'Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Renforcer la mobilité des populations du bassin - Risque de saupoudrage des actions du projet - Intégrer l'ensemble des actions agricoles, sylvicoles et pastorales. - Contribuer au renforcement de la résilience des populations du bassin du Niger - Ne pas épargner un domaine de développement donné <p>Un projet juste pour le politique et non les besoins des acteurs</p>
9	DRRA de l'Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<p>Appui à l'embouche bovine et ovine pour les femmes</p>
10	DRAASA de l'Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Intégrer l'ensemble des actions agricoles, sylvicoles et pastorales. - Ne pas épargner un domaine de développement donné - Prendre en compte le volet récupération des terres dégradées - Promouvoir le projet carbone au niveau des villages du bassin
11	DRIDT de l'Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme 	<p>Intégrer le volet « Pistes rurales » afin de désenclaver les villages</p>

N°	INSTITUTIONS/ ACTEUR	POINTS DISCUTES	PREOCCUPATIONS / SUGGESTIONS ET RECOMMANDATIONS
		<ul style="list-style-type: none"> • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	
12	ONG ADELE	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Prendre en compte le volet récupération des terres dégradées - Promouvoir le projet carbone au niveau des villages du bassin
13	ONG ARFA	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Contribuer au renforcement de la résilience des populations du bassin du Niger - Promouvoir l'agriculture biologique et réduire le niveau d'utilisation des pesticides
14	Mairie de Tenkodogo	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	Contribuer au renforcement de la résilience des populations du bassin du Niger
15	DREDD du Centre-Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	Contribuer au renforcement de la résilience des populations du bassin du Niger
16	DRAASA du Centre-Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	- Contribuer au renforcement de la résilience des populations du bassin du Niger
17	DRED du Centre- Est	<ul style="list-style-type: none"> • Informations sur les projets inscrits dans le programme • Préoccupations des acteurs • Impacts environnementaux possibles lors de la mise en œuvre du programme 	<ul style="list-style-type: none"> - Contribuer au renforcement de la résilience des populations du bassin du Niger - Appuyer l'agriculture de contre-saison au niveau des plans d'eau

ANNEX 3.2: ATTENDANCE LIST AT FADA GOURMA EAST

ANNEX 3.3: ATTENDANCE LIST IN DORI IN THE SAHEL

ANNEX 3.4: LIST OF PRESENCE IN THE CENTRE-EAST

ANNEX 4: MINUTES OF PUBLIC INFORMATION MEETINGS, IN MALI

ANNEX 4.1: MINUTES OF PUBLIC CONSULTATION MEETING, KOULIKORO

ANNEX 4.1.1: MINUTES OF PUBLIC CONSULTATION MEETING, KOULIKORO REGION

L'an deux mil quinze et le premier février, s'est tenue dans la salle de délibération du Conseil Régional de Koulikoro, la séance de consultation publique relative à l'Etude Environnementale et Social Stratégique du programme Intégré de Développement et d'Adaptation aux Changements climatiques dans le sous la présidence Mr Zoumana TRAORE 2^{ème} Adjoint au Préfet de Koulikoro.

Le comité consultatif interministériel formé pour la circonstance était composé des structures et organisations ci-après : représentant du Préfet, CR de Koulikoro, DRACPN, DRA, DRPIA, DRP, DREF, DRGR, DRH, GEDEFOR, SFN-NBA, CAFO.

La liste de présence (voir l'annexe).

Déroulement :

La séance a commencé à 10 h00 mn la motion du 1er Vice-Président qui avant d'entrée dans les travaux, a souhaité la bienvenue au nom du Président du CR à tous les participants, notamment ceux venus de Bamako.

Après la présentation des membres du comité interministériel et de celle des autorités administratives et communales les travaux débutèrent.

Pour alimenter les débats, Mr Cheickna DIARRA du SFN a fait une présentation sommaire sur le PIDACC, s'ensuit ensuite une présentation des activités provisoires du Programme par Mr Sékou S TRAORE consultant à ID-Sahel. Aussi Mr TRAORE a rappelé que la réunion se déroule comme d'habitude. Les interventions doivent porter sur la situation sans projet et prendre en compte vos attentes, préoccupations, suggestions et recommandations

Mme Keïta Aminata KONATE CAFO

Compte du temps très limité, ma préoccupation est de disposer des copies des présentations pour faire une restitution fidèle à nos structures. La recevabilité, elle est normale, tout de même elle doit être juste. Je remercie les partenaires d'avoir fait le déplacement pour Koulikoro. Les dispositions à prendre avant, pendant et après le projet, c'est d'informer tout d'avoir les acteurs de la venue du projet et étendre l'information à tout le monde à travers une conférence débat me paraît être la première disposition à prendre.

Mamadou DRAME DRPIA

Je commencerais par une suggestion, si nous pouvons avoir les présentations dans nos émaux. Autre suggestion, je propose d'associer les médias de proximité pour la diffusion des informations sur le programme. Le programme n'est pas connu de nous techniciens et les communautés dont vous parler pour l'appropriation. Par rapport à mes préoccupation, je ne vois pas le volet élevage, alors que de Kangaba, jusqu'à Banamba, il y a une vaste activité

d'élevage se fait le long des deux rives du fleuve avec les effets collatéraux sur le fleuve. Nous sommes en pourparlers avec certaines communes pour l'introduction de la bourgouculture de la région de Koulikoro, les communes ont même de donner des espaces pour la bourgouculture. Le programme sera la bienvenue pour nos appuyer dans ce sens. Ensuite, une deuxième suggestion, avec les coupes abusives, certaines espèces sont menacées de disparition tel que le « toro, le Guenou et autres ». Koulikoro et Kati sont des zones de consommation fourragères, nous pouvons instituer le système de périmètre fourrager pour une gestion rationnelle et durable.

Cheickna DIARRA SFN

Oui Mr DRAME, ça c'est objectif de la rencontre, nous (SFN) avons prévu la réalisation des bourgoucultures. Aujourd'hui, si Koulikoro, est en phase d'introduire la bourgouculture, notre objectif de 88000 ha sera atteint. Pour les médias de proximité, ces dispositions seront prises dans le projet finalisé.

Sékou S TRAORE Consultant

J'ai une suggestion, si les structures de recherche peuvent être associées pour faciliter l'introduction de la bourgouculture dans la région de Koulikoro.

Abdoulave Maiga CRA

J'ai une suggestion, je propose même une sous composante communication, pour donner plus d'information sur le projet auprès des populations. J'ai dans la présentation confection des cages flottantes, il s'agit de doter les communautés en cages flottantes ou de les former dans les techniques de confection des cages flottantes.

Cheickna DIARRA SFN

Il y a un volet de communication dans le projet. Je dis que pour les cages flottantes c'est des propositions de la DNP, il y a une sensibilisation, le choix des acteurs, leurs équipements, la production et le suivi. Le projet va faire des lâches d'alevins dans des zones de frayères mis en défends. Pour Koulikoro, l'information peut être partagée par la région. La cage c'est comme le marché à bétail des poissons, donc Koulikoro peut aussi être concerné pour l'approvisionnement de la ville e Bamako et la région de Koulikoro.

Salif FOMBA DRGR

J'ai quelques préoccupations notamment sur la présentation, il y a la conservation des sols et des sols et le traitement des ravins, je proposer d'ajouter les bassins versants pour éviter les courants d'eau. Ensuite, par rapport aux aménagements, notamment les retenues d'eau, il faut associer aussi la réalisation des pistes rurales. Le constat est qu'il est plus facile pour un transporteur d'aller prendre de la tomate à Sikasso que de venir des zones de Koulikoro qui sont plus proches. J'aimerais aussi savoir comment le projet compte travailler avec la région comme en cadrage institutionnel. Le dernier point, si projet peut prendre tous les niveaux d'études (APS, APD et la réalisation) pour permettre aux populations de s'approprier du Projet.

Abdou Kaly COULIBALY CR

Je donne une précision, l'encrage institutionnel du projet peut être le CR. Nous sommes là pour donner un cadre global, après les études se feront sur les activités provisoires.

Mamadou DIARRA DREF

J'interviens par rapport aux feux de brousse, si le projet peut faire de sensibilisation et aussi, initier des actions de reboisement, d'agroforesterie. Faire la diffusion des textes forestiers à travers les élus du conseil régional et même des députés.

Flabou DIARRA DRA

Je me demande que faire pour avoir de l'eau permanemment pour la production agricole. Si ce rêve peut se réaliser à travers ce projet, nous enlèverait une épine du pied. La réponse est le projet FONI, je pense qu'il faut faire des études détaillées pour l'évaluation des impacts environnementaux et sociaux.

Sékou S TRAORE

Nous sommes des environnementalistes, prenez la situation de l'environnement sans projet, quelles dispositions prendre pour atténuation des impacts du projet sur le milieu biophysique.

Antiamba TEMBELY CR

Je dis, il faut tenir compte des moyens pour le fonctionnement de comité de pilotage régional. Il y a une étude d'impact sur l'environnement pour tous les projets, nous souhaitons une très grande collaboration avec le CR. Les résultats des études doivent être partagés avec le CR et les acteurs. Les études doivent commencer depuis l'APS pour faciliter le choix de variante retenue. Les études détaillées se feront sur la variante choisie.

Salif FANE GEDEFOR

Nous (GEDEFOR) travaillerons avec les communes sur les mêmes thématiques que le PIDAC, le foncier doit être élucidé avant toutes interventions. Des prendre des dispositions pour juguler les feux de brousse, il y a lieu de faire beaucoup d'IECC pour le changement de comportement. Je prose au projet de faire un forum sur les feux de brousse pour permette à toutes les couches de s'exprimer.

Mamadou DIARRA DREF

Les forêts classées sont en train de disparaître, il faut de la volonté politique pour accompagner.

Mamadou DRAME DRPIA

Par rapport à l'étendue géographique de ce projet, est-ce qu'il tous les cercles sont concernés. Si oui, je propose au projet de prévoir, les périmètres pastoraux, nous avons des études disponibles pour 2 périmètres pastoraux de 10 000 ha chacun dans la zone de Banamba. Je voudrais savoir, est-ce que des activités sont prévues pour lutter contre l'ensablement du fleuve dans le projet. Je pense qu'il est aussi intéressant d'associer les radios de proximité. Ils peuvent être un bon relais, ils sont bien informés.

Zoumana NAYTE CR

Ici à Koulikoro, nous sommes confrontés au problème d'exploitation de sable et gravier, qui se fait de manière désorganisée. A Koulikoro, les berges sont devenues un dépotoir d'ordure, c'est un problème environnemental, les nuisances sont perceptibles sur le fleuve. A gestion des ordures permet de trouver une solution au niveau de dégradation des berges.

Abdou Kaly COULIBALY CR

Pour l'aménagement des berges, à Koulikoro, le CR à un SAT et d'autres documents de planification qui peut être amélioré en intégrant les aspects d'adaptation aux changements climatiques. Nous recommandons, le respect des politiques nationales et de la BAD dans le cadre de mise en œuvre des mesures d'atténuation.

Safif FANE GEEFOR

L'aspect traitement des bassins versant doit faire partie des aménagements, aux mesures mécaniques peuvent être associées les mesures biologiques et des mesures d'accompagnement pour le changement de comportements.

Abdoulaye MAIGA CR

Le renforcement des capacités des élus dans la maîtrise d'ouvrage. Au niveau des villages, des dispositions doivent être prise pour assurer l'entretien des ouvrages.

Il faut passer pour le privé (Bureau d'études, ONG) pour la réalisation des activités du projet. Les aspects de mobilisation sociale peuvent être assurés par les ONG.

Le Secrétaire de séanceLe Président de séance

Mady D KEITALe 2^{ème} Adjoint au Préfet

Zoumana TRAORE

ANNEX 4.1.2: EXPECTATIONS, AND RECOMMENDATIONS, KOULIKORO REGION

Points discutés	Attentes	Préoccupations	Suggestions et recommandations
<p>Avis par rapport au projet</p> <p>Communication</p>	<p>Etendre les informations sur le projet</p> <p>Pas le volet élevage (cas de Kangaba, Nara)</p> <p>La réalisation des pistes rurales dans le projet pour l'écoulement des produits</p> <p>La réalisation des périmètres pastoraux</p> <p>Comment le projet compte travailler avec la région (piste de solution comité de pilotage régional)</p> <p>Tenir compte du fonctionnement du comité</p> <p>Collaboration avec les conseillers du CR</p> <p>Faire tous les niveaux d'études (APS, EIES, APD) avec une forte implication des bénéficiaires</p> <p>Il faudra bien cerner le foncier</p> <p>Prendre des dispositions pour souscrire les feux de brousse</p> <p>Mettre un accent sur l'IEC/ CCC</p>	<p>Prendre en compte l'élevage pour la région de Koulikoro</p> <p>Comment les cases flottantes seront gérées dans le projet</p> <p>Redynamiser les brigades anti feu,</p> <p>Implication des élus dans la diffusion de la politique forestière (code forestier)</p> <p>Protection des forêts communautaires/villageoises</p> <p>Prendre les dispositions pour les attributions foncières</p> <p>Organisation des exploitants de sable</p> <p>Pollution des berges du fleuve Niger</p> <p>Associer les méthodes mécanique et biologique pour la protection des berges</p> <p>Respect des politiques nationales et de la BAD en matière environnementales et sociales</p> <p>Le renforcement de capacités des élus dans la maîtrise d'ouvrage</p>	<p>Avoir les documentations pour servir de relais au projet</p> <p>Associer les média de proximité pour la diffusion du programme</p> <p>Prendre en charge la bourgouculture dans la région de Koulikoro dans certaines zones</p> <p>la régénération des espèces menaces (Fucus gnafolocarpa, toro... instituer le système des périmètres fourragers</p> <p>implication des structures recherche (IER, IPR/IFRA, FAST, ISFRA...)</p> <p>intégration d'une sous composante communication et sensibilisation</p> <p>Traitement des Bassin versant (BV)</p> <p>Implication des ONG comme assistante technique dans la mobilisation sociale, l'encadrement des bénéficiaires</p>

ANNEX 4.1.3: LIST OF THE PRESENCE OF THE PUBLIC CONSULTATION IN THE KOULIKORO REGION

LISTE DE PRESENCE
Consultation Publique dans le cadre des études environnementales et Sociales Stratégiques (EESS)

Prénoms / Noms	Structures	Contacts	Email	Emargement
Zoumana TRAORE	2 ^{ème} adj. Préfet Cercle Koro	76 18 17 16	deugakoulikoro@yahoo.fr	
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Maimouna Diarra	DRP. Koro	75 66 16 75	-	
M ^{me} Keita Aminata Konaté	CATF / Koro	73 27 57 70	aaaminata@yahoo.fr	
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Chéikh DIARRA	STN. ARN	76 77 38 10	cheikhdiarra196@yahoo.fr	
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Laya SOLO	Conseil Régional	76 37 87 52	solola.laya@gmail.com	
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Zoumana Nkyste	CRK	79 12 17 28	nkystezouman@yahoo.fr	
Antiamba Tembely	Conseil Régional	78 62 60 65	antiamba@gmail.com	

ANNEX 4.2: MINUTES AND ATTENDANCE LIST OF THE PUBLIC CONSULTATION IN THE SEGOU REGION

ANNEX 4.2.1: MINUTES OF THE PUBLIC CONSULTATION IN THE SEGOU REGION

L'an deux mil quinze et le deux février, s'est tenue dans la salle de conférence de la DRACPN Ségou, la séance de consultation publique relative à l'Etude Environnementale et Social Stratégique du programme Intégré de Développement et d'Adaptation aux Changements climatiques dans le sous la présidence Mr Abdrahamane BAH Dicteur de la DRACPN Ségou.

Le comité consultatif interministériel formé pour la circonstance était composé des structures et organisations ci-après : CR de Ségou, DRACPN, DRA, DRPIA, DRP, DREF, DRGR, DRH, des ONG, SFN-NBA, DRS
La liste de présence (voir l'annexe).

Déroulement :

La séance a commencé à 10 h00 mn par les explications cadrage de MR Mohamed DIAKITE de la DRACPN pour situer le cadre de la rencontre, Il a remercié les d'avoir répondu à l'avis de réunion.

Après la présentation des membres du comité interministériel et de celle des autorités administratives et communales les travaux débutèrent.

Pour alimenter les débats, Mr Cheickna DIARRA du SFN a fait une présentation sommaire sur le PIDACC, s'ensuit ensuite une présentation des activités provisoires du Programme par Mr Sékou S TRAORE consultant à ID-Sahel. Aussi Mr TRAORE a rappelé que la réunion se déroule comme d'habitude. Les interventions doivent porter sur la situation sans projet et prendre en compte vos attentes, préoccupations, suggestions et recommandations

Dalvindi GANAME DRPIA

Je précise que le village concerné par les interventions de pâturage c'est bien Toïma

Abdrahamane BAH DRACPN

Puisque c'est une étude stratégie, nous avons fait appel aux personnes ressources, qui sont des techniciens, nous devons faire des propositions techniques pouvant faciliter la réalisation des interventions futures du programme. Je sais que les études détaillées se feront après dans le cadre du programme.

Mohamed DIAKITE DRACPN

Je pense que les structures ici présentes peuvent faire de contributions de taille chacun dans son domaine. Il y a certains services qui sont plus engagés que d'autres par les activités

éligibles. S'il y a un besoin de communication avec les autres membres, ils pourront leur faire par email questions de renforcer les points de vue.

Cheickna DIARRA SFN

Nous avons prévu 88000 ha de bougouculture, donc s'il y a une possibilité de réaliser le bourgou dans la région, notamment dans les Fala de l'ON, vous pouvez l'informer ou confirmer cette possibilité. Nous voulons aussi, que vous vous prononcer sur l'encrage institutionnel du projet dans la région de Ségou. Nous avons travaillé avec le niveau national pour le détail des activités provisoires. Nous voulons aussi que les eaux et forêts se prononcer sur la réalisation des forêts villageoises et communautaires.

Dalvindi GANAME DRPIA

Il y a une possibilité de réalisation du bourgou dans la région de Ségou. Dans ce cadre l'appui de la recherche est nécessaire. Nous avons une étude faisabilité dans la zone de DAOUNA par rapport aux périmètres pastoraux. Le besoin de bougouculture est réel dans la région dans les zones de Bla, San et Ségou (zone moyen bani). Les consultants qui doivent intervenir sur les activités doivent associer la base dans la mise en œuvre.

Celestin M'Banguidi personnes ressource

Je vous informe qu'il y a aussi la possibilité de réalisation d'*Andropogon Gayanus* dans la zone ORS.

Modibo Oumar COULIBALY CR de Ségou

Je commence par les préoccupations notamment l'encrage institutionnel, a qui appartiendra ces ouvrages, quel est le mécanisme de pérennisation de ces réalisations et leur rentabilité, nous avons une vision territoriale du développement et non sectoriel, les intentions de développement sont traduites dans les documents de planification (PDESC, SAT ...) au niveau du CR, donc nous pouvons mettre ces documents à la dispositions du Programme. Les méthodes de gestion doivent être définies dès le départ, nous avons fait des réalisations à Missedougou et la maîtrise d'ouvrage n'était définie, nous avons de sérieuse difficulté dans la mise en œuvre. Le développement est une affaire de maîtrise d'ouvrage, et la maîtrise d'ouvrage est l'affaire des collectivités. Pour a gestion durable, il y a plusieurs systèmes de délégations (prives, organismes partenaires ou une association)

Il y a d'autres PTF, qui font la même chose que le PIDACC, donc il faut une synergie d'action avec l'ensemble des intervenants dans la région. Nous avons des études réaliser pour ses partenaires, vous avez approximativement les mêmes activités provisoires, faire un inventaire permettra d'éviter des doublons. Le CR a fait des aménagements dans la zone de DAOUNA, il y a des PFT qui veulent faire la même chose. A titre d'exemple le PACEPEP veut faire la réalisation d'un bloc dans la zone de DAOUNA. Les autres blocs sont portés devant l'Etat du Mali. Je fais une recommandation pour l'organisation par le CR d'un atelier regroupant les acteurs intervenant dans le changement climatique sous le bras technique de la DRACPN.

Soumeilou SIDIBE DRP

Je dis que ce projet est la bienvenue, malgré le fait qu'il y a d'autres PFT dans la région. Nous avons des zones où, il n'y a aucun partenaire. Nous avons fait l'inventaire des pistes pastorales dans la région.

Je demande au programme de travailler avec les STDE pour le choix des sites et des espèces ligneuses pour les besoins multiples. Le choix des espèces se fera au moment opportun avec les services concernés

Fousseini Diabaté DREF

Le problème d'accès au bois de énergie se pose avec acuité dans la région, Ségou est presque le Sahara, la ressources forestière est entrain de disparaître, en zone ON les ressources manquent beaucoup, les populations font des kilomètres pour s'approvisionner, nous devons tous nous s'investir pour préserver le peu de ressources qui existent. Elles être protéger à travers une grande implication des populations. Je pense aussi, que dans ce projet, il faut une synergie d'action. Il y a beaucoup de perspectives pour la région dans le cadre de projets d'adaptation aux changements climatiques. L'enjeu sécuritaire doit aussi être pris en compte dans le projet. Je continue pour ajouter, les possibilités d'utilisation des équipements économes de bois énergie tel que les foyers améliorés dans le cadre de ce projet.

Bandiogou DIASSA CRJ

Je pense que toutes les questions de fragilité des ressources forestières dans la région, il s'agit d'aller aux solutions. La région de Ségou partage une grande bande avec la région Mopti. La gestion des pâturages doit se faire de concert avec la région de Mopti.

Kora DAGNOKO DRA

J'ai entendu dans les activités provisoires l'aménagement des bas-fonds et périmètres maraichers, ces interventions prennent en compte nos préoccupations, nous avons un partenaire de ce projet qui est aussi la BAD, je pense ce projet peut s'étendre dans l'ensemble des cercles de la région.

Cheickna DIARRA SFN

Je donne l'exemple du Tchad, peut être diffusé au Mali, pour l'utilisation des équipements économes pour une exploitation rationnelle de la ressource bois énergie.

Ousmane dit Sakirou DOLO Coordinateur PDD-DIN

Nous demandons aux constants du programme au moment des études de s'approcher des spécialistes dans la région. Ainsi, les services techniques doivent être associés et responsabiliser au choix des sites retenus pour les futures interventions.

Cheickna DIARRA SFN

Dans le cadre de la mise en œuvre du dans la région, je veux savoir, si les ONG ont un rôle a joué. Annuellement entre le pays de l'NBA, on fait atelier clinique, où chacun présente son plan de travail et son budget. Ensuite les possibilités de cofinancement sont dégagées.

Soumeilou SIDBE DRP

J'interviens sur les zones de frayères. Dans les « fala » de l'ON, nous avons des « tifa » qui ne servent à rien, on peut enlever la majeure partie et préserver une partie centrale comme zone de frayère. Aussi, les bougoutières peuvent constituer des zones de frayères. Il n'y a pas une compétition entre l'élevage et la pêche.

Bandiougou DIASSANA CRJ

A mon avis, au niveau de la région, on peut mettre en œuvre des politiques d'emplois des jeunes et des femmes dans la mise en œuvre du programme. Ainsi, les jeunes et femmes seront concernés par au moins 10% des bénéficiaires.

Oumar DIARRA ONG REFOR

Je pense que dans la mise en œuvre de programme, les ONG peuvent faire le travail d'information et de sensibilisation des populations bénéficiaires.

Nouhoum MAIGA DRP

Je partage l'information, nous avons données actualisées sur les zones aménageables sont disponibles au niveau de la DRGR. La disponibilité des alevins et des intrants est une réalité dans la région.

Mohamed DIAKITE DRACPN

Pour la mise en œuvre de programme, je propose de prévoir le maximum d'opportunités pour les mesures d'atténuation et le suivi/ surveillance environnemental

Le Secrétaire de séanceLe Président de séance

Souleymane KONELe 1^{er} Vice-Président,Sidiki KONE

ANNEX 4.2.2: EXPECTATIONS, CONCERNS, SUGGESTIONS AND RECOMMENDATIONS

Points discutés	Attentes	Préoccupations	Suggestions et recommandations
<p>Avis par rapport au projet</p>	<p>Le besoin de bougouculture est présent dans la région (zones du moyen Bani) et à l'ON Dans la zone ORS la possibilité d'exploitation d'<i>Andropogon gayanus</i> Prendre en compte l'inventaire des pistes pastorales disponibles à la DRPIA La sécurisation des parcelles reboisées</p> <p>Choix des essences (espèces fourragères) pour les plantations conformément aux objectifs avec l'implication des STDE Prise en compte des alternatives au bois de chauffe et ou utilisation des équipements économiques de bois énergie dans le projet La disponibilité des alevins et des intrants est une réalité (projets de cages financés par l'APEJ) La réalisation des EIES/NIES pour tout projet à but multiples</p>	<p>Implication des bénéficiaires à toutes les activités (pouvoir coutumier, élus et des STDE) Le développement est une affaire des CT L'appartenance des ouvrages, les mécanismes de réalisation des ouvrages et de rentabilité Prise en compte des documents de planification des collectivités Synergie d'actions avec : le PAHA (Programme d'Aménagement Hydro-agricole de la Office du Niger), PDI-BS, Profil territorial (PRAPS), PACEPEP), Grande muraille verte, PDRS. Mopti et Ségou partagent les pistes de transhumance et les espaces pastoraux Il y a une banque de données pour le répertoire des mares aménageable pour la pisciculture avec la DRP Les données actualisées sur les zones aménageables sont disponibles au niveau de la DRGR Elaborations des conventions de gestions des RN avec les CT Impliquer les STDE dans la conception, la mise en œuvre et l'évaluation des projets</p>	<p>Il y une étude de faisabilité par rapport aux périmètres pastoraux dans la zone de DAOUNA La gestion déléguée des investissements Faire un forum pour Cadre des intervenants sur le changement climatique sous l'égide du CR de Ségou Mettre en œuvre la politique d'emplois des jeunes et des femmes (10% des bénéficiaires) Vulgarisation des textes de lois pour la gestion des ressources forestières Intervention des ONG pour la sensibilisation pour la responsabilisation des communautés dans la gestion durable des investissements Prévoir le maximum d'opportunités pour les mesures d'atténuation et le suivi/ surveillance environnemental</p>

ANNEX 4.2.3: ATTENDANCE LIST FOR THE PUBLIC CONSULTATION IN THE SEGOU REGION

LISTE DE PRESENCE A LA CONSULTATION PUBLIQUE DANS LE CADRE DES ETUDES ENVIRONNEMENTALES ET SOCIALES STRATEGIQUES(EES) DU PROGRAMME INTEGRE DE DEVELOPPEMENT ET D'ADAPTATION AUX CHANGEMENTS CLIMATIQUES DANS LE BASSIN DU NIGER (PIDACC/BN) DE LA REGION DE SEGOU

N°	PRENOMS ET NOMS	STRUCTURE	CONTACT	EMARGEMENT
1	Fousseni DIABATE	DREF	fousseni.diabate@segou.fr 63374346	<i>[Signature]</i>
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3	Moussa Oumar Coulibaly	Centre Regional de l'Est	76075225 cdetac@segou.fr	<i>[Signature]</i>
4	Moussa SANA	Association DRA-7H-S	79 86 13 94 moussa.sana@segou.fr	<i>[Signature]</i>
5	Alic Diarra	D.A.H. Segou	65-67-74-811	<i>[Signature]</i>
6	Kora Dagnoko	DRA-Segou	Koungouba@segou.fr 66698062	<i>[Signature]</i>
7	Diarra DIARRA	STN-ABN	76773540	<i>[Signature]</i>
8	Samba Daou	DRSV-Segou	60-13-23-30 samba.daou@segou.fr	<i>[Signature]</i>
9	Foumeïlou Sidibe	DR Pêche/Segou	64-50-01-79 Sidibe5oumeilou@segou.fr	<i>[Signature]</i>
10	Oumar DIARRA	ONG REFOR	66783000 / 78149863 segou.rcf@segou.fr	<i>[Signature]</i>
11	Mohamed DIARRA	ADRCPN-S	66301156 mohamed.diarra@segou.fr	<i>[Signature]</i>
12	Abrahamane BAH	DRDCPN-S		<i>[Signature]</i>
13	Nourhan I.I Haïja	DRGR-Segou	67415642 nourhan.ihaija@segou.fr	<i>[Signature]</i>

14	Bandiouyou Siarrama	C R J - sejour	75 11 09 16 / 69 16 16 17 Bandiyouyou Siarrama @ yaho.fr	
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16	Sekou STADAT	ID-Sahel	traore.sekou@yaho.fr yaho.fr	
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,Le 2016

LE PRESIDENT DE SEANCE

Annex 4.3: Minutes and attendance list of the public CONSULTATION in the MOPTI REGION

ANNEX 4.3.1: MINUTES OF THE PUBLIC CONSULTATION IN THE MOPTI REGION

L'an deux mil quinze et le vingt-sept (28) janvier, s'est tenue dans la salle de délibération du Conseil régional de Mopti, la séance de consultation publique relative à l'Etude Environnementale et Social Stratégique du programme Intégré de Développement et d'Adaptation aux Changements climatiques dans le sous la présidence Mr Sidiki KONE 1^{er} Vice-Président du Conseil Régional.

Le comité consultatif interministériel formé pour la circonstance était composé des structures et organisations ci-après : CR, l'IER, DRACPN, DRA, DRPIA, DRP, DREF, IGM, DRGR, PDD-DIN, DRH, SFN-NBA.

La liste de présence (voir l'annexe).

Déroulement :

La séance a commencé à 10 h00 mn par les explications cadrage de Hatou DEMBELE Secrétaire Général du CR appuyé par Cheickna DIARRA Responsable de Suivi évaluation du SFN. Ensuite, Mr Sidiki KONE 1^{er} Vice-Président a souhaité la bienvenue au nom du Président à tous les participants dans la « Venise maline ». Lassana KOUMA à l'endroit des participants (services régionaux, consultants et les organisateurs de la réunion). Il a remercié les consultants pour le partagé d'informations sur le programme. Il s'agit aussi d'informer les acteurs de la région jusqu'au niveau des cercles, communes et village. Le CR régional se dit confiant des acteurs présents à a région pour améliorer les interventions futures du PIDACC/BN dans la région de Mopti. Il a aussi rappelé tout l'enjeu lié aux interventions dans les bougoutières. Il s'agit d'un travail technique, donc, la CR invite les acteurs à une large diffusion sur ce programme aux sorites de cette salle. Après la présentation des membres du comité interministériel et de celle des autorités administratives et communales les travaux débutèrent.

Pour alimenter les débats, Mr Cheickna DIARRA du SFN a fait une présentation sommaire sur le PIDACC, s'ensuit ensuite une présentation des activités provisoires du Programme par Mr Sékou S TRAORE consultant à ID-Sahel.

Amadou DIALLO CHEF AGENCE IGM

Je vous informe qu'il y a eu plusieurs interventions de ce genre dans la région, donc, j'invite le programme à une synergie d'action avec les autres projet/programme dans la région, aussi, nous voulons savoir, s'il y a une possibilité de cofinancement notamment les projets soumis au FED? En outre je demande de tirer les leçons du PREGDE.

Hatou DEMBELE Secrétaire Général du CR

Nous constatons que ce programme a les mêmes objectifs que le PDD-DIN, donc nous demandons une synergie d'actions avec tous les projets/programme intervenant dans le

changement climatique. Nous avons des PDESC qui arrivent en terme, le programme peut prendre en compte leurs élaborations ou leurs actualisations en y intégrant les aspects d'adaptation aux changements climatiques et donne plus de légitimité à ses interventions. Ces interventions d'élaboration ou d'actualisation des PDESC, concerneront les Collectivités partenaires du programme et non toutes les collectivités de la région.

Bakary DAO Conseiller Technique en Environnement du CR Mopti

Je voudrais avoir des éclaircissements, s'il y a une possibilité d'intervention du programme dans les espaces pastoraux aménagés par le CRM. Le changement climatique est un sujet d'actualité, l'implication des autorités traditionnelles et coutumières ne doit faire défaut.

Souleymane KONE chef Division Etudes DRACPN Mopti

Je salue tous les participants pour leur présence à cette réunion. Selon le décret n°08- 346/P-RM du 26 Juin 2008 relatif à l'étude d'impact environnemental et social en République du Mali, tous les projets qui peuvent porter atteinte à l'environnement ou au cadre de vie doivent faire l'objet d'Etude d'impact Environnemental et Social. Ainsi, les sites du projet n'étant encore choisis, la réalisation d'un cadre de gestion environnemental et social est possible à travers l'étude stratégique. Je vous demande alors de poser toutes les questions qui vous semblent utiles et pertinentes pour votre compréhension.

Mon intervention portera sur la précision des cercles d'intervention du programme, il s'agit des cercles de Mopti, Douentza, Tenenkou, Youwarou, et Djénné qui sont des zones concernées par le fleuve Niger.

Youssef CAMARA Chef division APA

Le cas de l'échec du PREGDE à Diambacourou est à mon avis une question d'approches. Il y a plusieurs types d'approches notamment l'approche systémique, le projet devrait valoriser les compétences locales. Initier une approche participative dans la mise en œuvre du projet NBA (ex : zones de frayères). Les critères d'éligibilités des bénéficiaires doivent être définis par les propriétaires traditionnels et les exploitants.

Mamadou WANE DAHP DRPIA

Je salue tout le monde. Je pense qu'il faut privilégier les activités de pêche dans ce projet et prendre en compte le point de vue des « Dioros ».

Jean Pierre TOGO DRA

Lors de la mise en œuvre de ce projet, je propose l'élaboration de conventions entre les parties prenantes (propriétaires traditionnels et coutumiers et Collectivités, et l'Etat). Autre priorité pour nous, le projet peut transformer les casiers rizicoles et en périmètres rizicoles avec maîtrise totale de l'eau.

Pathé SIDIBE DRGR

Nous pensons que pour ce genre de projet, des études sérieuses doivent être faites. Il s'agit des études APS, APD et même environnementales. Les études de gestions doivent être claires

dans le cadre d'une maîtrise d'ouvrage des Collectivités. Un accent particulier doit être mis sur les modes de gestion, financière, économique et les résultats doivent être partagés avec les bénéficiaires.

Sékou S TRAORE Consultant ID Sahel

Comment le point de vue des minorités sera pris en compte dans le projet compte tenu de tout l'enjeu lié à la gestion du foncier dans la région ?

Mamadou WANE DAHP DRPIA

Je pense que cette préoccupation est gérée dans la démarche, au niveau des plans d'eau, les exploitants peuvent se joindre aux gestionnaires coutumiers. Les exploitants seront représentants à partir des organisations faitières et des coopératives.

Ousmane dit Sakirou DOLO Coordinateur PDD-DIN

Nous demandons aux constants du programme au moment des études de s'approcher des spécialistes dans la région. Ainsi, les services techniques doivent être associés et responsabiliser au choix des sites retenus pour les futures interventions.

Cheickna DIARRA SFN

Dans le cadre de la mise en œuvre du dans la région, je veux savoir, si les ONG ont un rôle a joué.

Seydou SANGARE ONG RIC4RBC

Pour nous, les ONG ont un rôle à jouer dans la mobilisation communautaire à travers les actions d'information et de sensibilisation. Ainsi, nous pouvons assurer le travail d'assistant technique afin de faciliter la mise en place des organes de gestionnaire communautaire d'une part et d'autre part la mise en point des stratégies de durabilité des investissements réalisés.

Boubacar NIABOULY DREF

Je pense que le mandat des ONG doit être claire pour qu'il n'y ait pas de confusion avec celui du Maîtrise d'ouvrage et des services techniques chargés de l'encadrement des exploitants futurs bénéficiaires. Les ONG ne doivent pas donner les directives aux services techniques. Puisque l'appui des ONG est une exigence des PTF, l'assistant technique doit avoir des expertises avérées dans la région.

Cheickna DIARRA SFN

Les interventions de l'ONG doit être différencier de celles des prestataires qui sont recrutés pour la réalisation physique des investissements, je donne l'exemple du cas sur le choix de l'ONG NEF à travers la DRPIA, c'est le faire –faire, c'est propos peuvent être confirmés ou infirmés par eux.

Sékou S TRAORE consultant ID-Sahel

Les interventions de l'assistant technique porte sur les actions de mobilisation communautaire. Il s'agit d'assurer la participation communautaire à travers des actions de

proximité au niveau des bénéficiaires. L'ONG ne fait pas le travail de maîtrise d'ouvrage déléguée. Elle assure des actions de formation, de sensibilisation des communautés, elle n'intervient dans la gestion des contrats de prestation avec le projet et les prestataires pour la réalisation des ouvrages.

Mamadou WANE DAHP DRPIA

Par rapport à l'assistant technique, l'ONG est sous le couvert du service technique compétent ou si elle est indépendante.

Ousmane dit Sakirou DOLO Coordinateur PDD-DIN

L'ONG est indépendante du service technique, son recrutement peut se faire à travers la maîtrise d'ouvrage de la collectivité.

Amadou DIALLO IGM

Je pense que nous pouvons ici, tenir seulement la possibilité d'intervention des ONG sur le programme. Le détail sur les mandats de l'ONG se sera après, tout de même, elle travaillera avec les CT et les STDE.

Moussa ZEROME

Nous attendons La diffusion des technologies diffusées par la recherché dans le cadre de projet notamment l'IER. .

Cheickna DIARRA SFN

Je suis très satisfait surtout que nous sommes arrivés en mettre en exergue la spécificité de la région c'est ça le plus important pour moi.

Hatou DEMBELE SG CR

Nous attendons à des études plus poussées pour les interventions futures comme signalé par le consultant. Je remercie tout un chacun et je souhaite un bon retour à chaque participant dans son lieu de travail.

La séance est donc levée à 12 H 00 mn.

Le Secrétaire de séance

Souleymane KONE

Le Président de séance

1^{er} Vice-Président,

Sidiki KONE

ANNEX 4.3.2: EXPECTATIONS, AND RECOMMENDATIONS FOR STAKEHOLDERS IN MOPITI

Attentes	Préoccupations	Suggestions et recommandations
<p>ATirer les leçons du PREGDE ‘demander les vidérogations) i Possibilités de cofinancement avec les projets soumis au FED Gestion des risques environnementaux Plmmatriculations des forêts villageoises et acommunautaires r Faire des PGS au tour des forêts classées Elaboration des conventions au tour des mises en r défends aPréciser les objectifs primaires des projets, pSynergie d’actions entre la pêche et l’élevage pTransformation des casiers rizicoles en périmètres irrigués avec maîtrise totale de l’eau</p>	<p>Synergie d’action avec les projets intervenant dans la GRN Aller dans le même sens que le PREGDE en vue d’immatriculer les forêts villageoises et communautaires La continuation des actions du CR pour les aménagements pastoraux Initier une approche participative dans la mise en œuvre du projet NBA (ex : (zones de frayères) Définition des critères d’éligibilités des bénéficiaires Participation des propriétaires traditionnels Accords ou conventions entre les parties : l’Etat, la CR, les Dioros et les propriétaires des plans d’eau pour</p>	<p>Créer et Renforcer le système d’information des pêcheries du Delta Intérieur du Niger Approche systémique, Créer des sanctuaires pour les plans d’eau Créer un cadre de concertation entre les différents acteurs (gestionnaires traditionnels et coutumiers, PTF, les faitières…) Impliquer les STDE pour disposer des statiques et le choix des sites Intégrer l’assistance technique à</p>

<p>r Une large sensibilisation/négociation par la SC t (dioros et les propriétaires des plans d'eau) Faire recours aux structures sociales dans l'étude asociologique u Pour l'empoisonnement des plans d'eau procéder au respect de l'itinéraire technique p Tenir compte de la gestion coutumière r (revaloriser) o Elaborer une stratégie de définition des critères j pour le choix des sites d'intervention du projet e t</p>	<p>une implication réelle Faire des études de gestion (modes de gestion, financière, économique) détaillée et partagée des investissements Prévoir des mesures d'accompagnement des communautés (zone de recasement) Appliquer les politiques nationales et de la BAD pour la gestion des impacts du Projet Mettre en place un MGP (Mécanisme de Gestion des Plaintes) Respecter les quatre principes de la GIRE</p>	<p>travers les ONG Diffusion des technologies générées par l'IER Actualiser les PDESC des CT partenaires du projet en intégrant les aspects des changements climatiques</p>
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**APPENDIX 4.3.3: ATTENDANCE LIST FOR PUBLIC
CONSULTATION IN THE MOPTI REGION**

**PROGRAMME INTEGRE DE DEVELOPPEMENT ET ADAPTATION
AU CHANGEMENT CLIMATIQUE DANS LE BASSIN DU NIGER
(PIDACC/BN)**

**Etude pour l'Evaluation Sociale et Stratégiques dans la région de
Mopti**

Date :

Liste de présence

N°	Prénom et nom	Qualité	Contact	Emargement
01	Sidiiki Koumb	Vice président CASC Ropti	7 60 4 51 655 42966	
02	ZEROME Moussa	chercheur	65309229	
03	Souleymane Kou	chef. Div. DRACPN-M	66 1587 95	
04	Jean-Pierre Togo	chef DEAAA DR-M	69096739	
05	Mamadou Wane	DR, PIA chef D'AHF-	75404358	
06	Yousouf Camara	chef - A - P - A	66-80-75-46	
07	Amadou Diallo	chef Agence IGR	66760813	
08	Abdoulaye G. Maïga	Ad. Vie - Polt CR - Mopti	75030037	
09	Habou Deubelo	SA - CR - Mopti	79070666	
10	Pathé Sidibe	Représentant MCR	76 06 2916	
11	Doumane dit zakoua Dolo	coordonnateur PAD - AIT	65887528	
12	Boche G. Niakouly	DREF.	75229111	
13	Seydou Sangaré	Coordinateur RICHARBE	79763540	
14	Bakary Dial	CTEMIN CRN	66973759	
15	Djougat Gao	conseiller	65542969	
16	Moukoko K. Balla	NEF Conseiller DFC	62 52 96 90	
17	Adama Tengué	Conseiller DFC NEF - Mali	66890477	
18	Abou Doucouly	SFN - ARI	76 17 35 40	

LISTE DE PRESENCE A LA CONSULTATION PUBLIQUE DANS LE CADRE DES ETUDES ENVIRONNEMENTALES ET SOCIALES STRATEGIQUES (EES) DU PROGRAMME INTEGRE DE DEVELOPPEMENT ET D'ADAPTATION AUX CHANGEMENTS CLIMATIQUES DANS LE BASSIN DU NIGER (PIDACC/BN) DE LA REGION DE SEGOU

N°	PRENOMS ET NOMS	STRUCTURE	CONTACT	EMERGEMENT
1	Foupeini DIABATE	DREF	foupeini@kajoko.fr 63374346	<i>[Signature]</i>
2	Delvinali Ganame	DRPIA	66945781-ganame@jatro.fr	<i>[Signature]</i>
3	Moukoko Oumar Coulibaly	Centre Regional de Etiori	76075225 cdelac@jatro.fr	<i>[Signature]</i>
4	Moussa SANA	Association DRAH-S	79861394 luc@ama709@jatro.fr	<i>[Signature]</i>
5	Luc Diarra	D-A-H-Segou	65677451	<i>[Signature]</i>
6	Kora Dagnoko	DRA-Segou	Koradagnoko@jatro.fr 66696062	<i>[Signature]</i>
7	Sheikha DIARRA	SEN-ABN	76673840	<i>[Signature]</i>
8	Samba Daou	DRSV-Segou	60132330 dawalbamba@jatro.fr	<i>[Signature]</i>
9	Foumeillon Sidibe	DR Pechel Segou	64500179 SidibeSoumeil@jatro.fr	<i>[Signature]</i>
10	Oumar DIARRA	ONG REFOR	66783000/78149663 regeourzfor@jatro.fr	<i>[Signature]</i>
11	Mohamed DIARRITE	ADACP-N-S	66301196 mohameddiarrite594@jatro.fr	<i>[Signature]</i>
12	Abdrahamane BAH	ADACP-N-S		<i>[Signature]</i>
13	Nourhan TI Maiga	DRGR-Segou	67115642 nourhanmaiga@jatro.fr	<i>[Signature]</i>

ANNEX 5: MINUTES AND ATTENDANCE LISTS AT PUBLIC INFORMATION MEETINGS HELD IN BENIN

ANNEX 5.1: MINUTES OF MEETING WITH THE STAKEHOLDERS IN THE CARDER BORGOU ALIBORI A BEMBEREKE

L'an deux mil seize et le mardi vingt-six janvier a eu lieu dans la salle de réunion du Secteur Communal pour le Développement Agricole (SCDA) de Bembereke la séance de consultation publique entre le consultant ID Sahel et les maires, les RDR, les agriculteurs, les transformatrices, les éleveurs, les commerçants, les unions communales des producteurs et les maraichers des communes de Nikki, Kalalé, Bembereke et Sinendé, dans le cadre du Programme Intégré de Développement et d'Adaptation aux Changements Climatiques dans le Bassin du Niger (PIDACC/ BN). (Voir liste de présence en annexe).

Il faut noter la présence effective des maires de Nikki, Kalalé et Bembéréké.

La séance a été présidée par le maire de Bembereke, monsieur SINA D. Boni François avec comme rapporteurs Messieurs GARBA Kamarou-Dine (RDR de Nikki) et BONI K. Souleymane (Gérant UCP de Sinendé).

L'objectif de la consultation est de présenter le contenu du PIDACC/BN aux participants et de recevoir leurs préoccupations sur les enjeux et les risques à éviter dans la mise en œuvre du PIDACC/BN.

La séance s'est déroulée suivant l'ordre du jour ci-après :

- 1- Présentation des participants ;
- 2- Présentation du contenu du PIDACC/BN ;
- 3- Echanges et débats ;
- 4- Les enjeux du PIDACC/BN
- 5- Résolutions

- 1- Présentation des participants

La séance a démarré par la présentation des uns et des autres pour mieux se connaître.

2- Présentation du contenu du PIDACC/BN

Le consultant ID-Sahel a abordé dans sa présentation les points ci-après :

- Bref historique de l'Autorité du Bassin du Niger (NBA) ;
- Contexte et justification du PIDACC/BN ;
- Zones d'intention du PIDACC/BN
- Mandat du consultant ID-Sahel ;
- Les activités prévues au Bénin qui se répartissent en trois composantes à savoir:
 - * développement de la résilience des ressources et des écosystèmes ;
 - * développement de la résilience des populations ; et
 - * coordination et gestion du programme.

3- Echanges et débats

Après la présentation du contenu du PIDACC/BN les préoccupations ci-après ont été soulevées par les participants.

- Construction d'un barrage hydro agricole à Nikki pour palier au problème d'eau.
- construction d'un barrage intercommunal entre Nikki et Kalalé sur le fleuve OLY.

- Prise en compte des activités génératrices de revenus ;
- L'implication des acteurs à la base dans la mise en œuvre du programme ;
- Définir un mécanisme claire de suivi-évaluation ;
- Clarifier les communes du Borgou qui sont concernées par les activités ;
- les activités sont beaucoup plus concentrées dans les communes de Bembereke et Kalalé ;
- Définir la méthodologie d'intervention sur le terrain pour l'atteinte des objectifs ;
- Installation des parcelles fourragères pour sédentariser les éleveurs,
- Former sur les techniques de gestion intégrée de la fertilité des sols.

4- Les enjeux du PIDACC/BN

Les participants ont unanimement relevés les enjeux ci-après :

- Le maintien de l'équilibre biologique des écosystèmes par la mise en œuvre des travaux mécaniques et biologiques de DRS, les travaux de conservation des eaux et du sol dans les parcelles cultivées, le traitement mécanique et biologique des ravins, la jachère améliorée et l'agroforesterie ;
- L'augmentation de la résilience des populations par la mise en place des AGR (Apiculture, pisciculture, le petit élevage, la mise en valeur des périmètres irrigués) ;
- La mise en place d'un cadre institutionnel adéquat pour la mise en œuvre du PIDACC/BN.

5- Résolutions

Les participants ont adopté les résolutions suivantes à l'issue de la consultation publique :

- La mise à disposition du document de présentation du PIDACC/BN aux Participants ;
- La prise en compte des activités génératrices de revenus (Apiculture, Transformation et petit élevage) dans le PIDACC/BN ;
- La définition du mécanisme de suivi-évaluation ;
- La sécurisation des sites en tenant compte du nouveau code foncier domaniale ;
- L'actualisation des périodes de semis par rapport aux changements climatiques ;

La séance de travail s'est déroulée dans une bonne ambiance d'échange de 10h 20mn à 14h 05mn.

Fait à Bembereke, le 26 Janvier 2016

Les rapporteurs,

Kamarou-Dine GARBA

Souleymane K. BONI

Le Président, **François B. SINA**

ANNEX 5.2: MINUTES OF THE MEETING WITH CARDER BORGOU ALIGORI STAFF HELD AT PARAKOU

L'an deux mil seize et le lundi 25 Janvier a eu lieu dans la salle de conférence du CARDER BORGOU-ALIBORI à Parakou la séance de consultation publique entre le consultant ID Sahel et les cadres du CARDER B/A dans le cadre du Programme Intégré de Développement et d'Adaptation aux Changements Climatiques dans le Bassin du Niger (PIDACC/ BN).

Elle a connu la présence effective du Directeur Général, des Directeurs Techniques et les Chefs Service du CARDER B/A (voir liste de présence en annexe).

La séance a été présidée par le Directeur Général du CARDER B/A Monsieur Séverin CHALLA avec comme rapporteurs Messieurs Franck LEGBA (Responsable du Volet Aménagement du PDREGDE Bénin) et Amine M. YACOUBOU (Chef Service Analyse des Filières et Démarche de Promotion).

L'objectif de la consultation est de présenter le contenu du PIDACC/BN aux participants et de recevoir leurs préoccupations sur les enjeux et les risques à éviter dans la mise en œuvre du PIDACC/BN.

La séance s'est déroulée suivant l'ordre du jour ci-après :

- 6- Présentation du contenu du PIDACC/BN ;
- 7- Echanges et débats ;
- 8- Les enjeux du PIDACC/BN
- 9- Résolutions

6- Présentation du contenu du PIDACC/BN

Le consultant ID-Sahel a abordé dans sa présentation les points ci-après :

- Bref historique de l'Autorité du Bassin du Niger (NBA) ;
- Contexte et justification du PIDACC/BN ;
- Zones d'intervention du PIDACC/BN
- Mandat du consultant ID-Sahel ;
- Les activités prévues au Bénin qui se répartissent en trois composantes à savoir:
 - * développement de la résilience des ressources et des écosystèmes ;
 - * développement de la résilience des populations ; et
 - * coordination et gestion du programme.

7- Echanges et débats

Après la présentation du contenu du PIDACC/BN les préoccupations ci-après ont été soulevées par les participants.

- Les risques de la disparition du Fleuve Niger liés à l'ensablement et les mauvaises pratiques ;
- La liste des activités prévues au Bénin ;
- Les problèmes relatifs à la pratique de l'élevage au niveau du Fleuve Niger ;
- La stratégie à adopter pour le contrôle de la qualité de l'eau ;
- Le rôle et engagement du CARDER B/A dans la mise en œuvre du PIDACC/BN ;
- Le cadre institutionnel à mettre en place pour la mise en œuvre du PIDACC/BN ;

- La prise en compte du nouveau code foncier pour la sécurisation des sites du PIDACC/BN ;
- La prise en compte des activités génératrices de revenus (Apiculture, la transformation, la cuniculture, l'élevage des champignons) ;
- La prise en compte des actions de communications par les masses médias dans le PIDACC/BN ;
- La prise en compte de l'actualisation des périodes de semis dans les actions du PIDACC/BN ;
- Les risques liés à la réalisation des couloirs de transhumance ;
- La promotion des parcelles fourragères pour le développement de l'élevage ;
- Le problème d'endiguement des communes de Karimama et Malanville pour lutter contre les inondations récurrentes observées ces dernières années ;
- La prise en compte du principe de la Gestion Intégrée des Ressources en Eau (GIRE) dans la construction des barrages à buts multiples.

Le consultant a apporté les approches de solutions aux différentes préoccupations des participants. Des contributions ont été apportées par certains participants pour mieux étayer les préoccupations soulevées.

8- Les enjeux du PIDACC/BN

Les participants ont unanimement relevés les enjeux ci-après :

- Le maintien de l'équilibre biologique des écosystèmes par la mise en œuvre des travaux mécaniques et biologiques de DRS, les travaux de conservation des eaux et du sol dans les parcelles cultivées, le traitement mécanique et biologique des ravins, la jachère améliorée et l'agroforesterie ;
- L'augmentation de la résilience des populations par la mise en place des AGR (Apiculture, pisciculture, le petit élevage, la mise en valeur des périmètres irrigués) ;
- La mise en place d'un cadre institutionnel adéquat pour la mise en œuvre du PIDACC/BN.

9- Résolutions

Les participants ont adopté les résolutions suivantes à l'issue de la consultation publique :

- La mise à disposition du document de présentation du PIDACC/BN au CARDER B/A ;
- La prise en compte des activités génératrices de revenus (Apiculture, Transformation et petit élevage) dans le PIDACC/BN ;
- La prise en compte des actions de sensibilisation des bénéficiaires par les masses médias ;
- La sécurisation des sites en tenant compte du nouveau code foncier domaniale ;
- La prise en compte du principe de la GIRE dans la construction des barrages à buts multiples ;
- L'actualisation des périodes de semis par rapport aux changements climatiques ;

- La mise en œuvre d'un cadre institutionnel en précisant les rôles et missions de chaque structure intervenant et en tenant compte de l'expertise du CARDER B/A dans la mise œuvre du PDREGDE. A cet effet, le CARDER B/A regroupe 10 communes sur les 13 de la zone d'intervention du PIDACC/BN, toutes les activités du PIDACC/BN font partie intégrantes de la mission régaliennne du CARDER B/A ; le CARDER B/A dispose des ressources humaines compétentes et a des démembrements dans tous les villages d'intervention du PIDACC/BN. Enfin, les participants ont vivement souhaité que la Coordination Nationale de gestion du PIDACC/BN soit dans sa zone d'intervention.

La séance de travail s'est déroulée dans une bonne ambiance d'échange de 10h 08mn à 12h 05mn.

Fait à Parakou le 25 Janvier 2016

Les rapporteurs,

Franck LEGBA

Le Président,

Amine Mohamed YACOUBOU

Séverin CHALLA

ANNEX 5.3: MINUTES OF THE INTERVIEW WITH THE TECHNICAL SERVICES AND REPRESENTATIVES OF THE PRODUCERS OF THE DEPARTMENT OF BORGOU – ALIBORI A PARAKOU

L'an deux mil seize et le lundi 25 Janvier a eu lieu dans la salle de conférence de la Direction Départementale de l'Eau du BORGOU à Parakou la séance de consultation publique entre le consultant ID Sahel, les Services techniques et les représentants des producteurs du Département du Borgou/Alibori dans le cadre du Programme Intégré de Développement et d'Adaptation aux Changements Climatiques dans le Bassin du Niger (PIDACC/ BN).

Elle a connu la présence effective du représentant du Directeur Départemental de l'Eau du Borgou-Alibori, du Directeur Départemental de l'Environnement et de la Gestion des Changements Climatiques Borgou-Alibori, la représentante du Préfet et les élus de l'Union Régionale des Producteurs Borgou /Alibori (voir liste de présence en annexe).

La séance a été présidée par le représentant du Directeur Départemental de l'Eau du Borgou-Alibori, Monsieur DJAUGA Amadou avec comme rapporteurs Messieurs Issoufou SARE BAGNAN (Directeur Départemental de l'Environnement et de la Gestion des Changements Climatiques Borgou-Alibori) et Louis-Marc SOGNON (Assistant DERT/ Service Eau Borgou).

L'objectif de la consultation est de présenter le contenu du PIDACC/BN aux participants et de recevoir leurs préoccupations sur les enjeux et les risques à éviter dans la mise en œuvre du PIDACC/BN.

La séance s'est déroulée suivant l'ordre du jour ci-après :

- 1- Présentation des participants ;
- 2- Présentation du contenu du PIDACC/BN ;
- 3- Echanges et débats ;
- 4- Les enjeux du PIDACC/BN
- 5- Résolutions

1- Présentation des participants

A l'ouverture de la séance les participants se sont présentés à tour de rôle. Vingt cinq (25) participants étaient présents dont huit (08) femmes.

2- Présentation du contenu du PIDACC/BN

Le consultant ID-Sahel a abordé dans sa présentation les points ci-après :

- Bref historique de l'Autorité du Bassin du Niger (NBA) ;
- Contexte et justification du PIDACC/BN ;
- Zones d'intention du PIDACC/BN
- Mandat du consultant ID-Sahel.

Les activités prévues au Bénin qui se répartissent en trois composantes à savoir:

- * développement de la résilience des ressources et des écosystèmes ;
- * développement de la résilience des populations ; et
- * coordination et gestion du programme.

3- Echanges et débats

Après la présentation du contenu du PIDACC/BN les préoccupations ci-après ont été soulevées par les participants.

- La prise en compte des variétés à cycle court dans les mesures d'adaptation aux changements climatiques ;
- La création d'un volet de gestion des conflits

Le consultant a apporté les approches de solutions aux différentes préoccupations des participants. Des contributions ont été apportées par certains participants pour mieux étayer les préoccupations soulevées.

4- Les enjeux du PIDACC/BN

Les participants ont unanimement reconnu que les activités proposées cadrent bien avec les défis liés aux changements climatiques.

5- Résolutions

Les participants ont adopté les résolutions suivantes à l'issue de la consultation publique :

- La mise à disposition du document de présentation du PIDACC/BN aux participants ;
- La prise en compte des variétés à cycle court dans les mesures d'adaptation aux changements climatiques ;
- La création d'un volet de gestion des conflits.

La séance de travail s'est déroulée dans une bonne ambiance d'échanges de 15 h 45mn à 17h 00mn.

Fait à Parakou le 25 Janvier 2016

Les rapporteurs,

Issoufou **SARE BAGNAN**

Louis-Marc **SOGNON**

Le Président,

Amadou **DJAUGA**

ANNEX 5.4: MINUTES OF THE MEETING WITH THE BENEFICIARIES OF THE PROGRAMME AT THE LEVEL OF THE DEPARTMENT OF ATACORA (KEROU-HASAN-PEHUNCO) HELD KEROU

L'an deux mil seize et le jeudi vingt-huitjanvier a eu lieu dans la salle de réunion de la Mairie de Kérou la séance de consultation publique entre le consultant ID Sahel et les représentants des maires, les représentants des RDR, les agriculteurs, les transformatrices, les éleveurs, les commerçants, les unions communales des producteurs et les maraichers des communes de Kérou, Kouandé, et Péhunco, dans le cadre du Programme Intégré de Développement et d'Adaptation aux Changements Climatiques dans le Bassin du Niger (PIDACC/ BN). (Voir liste de présence en annexe).

La séance a été présidée par le représentant du Maire de Kérou, Monsieur Sanni GUERA (le Chef d'Arrondissement Centrale Kérou) avec comme rapporteurs Messieurs SEKOU Arounah (Technicien en Aménagement et Equipement Rural de Péhunco représentant le RDR Péhunco) et ALOU N'GOBI Alidou (Deuxième Adjoint au Maire de Kouandé représentant du Maire de Kouandé).

L'objectif de la consultation est de présenter le contenu du PIDACC/BN aux participants et de recevoir leurs préoccupations sur les enjeux et les risques à éviter dans la mise en œuvre du PIDACC/BN.

La séance s'est déroulée suivant l'ordre du jour ci-après :

- 1- Présentation des participants ;
- 2- Présentation du contenu du PIDACC/BN ;
- 3- Echanges et débats ;
- 4- Les enjeux du PIDACC/BN
- 5- Résolutions
- 6- Présentation des participants

La séance a démarré à 10 heures 05 minutes par la présentation des uns et des autres pour mieux se connaître.

1- Présentation du contenu du PIDACC/BN

Le consultant ID-Sahel a abordé dans sa présentation les points ci-après :

- Bref historique de l'Autorité du Bassin du Niger (NBA) ;
- Contexte et justification du PIDACC/BN ;
- Zones d'intention du PIDACC/BN
- Mandat du consultant ID-Sahel ;
- Les activités prévues au Bénin qui se répartissent en trois composantes à savoir:
 - * développement de la résilience des ressources et des écosystèmes ;
 - * développement de la résilience des populations ; et
 - * coordination et gestion du programme.

2- Echanges et débats

Après la présentation du contenu du PIDACC/BN les préoccupations ci-après ont été soulevées par les participants.

- Prise en compte par le projet d'une synergie d'action des différents acteurs pour la réussite du projet ;

- Comment aider les collectivités territoriales à faire la mise en place d'un système d'alerte précoce afin de faire face aux effets liés aux changements climatiques ?
- Faiblesse des activités qui doivent être menées dans l'Atacora dans le document ;
- Implantation d'un système amélioré agricole pour réduire la coupe abusive des arbres ;
- Amélioration du système cultural au nord du Bénin ;
- Amélioration des barrages pour faciliter l'abreuvement des animaux ;
- Installation des parcelles fourragères pour diminuer la pression sur les forêts ;
- Prise en compte des AGR (Activités Génératrices de Revenus) ;
- Formation sur les techniques de gestion intégrée de la fertilité des sols.

3- Les enjeux du PIDACC/BN

Les participants ont unanimement relevés les enjeux ci-après :

- Le centre d'alevinage va permettre d'empoisonner les étangs piscicoles qui sont creusés depuis plusieurs années et palier aux problèmes de pénurie de poissons dans les périodes de soudures.
- La mise en place des étangs piscicoles permettra également de diminuer la pression observée sur les retenues d'eau et barrage qui conduit à leur ensablement voir disparition ;
- Le maintien de l'équilibre biologique des écosystèmes par la mise en œuvre des travaux mécaniques et biologiques de DRS, les travaux de conservation des eaux et du sol dans les parcelles cultivées, le traitement mécanique et biologique des ravins, la jachère améliorée et l'agroforesterie ;
- L'augmentation de la résilience des populations par la mise en place des AGR (Apiculture, pisciculture, le petit élevage, la mise en valeur des périmètres irrigués) afin de permettre l'augmentation du niveau de vie des populations;
- La mise en place d'un cadre institutionnel adéquat pour la mise en œuvre du PIDACC/BN.

4- Résolutions

Les participants ont adopté les résolutions suivantes à l'issue de la consultation publique :

- La mise à disposition du document de présentation du PIDACC/BN aux Participants ;
- La prise en compte des activités génératrices de revenus dans le PIDACC/BN ;
- L'installation des parcelles fourragères ;
- Le reboisement des abords des cours d'eau ;
- La sensibilisation des populations sur les itinéraires techniques ;

La séance de travail qui s'est déroulée dans une ambiance de convivialité a pris fin à 12h 25mn par les mots de satisfaction du représentant du Maire de Kérou qui a remercié tous les participants pour leur active participation avant de leurs souhaiter un bon retour en famille.

Fait à Kérou, le 28 Janvier 2016

Les rapporteurs,

Arounah SEKOU

Alidou ALOU N'GOBI

Le Président, Sanni GUERA

**ANNEX 6: MINUTES OF PUBLIC INFORMATION MEETINGS IN
GUINEA**

**ANNEX 7: MINUTES OF PUBLIC INFORMATION DISCLOSURE
MEETINGS IN COTE D'IVOIRE**

**ANNEX 8: MINUTES OF THE PUBLIC MEETINGS OF INFORMATION
DISCLOSURE IN CAMEROON**

ANNEX 8.1: MINUTES OF PUBLIC INFORMATION MEETINGS HELD IN CAMEROON

ANNEX 8.1.1: MINUTES OF THE PUBLIC INFORMATION MEETING ORGANISED AT DAMI VILLAGE A REY BILL

PROCES VERBAL DE LA REUNION DE CONSULTATION PUBLIQUE AU VILLAGE DAMI A REY BOUBA

L'an deux mille seize et le trois du mois d'avril s'est tenue à partir de 14 h à la place du marché de Dami à Rey Bouba la réunion ci-dessus désignée.

Une réunion de consultation publique entre les populations bénéficiaires et les membres de l'équipe du cabinet ID-SAHÉL en charge de la réalisation de l'évaluation préliminaire de l'étude environnementale et sociale stratégique relative au projet PIDDAC/ BN. Cette réunion avait pour objectifs de déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction d'un débarcadère. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet.

Ont pris part à cette réunion, les personnes dont les noms figurent sur la liste de présence ci-jointe.

L'ordre du jour était articulé autour de quatre points :

- Mot du chef de Dami ;
- Présentation du consultant ;
- Présentation des objectifs de la réunion ;
- Echanges entre population et le consultant

1. Mot du chef de Dami

Le chef a salué l'assistance et remercié les populations pour leur participation massive à cette rencontre. Par ailleurs il a demandé aux populations de suivre attentivement les explications des consultants.

2. Présentation du consultant

Monsieur BOUBA GAO, le chef de mission a donné la parole à l'expert socio économiste afin de se présenter à la population.

3. Présentation des objectifs de la réunion

Monsieur OUMAROU, le Délégué d'Arrondissement de l'élevage et des Pêches de Rey Bouba a tout d'abord salué l'assistance. Il a présenté par la suite l'objet de la rencontre. De cette présentation, il est ressorti que la réunion a été initiée dans le but de :

- déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction d'un débarcadère. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet

4. Echanges entre le consultant et la population

Question : vous êtes au courant du projet de construction d'un débarcadère ?

Réponse : oui, les populations sont informées

Question du Délégué d'Arrondissement du MINEPIA: le projet va débiter en quelle année ?

Réponse : Pour l'instant nous ne connaissons pas la date exacte, nous menons d'abord les études avant la mise en œuvre du projet

Souhait du Délégué d'Arrondissement du MINEPIA: il a souhaité que la mise en œuvre de ce projet car ça va renforcer les recettes de la commune.

Suggestions des populations bénéficiaires :

Les populations rencontrées et les responsables sectoriels souhaitent que les zones de frayères soient balisées afin d'éviter une pression trop forte sur la ressource halieutique, que la chambre froide soit dans un premier temps construite à Rey-Bouba, comme Dami n'étant pas desservie par le réseau électrique, que le débarcadère soit géré par les groupements de pêcheurs.

Après ce jeu de questions réponses, animé par l'équipe de consultant, la séance a été terminée par la réjouissance chez le Président des Pêcheurs.

Fait à Dami, le 03 avril 2016

Représentant de la chefferie



SAIDOU Moussa



BOUBA GAO

ANNEX 8.1.2: MINUTES OF THE PUBLIC INFORMATION MEETING

PROCES VERBAL DE LA REUNION DE CONSULTATION PUBLIQUE A LA COMUNE DE GUIDER

L'an deux mille seize et le premier du mois d'avril s'est tenue à partir de 16h à la commune de Guider la réunion ci-dessus désignée.

Une réunion de consultation publique entre les populations bénéficiaires et les membres de l'équipe du cabinet ID-SAHÉL en charge de la réalisation de l'évaluation préliminaire de l'étude environnementale et sociale stratégique relative au projet PIDDAC/ BN. Cette réunion avait pour objectifs de déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet portant sur la jachère améliorée et agroforesterie. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet.

Ont pris part à cette réunion, les personnes dont les noms figurent sur la liste de présence ci-jointe.

L'ordre du jour était articulé autour de quatre points :

- Mot du Délégué Départemental des Forêts et de la Faune du Mayo Louti ;
- Présentation du consultant ;
- Présentation des objectifs de la réunion ;
- Echanges entre population et le consultant

1. Mot du Délégué

Le Délégué a salué l'assistance et remercié les populations pour leur participation à cette rencontre. Par ailleurs il a demandé aux populations de suivre attentivement les explications des experts.

2. Présentation du consultant

Monsieur BOUBA GAO, le chef de mission a donné la parole à l'expert socio économiste pour se présenter à la population.

3. Présentation des objectifs de la réunion

Monsieur BOUBA GAO, chef d'équipe, a tout d'abord salué l'assistance. Il a présenté par la suite l'objet de la rencontre. De cette présentation, il est ressorti que la réunion a été initiée dans le but de :

- déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de jachère améliorée et agroforesterie. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet

4. Echanges entre le consultant et la population

Question : vous êtes au courant des projets financés par ABN?

Réponse : non, les populations ne sont pas informées

Souhait des populations : elles souhaitent la mise en œuvre de ces projets car ça pourra développer des activités agropastorales dans la zone du projet.

Suggestions des populations bénéficiaires :

Les populations rencontrées et les responsables sectoriels souhaitent que les projets soient mis en œuvre et qu'ils puissent être vulgarisés auprès des différentes parties prenantes.

Après ce jeu de questions réponses, animé par l'équipe de consultant, la séance a été terminée vers 18h 30mn.

Fait à Guider, le 01 avril 2016

Pour les populations



HAMAN VONDOU

Pour le Consultant



BOUBA GAO

ANNEX 8.1.3: MINUTES OF THE PUBLIC INFORMATION MEETING ORGANIZED BY HINA

PROCES VERBAL DE LA REUNION DE CONSULTATION PUBLIQUE A LA COMMUNE DE HINA

L'an deux mille seize et le premier du mois d'avril s'est tenue à partir de 11 h à la commune de Hina la réunion ci-dessus désignée.

Une réunion de consultation publique entre les populations bénéficiaires et les membres de l'équipe du cabinet ID-SAHÉL en charge de la réalisation de l'évaluation préliminaire de l'étude environnementale et sociale stratégique relative au projet PIDDAC/ BN. Cette réunion avait pour objectifs de déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction de retenues d'eau pour abreuvement des animaux. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet. Ont pris part à cette réunion, les personnes dont les noms figurent sur la liste de présence ci-jointe.

L'ordre du jour était articulé autour de quatre points :

- Mot du Maire ;
- Présentation du consultant ;
- Présentation des objectifs de la réunion ;
- Echanges entre population et le consultant

1. Mot du Maire

Le Maire a salué l'assistance et remercié les populations pour leur participation à cette rencontre. Par ailleurs il a demandé aux populations de suivre attentivement les explications des experts.

2. Présentation du consultant

Monsieur BOUBA GAO, le chef de mission a donné la parole à l'expert socio économiste pour se présenter à la population.

3. Présentation des objectifs de la réunion

Monsieur BOUBA GAO, chef d'équipe, a tout d'abord salué l'assistance. Il a présenté par la suite l'objet de la rencontre. De cette présentation, il est ressorti que la réunion a été initiée dans le but de :

- déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction de retenues d'eau pour abreuvement des animaux. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet

4. Echanges entre le consultant et la population

Question : vous êtes au courant du projet de construction de retenues d'eau dans votre commune?

Réponse : oui, les populations sont informées

Question du Maire: le projet va débuter en quelle année ?

Réponse : Pour l'instant nous ne connaissons pas la date exacte, nous menons d'abord les études avant la mise en œuvre du projet

Souhait des populations : elles souhaitent la construction rapide d'une retenue d'eau pour l'abreuvement des animaux car elle constitue une opportunité pour le développement des activités agropastorales dans la zone du projet.

Suggestions des populations bénéficiaires :

Les populations rencontrées et les responsables sectoriels souhaitent que le projet soit mis en œuvre le plus rapidement possible. Elles suggèrent qu'un programme de maintenance des divers forages et marres déjà existants soit mis en place. Egalement, qu'en plus de la fonction de fourniture en eau soit rajoutée un volet de production d'énergie hydroélectrique afin d'approvisionner la zone en courant électrique.

Après ce jeu de questions réponses, animé par l'équipe de consultant, la séance a été terminée par la réjouissance au marché périodique de Hina

Fait à Hina, le 01 avril 2016

Le Lawan de Mandjah



SADOU Mbébing



Pour le Consultant

BOUBA GAO

ANNEX 8.1.4: MINUTES OF PUBLIC INFORMATION MEETINGS, DJIBORDE AND LAGDO DISTRICTS

PROCES VERBAL DE LA REUNION DE CONSULTATION PUBLIQUE AU QUARTIER DJIPORDE A LAGDO

L'an deux mille seize et le trente un du mois de mars s'est tenue à partir de 12 h au hangar de pêcheurs de la place du marché de Djibordé à Lagdo la réunion ci-dessus désignée.

Une réunion de consultation publique entre les populations bénéficiaires et les membres de l'équipe du cabinet ID-SAHÉL en charge de la réalisation de l'évaluation préliminaire de l'étude environnementale et sociale stratégique relative au projet PIDDAC/ BN. Cette réunion avait pour objectifs de déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction d'un débarcadère. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet.

Ont pris part à cette réunion, les personnes dont les noms figurent sur la liste de présence ci-jointe.

L'ordre du jour était articulé autour de quatre points :

- Mot du chef du Président des Pêcheurs ;
- Présentation du consultant ;
- Présentation des objectifs de la réunion ;
- Echanges entre population et le consultant

1. Mot du Président des Pêcheurs

Le chef a salué l'assistance et remercié les populations pour leur participation massive à cette rencontre. Par ailleurs il a demandé aux populations de suivre attentivement les explications des consultants.

2. Présentation du consultant

Monsieur BOUBA GAO, le chef de mission a donné à donner l'occasion à l'expert socio-économiste de se présenter à la population.

3. Présentation des objectifs de la réunion

Monsieur BOUBA GAO, chef d'équipe, a tout d'abord salué l'assistance. Il a présenté par la suite l'objet de la rencontre. De cette présentation, il est ressorti que la réunion a été initiée dans le but de :

- déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de construction d'un débarcadère. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet

4. Echanges entre le consultant et la population

Question : vous êtes au courant du projet de construction d'un débarcadère ?

Réponse : oui, les populations sont informées

Question du Délégué d'Arrondissement du MINEPIA: le projet va débiter en quelle année ?

Réponse : Pour l'instant nous ne connaissons pas la date exacte, nous menons d'abord les études avant la mise en œuvre du projet

Souhait du Délégué d'Arrondissement du MINEPIA: il a souhaité que la mise en œuvre ce projet car ça va renforcer les recettes à la commune et ils auront la base des données des pirogues qui accostent dans la zone de Lagdo.

Suggestions des populations bénéficiaires :

Les populations rencontrées souhaitent que le site de mise en œuvre du projet de débarcadère soit dans un premier temps aménagé (désensablement) afin de permettre aux pirogues d'accoster plus près du marché et ainsi résoudre le problème de la baisse du niveau d'eau en saison sèche.

Elles suggèrent également qu'une digue soit construite afin d'éviter les problèmes d'inondations en saison de pluies.

Il faut des infrastructures annexes que sont la chambre froide et le hall du marché soient construits et des bâtiments pouvant servir de restaurants.

Après ce jeu de questions réponses, animé par l'équipe de consultant, la séance a été terminée par la réjouissance chez le Président des Pêcheurs.

Fait à Lagdo, le 31 mars 2016

Le Président des Pêcheurs



ADAM Abdoulaye



ANNEX 8.1.5: MINUTES OF THE PUBLIC INFORMATION MEETING HELD IN TIGNERE

PROCES VERBAL DE LA REUNION DE CONSULTATION PUBLIQUE A TIGNERE

L'an deux mille seize et le six du mois d'avril s'est tenue à partir de 10h à Délégation Départementale de l'Agriculture à Tignère la réunion ci-dessus désignée.

Une réunion de consultation publique entre les populations bénéficiaires et les membres de l'équipe du cabinet ID-SAHÉL en charge de la réalisation de l'évaluation préliminaire de l'étude environnementale et sociale stratégique relative au projet PIDDAC/ BN. Cette réunion avait pour objectifs de déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet portant l'aménagement des périmètres irrigués sur les ouvrages hydro-agricoles. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet.

Ont pris part à cette réunion, les personnes dont les noms figurent sur la liste de présence ci-jointe.

L'ordre du jour était articulé autour de quatre points :

- Mot du Délégué Départemental de l'Agriculture ;
- Présentation du consultant ;
- Présentation des objectifs de la réunion ;
- Echanges entre population et le consultant

1. Mot du Délégué

Le Délégué a salué l'assistance et remercié les populations pour leur participation à cette rencontre. Par ailleurs il a demandé aux populations de suivre attentivement les explications des experts.

2. Présentation du consultant

Monsieur BOUBA GAO, le chef de mission a donné la parole à l'expert socio économiste pour se présenter à la population.

3. Présentation des objectifs de la réunion

Monsieur BOUBA GAO, chef d'équipe, a tout d'abord salué l'assistance. Il a présenté par la suite l'objet de la rencontre. De cette présentation, il est ressorti que la réunion a été initiée dans le but de :

- déterminer le niveau d'implication des responsables sectoriels ainsi que des populations locales dans le processus de mise en œuvre du projet de l'aménagement de périmètres irrigués sur les ouvrages hydro-agricoles. Il était également question de déterminer la perception et les attentes des populations vis-à-vis du dit projet

4. Echanges entre le consultant et la population

Question : vous êtes au courant des projets financés par ABN?

Réponse : non, les populations ne sont pas informées

Souhait des populations : elles souhaitent la mise en œuvre de ces projets car ça pourra développer des activités agropastorales dans la zone du projet.

Suggestions des populations bénéficiaires :

Les populations rencontrées et les responsables sectoriels souhaitent que les projets soient mis en œuvre et le délégué Départemental de l'Agriculture mettra les moyens pour le choix de ces sites de ces projets

Après ce jeu de questions réponses, animé par l'équipe de consultant, la séance a été terminée vers 12 heures.

9 6

Fait à Tignère, le 06 avril 2016

Pour les populations



ABDOU Paul

Pour le Consultant



BOUBA GAO

ANNEX 8.2: MINUTES OF PUBLIC CONSULTATIONS MEETINGS, PIDACCAU CAMEROON

N°	Institutions/acteur	Points discutés	Préoccupations et craintes	Suggestions et recommandations
1	DR-MINEPAT/ISSA Félix	<ul style="list-style-type: none"> - Les projets financés par NBA concernant la région du Nord - Les enjeux environnementaux des projets 	<ul style="list-style-type: none"> - Manque de diffusion d'informations relatives aux projets - Risque de non effectivité des projets 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information relative aux projets de l'NBA - Mise en œuvre effective de ces projets
2	DR-MINDCAF/DJONFABE Joel	<ul style="list-style-type: none"> - La quintessence des projets financés par NBA dans la région du Nord - Les instances en charge de la mise en œuvre des projets financés par NBA 	<ul style="list-style-type: none"> - Manque de diffusion d'informations relatives aux projets - Manque d'implication des responsables des affaires foncières dans le processus de mise œuvre du programme PIDACC/BN 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information relative aux projets de l'NBA - Impliquer les responsables des affaires foncières dans la mise en œuvre du programme PIDACC/BN
3	DD-MINEPIA/ERAVAI BOUBA Françoise	<ul style="list-style-type: none"> - Projet de construction d'un débarcadère à Lagdo - Importance de la construction d'infrastructures annexes - Les enjeux environnementaux du projet 	<ul style="list-style-type: none"> - Risque d'inondations en saison des pluies - problème d'ensablement de la Bénoué 	<ul style="list-style-type: none"> - Aménagement du site de projet afin de permettre un accès aux pirogues en toute saison - Construction d'une digue pour éviter les inondations en saison des pluies - Respecter les mesures environnementales
4	MINEPIA/DA de Lagdo	<ul style="list-style-type: none"> - Projet de débarcadère a Lagdo - Rôle du projet dans l'assainissement du secteur piscicole - Les enjeux environnementaux du projet 	<ul style="list-style-type: none"> - Risque d'inondations en saison des pluies - Problème d'ensablement de la Bénoué - Exclusion des populations bénéficiaires de la gestion des infrastructures 	<ul style="list-style-type: none"> - Aménagement du site afin de permettre un accès en toutes saisons - Construction d'une digue pour éviter les inondations en saison des pluies - Participation des populations à la gestion du débarcadère
5	COMMUNE HINA/Maire DE	<ul style="list-style-type: none"> - Projet de construction d'une retenue d'eau - Opportunités offertes par le projet sur l'amélioration de l'accès à l'eau dans la zone de projet 	<ul style="list-style-type: none"> - Risque de la non effectivité des projets - L'abandon des vieilles infrastructures d'approvisionnement en eau. 	<ul style="list-style-type: none"> - Maintenance des points d'eau et mares existantes - Mise en œuvre effective et rapide du projet - Elaboration de projets de fourniture

N°	Institutions/acteur	Points discutés	Préoccupations et craintes	Suggestions et recommandations
6	DD-MINEPAT -Mayo Louti/cadre	<ul style="list-style-type: none"> - Les enjeux environnementaux du projet - projets concernant le département - Les enjeux environnementaux des projets 	<ul style="list-style-type: none"> - Manque de diffusion d'informations relatives aux projets - Abandon des parcelles agricoles au profit des plantations agroforestières 	<ul style="list-style-type: none"> - Diffusion de l'information à toutes les sectoriels concernés - Sensibilisation des populations - Respecter les mesures environnementales de ces projets
7	DD-MINDCAF-ML-Guider/BOURDANE	<ul style="list-style-type: none"> - Projets au sein du département - La sélection des sites de projets 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Manque d'implication de responsables des affaires foncières à la mise œuvre de ces projets 	<ul style="list-style-type: none"> - Diffusion de l'information à toutes les parties prenantes - Implication de tous les responsables sectoriels concernés à la mise en œuvre de ces projets
8	MINFOF/DD Mayo Louti	<ul style="list-style-type: none"> - Projet relatif à la mise en place de jachère améliorée et d'agroforesterie - les enjeux environnementaux du projet 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Manque de structure de coordination et de suivi des projets financés par NBA dans la région 	<ul style="list-style-type: none"> - Diffusion de l'information à toutes les parties prenantes - Mise sur pied d'une structure de coordination et de suivi des projets financés par NBA
9	Préfecture Faro et Déo /Préfet à Tignère	<ul style="list-style-type: none"> - Présentation du programme PIDACC/BN - Projets de l'NBA dans le département de Faro et Deo 	<ul style="list-style-type: none"> - Manque de diffusion d'informations relatives aux projets 	<ul style="list-style-type: none"> - Diffusion de l'information à toutes les parties prenantes
10	DD-MINEPAT/Délégué de Faro et Déo à Tignère	<ul style="list-style-type: none"> - Les projets financés par NBA concernant le Département du Faro et Déo - L'identification des sites de projets 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Manque de structure de coordination et de suivi des projets financés par NBA dans la région de l' Adamaoua 	<ul style="list-style-type: none"> - Diffusion de l'information - Mise sur pied d'une structure de coordination des études et des projets dans la région de l' Adamaoua
11	DD-MINADER/délégué Faro et Déo à Tignère	<ul style="list-style-type: none"> - Les projets financés par NBA dans le Département - Identification des sites des projets - Importance des projets financés par l'NBA pour l'amélioration des conditions de vie des populations et la 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Manque de temps supplémentaire pour l'élaboration de ces projets 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information à toutes les parties prenantes - Accord de temps supplémentaire pour une meilleure élaboration des projets

N°	Institutions/acteur	Points discutés	Préoccupations et craintes	Suggestions et recommandations
12	DR-MINE/Délégué Régional du Nord	<ul style="list-style-type: none"> - gestion de l'environnement dans la zone de projet - Les projets de l'NBA dans la région du Nord - Les enjeux environnementaux de ces projets 	<ul style="list-style-type: none"> - Manque de structure de coordination des projets d'NBA dans la région du Nord - Risque de pollution des eaux souterraines lors de réalisation de ces projets 	<ul style="list-style-type: none"> - Mise sur pied d'une structure de coordination et de suivi des projets financés par NBA dans la région du Nord
13	DD-MINADER/Délégué de la Bénoué	<ul style="list-style-type: none"> - Les projets financés par NBA dans le département de la Bénoué - Instances impliquées dans la mise en œuvre des projets 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information relative aux projets de l'NBA
14	DR-MINFOF/Chef de Service Régional de la Faune et des Aires protégées du Nord	<ul style="list-style-type: none"> - projet relatif à la plantation d'arbres forestiers dans les forêts communales villageoises et communautaires - Projet relatif à la protection de la biodiversité 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Risque de la non effectivité de ces projets 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information à toutes les parties prenantes - La mise en œuvre effective de ces projets
15	DD-MINEDEP/Délégué départemental de la Bénoué	<ul style="list-style-type: none"> - Les projets financés par NBA dans la région du Nord - Les enjeux environnementaux des projets 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Risque de pollution d'eaux souterraines - problème d'ensablement de la Bénoué 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information à toutes les parties prenantes - Mise en place d'un organe de suivi du respect des normes et mesures environnementales
16	MINEPIA/Délégué d'Arrondissement de Rey Bouba	<ul style="list-style-type: none"> - Projet de construction de débarcadère à Dami - Instances impliquées dans la réalisation des projets - Opportunités offertes par le projet dans les secteurs de production piscicole, du commerce et le désenclavement de la zone - Les enjeux environnementaux du projet 	<ul style="list-style-type: none"> - Manque d'implication des sectoriels concernés dans la mise en œuvre du programme - risque d'accroissement de la criminalité - Risque de surexploitation de la ressource halieutique 	<ul style="list-style-type: none"> - Balisage des zones de frères - Recrutement prioritaire des populations locales pour les emplois inhérents à la construction du débarcadère - Construction des infrastructures annexes a Rey-Bouba - Elaboration d'un projet de désenclavement routier de la zone de projet

N°	Institutions/acteur	Points discutés	Préoccupations et craintes	Suggestions et recommandations
17	MINEPIA/Chef du Centre d'Alevinage et de Contrôle de Pêche d'Alfa	<ul style="list-style-type: none"> - Projet de construction de débarcadère à Dami - Opportunités offertes par le projet dans les secteurs de production piscicole, du commerce, le désenclavement de la zone, la structuration du mouvement des pêcheurs et l'amélioration du niveau de vie des populations 	<ul style="list-style-type: none"> - Manque d'implication des sectoriels concernés dans la mise en œuvre du programme 	<ul style="list-style-type: none"> - Gestion du débarcadère par les populations sous le contrôle des instances administratives et traditionnelles
18	MEADEN/Chef Service cartographie	<ul style="list-style-type: none"> - Projets financés par NBA dans la région du Nord - Identification des sites des projets 	<ul style="list-style-type: none"> - Manque de structure de coordination de gestion des projets d'NBA dans la région 	<ul style="list-style-type: none"> - Mise en place d'une structure de coordination des projets de l'NBA dans la région du Nord
19	Populations bénéficiaires des projets	<ul style="list-style-type: none"> - Projets financés par NBA - Importance de ces projets pour les populations - Les enjeux environnementaux de ces projets 	<ul style="list-style-type: none"> - Manque de diffusion d'information des projets - Risque de la non effectivité de mise en œuvre de ces projets - augmentation du taux de criminalité - destruction des zones de frayères 	<ul style="list-style-type: none"> - Meilleure diffusion de l'information à toutes les parties prenantes - Mise en œuvre effective des projets du programme PIDACC/BN - Respect des normes et mesures environnementales - Recrutement prioritaire des populations locales pour les emplois inhérents à la construction du débarcadère

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