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MINISTRE DE L'AGRICULTURE
ET DE L'ELEVAGE



ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

*Hydro-agricultural development project with smart
agriculture practices resilient to climate change in Niger*

Final Report

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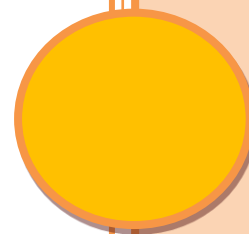


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ACRONYMS

AfDB	African Development Bank
AGR	Revenue Generating Activities
AHA	Hydro-Agricultural Development
AIC	Climate Intelligent Agriculture
ANPEIE	Nigerian Association of Professionals in Environmental Impact Assessment (Association Nigérienne des Professionnels en Étude d'Impact sur l'Environnement)
AUEi	Irrigation Water Users Association
BNEE	National Environmental Assessment Office
BOAD	West African Development Bank
BRGM	Geological and Mining Research Bureau
CCNUCC	United Nations Framework Convention on Climate Change
CEC	Cation Exchange Capacity
CDB	Convention on Biological Diversity
CES/DRS	Water and Soil Conservation / Soil Defence and Restoration
CEDEAO	Economic Community of West African States
CFAF	CFA francs (Local currency)
CGES	Environmental and Social Management Framework
CH	Hamadian Continental
CI	Continental Interlayer
CILSS	Interstate Committee for Drought Control in the Sahel
CLPE	Free, Prior and Informed Consent
CNEDD	National Environmental Council for Sustainable Development
COP 21	Conference of the Parties 21
CPE	Informed Consultation and Participation
CRD	Compliance and Regulatory Division
CT	Continental Terminal
DCR	Compliance and Regulatory Division
DDH	Departmental Hydraulic Directorate
DEESE	Division of Environmental Assessments and Ecological Monitoring
DNM	National Directorate of Meteorology
DRA	Regional Directorate of Agriculture
DRE/LCD	Regional Directorate of Environment and the Fight against Desertification
DRH	Regional Hydraulics Directorate
E&S	Environmental and Social
ECOWAP	ECOWAS Common Agricultural Policy
EIES	Environmental and Social Impact Assessment
ESE/GRN	Expert in Environmental Protection and Natural Resources Management
ESS/G	Expert in Social and Gender Safeguards
ETP	Potential Evapotranspiration
FEM	Global Environment Facility
FNUAP	United Nations Population Fund

FVC	Green Climate Fund
GHG	Greenhouse gas
GPS	Geostrategic Positioning System
i3N/SAN/DAD	Food and Nutritional Safety and Sustainable Agricultural Development Strategy
INS	National Statistical Institute
KWh	Kilowatt-hour
MdC	Control Mission
MESUDD	Ministry of the Environment, Urban Sanitation and Sustainable Development
MWh	Megawatt-hour
OMS	World Health Organization
ONAHA	Office Nationale des Aménagements Hydro Agricoles
ONG	Non-Governmental Organization
OP	Peasant Organization
OSS	Sahara and Sahel Observatory
PANGIRE	National Action Plan for Integrated Water Resources Management
PADL	Local Development Support Project
PAU	UEMOA Agricultural Policy
PCAE	Common Policy for the Improvement of the Environment
PCV	Poly Vinyl Chloride
PDDAA	Detailed Program for the Development of African Agriculture
PGES	Environmental and Social Management Plan
PGPP	Pest and Pesticide Management Plan
pH	Hydrogen Point
PNEDD	National Environmental Plan for Sustainable Development
PNIA	National Agricultural Investment Plan
POP	Persistent Organic Pollutant
PROSEHA	Water Hygiene and Sanitation Sector Program
RGP/H	General Census of Population and Housing
SDDCI	Sustainable Development and Inclusive Growth Strategy
SGES	Environmental and Social Management System
SPIN	Small Irrigation Strategy in Niger
t CO ₂ e	Ton CO ₂ equivalent
TDR	Terms of Reference
UEMOA	West African Economic and Monetary Union
UGP	Project Management Unit
UNICEF	United Nations Children's Fund

NON-TECHNICAL SUMMARY

1. Brief description of the project

The overall objective of the project is to contribute to the increase of national agricultural production by strengthening the resilience of populations to the adverse effects of climate change.

The specific objectives of the project are : (i) intensify agricultural production in a sustainable manner by improving crop yields through hydro-agricultural developments designed with innovative irrigation and solar pumping systems; (ii) protect productive capital against threats from the effects of climate change (silting, flooding, etc.); (iii) ensure the operation and sustainability of infrastructures through the strengthening of technical and organizational capacities of operators and technical services.

Scope of the project

The perimeters to be developed under this project cover a total area of 1750 ha located in the regions of Agadez, Tahoua, Maradi, Zinder and Diffa.

Project Components

The project is structured around three components: (i) Sustainable development and rehabilitation of perimeters vulnerable to the adverse effects of climate change; (ii) Support for the development of developed and rehabilitated perimeters; (iii) Developing the technical and organizational capabilities of stakeholders to promote climate-resilient agricultural practices.

Component 1: Sustainable development and rehabilitation of perimeters vulnerable to the adverse effects of climate change

This component aims to develop new hydro-agricultural perimeters and to strengthen old hydro-agricultural perimeters that are victims of the adverse effects of climate change. Thus, through this component, actions aimed at ensuring the sustainable development of AHAs will be undertaken. Two results are expected in the implementation of this component: (i) the perimeters are developed with techniques resilient to the adverse effects of climate change; (ii) the perimeters are developed with total water control and a clean energy system.

Activity 1.1.1: Development of hydro-agricultural perimeters with climate-resilient techniques

- *Sub-activity 1.1.1.1: Preparation of sites and parcels of land*
- *Sub-activity 1.1.1.2: Protection of sites against water erosion by building anti-erosion structures*
- *Sub-Activity 1.1.1.3: Flood protection for perimeter areas*
- *Sub-activity 1.1.1.4: Strengthening erosion control by planting trees around plots and sites*

Activity 1.1.2: Rehabilitation of 749 ha of hydro-agricultural developments

Activity 1.2.1. Drilling of boreholes and installation of solar water dewatering energy system

- Sub-activity 1.2.1.1: Drilling and storage tank construction

- Sub-activity 1.2.1.2: Equipping boreholes with solar pumps and installation

Activity 1.2.2 Installation of drip and California irrigation systems

Component 2: Support for the sustainable development of developed and rehabilitated perimeters

This component aims to ensure the rational use of the developed or rehabilitated areas to support the sustainable increase in agricultural productivity and income of farmers in irrigated areas. It contains actions that will make it possible to develop the physical investments planned under component 1 "development of perimeters with techniques resilient to the adverse effects of climate change". It will also be consolidated by the activities of Component 3, "Strengthening technical capacities for the promotion of climate-resilient agriculture". The expected results of this component are as follows (i) producers organized for optimal development of the perimeters; (ii) technical itineraries adapted to the major climatic risks of the irrigated perimeters adopted for crop production; (iii) integrated system of externalized water and energy management set up and operational for optimal development of the perimeters; (iv) mechanisms for market access for products from the irrigated perimeters strengthened.

The activities under this component will be conducted by ONAHA. These activities will be implemented on each site and profit the all of direct beneficiaries.

Activity 2.1.1: Conduct of the land registration process of the selected sites.

Activity 2.1.2: Appropriate distribution of hydraulic districts and allocation of plots

Activity 2.1.3: Support for the establishment and operation of farmers' organizations

Activity 2.1.4: Establishment of operating contracts with cooperatives and AUEi

Activity 2.2.1. Support for site-level activity planning

Activity 2.2.2. Support to vulnerable groups for the acquisition of small farming equipment

Activity 2.2.3. Reinforcement of agronomic monitoring mechanisms and acquisition of agricultural inputs

Activity 2.2.4. Support for organic manure production on site

Activity 2.3.1: Design and implementation of a mechanism for servicing and maintaining hydraulic infrastructure

Activity 2.3.2: Design and implementation of a maintenance and servicing mechanism for electrical equipment

Activity 2.3.3: Implementation of a program for close monitoring of the functionality of hydraulic and electrical structures

Activity 2.4.1. Support for the implementation of business plans developed at the level of groups and cooperatives

Activity 2.4.2. Support for the development of income-generating activities (IGA) based on the conservation and processing of agricultural products

Activity 2.4.3. Support for warrantage and group sales initiatives

Component 3: Support for the sustainable development of developed and rehabilitated perimeters

This component aims to build the capacity of technical services and producers on techniques that are resilient to the adverse effects of climate change in order to facilitate project implementation, ownership and sustainability. Three results are expected in the implementation of this component: (i) knowledge and practices of agriculture resilient to the adverse effects of climate change are strengthened; (ii) the technical and organizational capacities of farmers' groups are strengthened for the implementation of climate resilient actions; (iii) lessons learned are shared among stakeholders and disseminated for an overall strengthening of the resilience of the agriculture sector to climate change in Niger.

Activity 3.1.1: Strengthening of knowledge on rainfall trends and temperature variability in the project area

Activity 3.1.2: Strengthening the technical capacities of local actors and producers for the promotion of agriculture resilient to the adverse effects of climate change

Activity 3.1.3. Training of project stakeholders in the use of tools for monitoring changes in natural resources related to climate smart technologies for fighting against climate change in the framework of the implementation of environmental and social management plan

Activity 3.1.4: Improvement and implementation of texts binding the State, ONAHA and cooperatives and operators

Activity 3.2.1. Training of producers in climate-smart farming practices likely to preserve soil and water resources in a sustainable manner.

Activity 3.2.2: Reinforcement of the management capacity of farmers associations

Activity 3.2.3: Support for access to adapted agro-meteorological information by producer groups

Activity 3.3.1: Building the capacity of the private financial sector to promote and scale innovative financing for climate-resilient agriculture

Activity 3.3.2: Set up an attractive on-lending mechanism for climate resilient agriculture through local financial institutions in the form of a loan facility from GCF, which could be

scaled up at a later stage with the support regional or international development financial institutions (the “GCF Loan Facility”)

Activity 3.4.1: Control and supervision of works.

Activity 3.4.2: Monitoring and evaluation of the works

Activity 3.5.1: Capitalization of results and compilation of lessons learned from the project

Activity 3.5.2. Elaboration of technical sheets and user manuals for the operator

Activity 3.5.3: Knowledge sharing and dissemination of good practices for a climate resilient agricultural sector in Niger.

2. Brief presentation of impacts and risks

The main environmental and social risks and impacts of the project are presented in the following table.

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
CONSTRUCTION PHASE				
Soils	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Modification of the soil structure	This is mainly due to soil compaction caused by the maneuvering and circulation of construction equipment and trucks. These maneuvers and traffic often spill over the tracks and reserved lanes and affect crop fields located on the edges of the roads or at the level of the material collection sites. This compaction locally modifies the structure of the soils resulting in a reduction in their capacity to infiltrate rainwater.
			Loss of arable land	Lateritic sand extraction sites for runway rehabilitation/construction are often located on arable land with good agronomic qualities. The opening and operation of quarries on these sites thus represents a source of reduction in the amount of arable land in the project area

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
Air	<p>Site development work (clearing brush, parceling out, construction of pipeline works, etc.)</p> <p>Opening of access roads to the sites</p> <p>Gas emissions from construction machinery.</p>		Air Pollution	The cleanup of site areas, the collection and disposal of site waste to appropriate sites, the earthworks, and the movement of trucks and construction machinery will result in the release of dust particles during windy and dry weather, which may significantly increase the usual level of particulate pollution in the project area. Exhaust fumes from construction trucks constitute another source of air pollution during construction.
Surface and groundwater	<p>Site development work (clearing brush, parceling out, construction of pipeline works, etc.)</p> <p>Opening of access roads to the sites</p> <p>Use of chemical products by construction equipment</p>		Pollution of surface and groundwater	This pollution will be caused by accidental discharges or uncontrolled leaks of oil, fuel and grease, but also in the absence of an appropriate waste management system, by the discharge into the environment of various chemical products, food and drink packaging, etc. In addition to the associated effect of clutter and ugliness of the landscape, this pollution may affect the quality of surface water (transfer of chemical pollutants by rainwater runoff) and groundwater (transfer of chemical pollutants by percolation and/or infiltration of rainwater).
	Drilling of boreholes		Poor siting of boreholes	In the same watershed, the productivity of boreholes varies depending on their location but also on a number of parameters such as transmissivity, depth, static level, thickness of the weathering layer, etc. It is even possible to fall, in the same basin, on non-productive boreholes, which can give rise to less quantities of water mobilized than those foreseen by the project
Landscape	Site development work (clearing brush, parceling out, construction of pipeline works, etc.)		Landscape Modification	The landscape will be modified to a greater or lesser extent as a result of the cutting of trees and shrubs on the project sites. These modifications may also be caused by the opening of

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
	Opening of access roads to the sites			new access roads to certain sites and by the extension of the material borrow areas (sand, gravel)
Flora	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Loss of vegetation cover and wildlife resources	The clearing of rights-of-way for development and infrastructure will result in the cutting down of trees and shrubs on the sites, causing a reduction in local vegetation and a temporary or permanent displacement of certain wildlife species. Similarly, the rehabilitation and/or construction of access roads to the sites as well as the extension or opening of new quarries for the extraction of materials will result in the destruction of the vegetation cover
			Reduction of grazing areas nationally	The new AHAs to be developed cover a total area of 1001 ha which will be definitively subtracted from the total area of the country's grazing areas. The shortage of fodder thus created can disrupt, in certain localities, the activities of indigenous peoples who are, for the most part, transhumant herders.
Wildlife	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Disturbance, destruction of wildlife habitat and poaching	Noise generated by the presence of workers and the movement of construction equipment and trucks may cause some species to be temporarily displaced from the sites during the construction phase. Expansion of old material collection sites or the opening of new sites will result in further destruction of vegetation cover representing wildlife habitat. Poaching by the workers for commercial purposes or for personal consumption on the construction sites is also a disruptive factor in the natural wildlife regulation system of the area.

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
Health and safety	<p>Site development work (clearing brush, parceling out, construction of pipeline works, etc.)</p> <p>Opening of access roads to the sites</p>		Health and safety of workers and the population	<p>The safety and health of workers and people living around the sites may be affected by the project activities. Indeed, in the absence of appropriate personal protective equipment (PPE) such as boots, gloves, muffs, etc., workers will be exposed to the risk of injuries and accidents at work and to respiratory ailments. The presence of workers from other regions, departments and communes in the village-sites often leads to unprotected sexual relations, which can lead to the contamination of the local population with sexually transmitted diseases such as HIV-AIDS. The movement of construction equipment and trucks can also cause traffic accidents in the open country or when crossing towns.</p>
Mobility	Opening of access roads to the sites		Traffic disruption	<p>The movement of people in the project area will be slightly disrupted by the rehabilitation of existing trails or the construction of new access trails to the sites. These disturbances will be temporary.</p>
Gender			Risk of discrimination and marginalization of certain social groups in terms of employment	<p>Most of the time, the companies in charge of carrying out the work only hire able-bodied men and young men who can perform difficult and sometimes strenuous manual work, leaving out women, young people and disabled people who are considered unfit.</p>
			Potential risks of sexual exploitation, abuse and harassment	<p>Psychological/emotional abuse, rape, sexual assault, physical assault, forced marriage, and denial of resources, opportunities, or services are common phenomena in Niger and can be observed during project implementation, both during the construction and operation phases. According to the "Study on the scope and</p>

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				determinants of gender-based violence in Niger", the prevalence rate of all types of violence, regardless of gender, is 53%. The national prevalence of GBV is 28.4%. Women are victims of numerous forms of violence, especially physical (29%), sexual (20%), early or forced marriages (14%) and lack of access to their own resources (22%).
Cultural Resources	Site development work (clearing brush, parceling out, construction of pipeline works, etc.)		Unintentional destruction of archaeological remains	It is possible to discover prehistoric objects of cultural value to be protected during the works. The implementation of the project will strongly contribute to the creation of jobs and to the improvement of the income of the local populations during the construction phase as well as during the exploitation phase. In fact, during the construction phase, all unskilled labor will be recruited from the local population in the intervention zone. Similarly, the presence of the construction sites in the villages where the work is being implemented will encourage the development of small commercial activities that can contribute to improving the income of the local population.
Economic activities and income	Overall work	Job creation and income improvement		
OPERATION PHASE				
Soils	Development of sites and Installation of technical equipment	Improvement and/or maintenance of soil quality		Strengthening the support of technical services and training producers in good input use and soil conservation practices will help maintain and/or improve soil quality. This will improve agricultural yields.
	Use of agrochemical inputs (fertilizers, pesticides, etc.)		Soil salinization	Salinization is the phenomenon that occurs when salts contained in irrigation water

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				are deposited in the soil to the point of making the soil totally or partially infertile. Salinization can have several origins, among which the saline facies of the soil, the excessive use of chemical fertilizers, too much irrigation water, insufficient irrigation that allows salts to settle in the soil, or excessive irrigation that causes waterlogging and the rise of the water table by capillary action toward the rhizosphere. The phenomenon can also result from direct evaporation from the soil in areas where the evaporation potential is greater than that of precipitation. Soil salinization mainly affects arid or semi-arid areas; it hardly exists in humid areas.
Ecosystem services	Use of agrochemical inputs (fertilizers, pesticides, etc.)		Disruption of ecosystem services	<p>Misuse of agrochemicals can have serious consequences on all ecosystems and disrupt ecosystem services. Nitrates from nitrogen fertilizers are responsible for the pollution of surface and ground water. The elements that are not consumed by plants can harm the immediate ecosystem, the fauna (earthworms...) and the micro-organisms (bacteria, fungi...) present in the soil.</p> <p>After their application, pesticides could end up in the air, the soil, and the aquatic environment. They can thus directly and indirectly impact ecosystems and represent a major factor of incidence on biological diversity. The consequences of the use of pesticides are:</p> <ul style="list-style-type: none"> -disruption of nitrogen fixation by leguminous plants; -diminution of plants in the fields; -direct or indirect poisoning of organisms; -reduction of the food supply (weeds, seeds, insects) and

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				therefore of the species that feed on them
Air	Solar Energy production	Reduction of GHG emissions		Equipping the AHAs with solar energy will reduce the consumption of fossil fuels. According to the available data, the consumption of fossil fuel is 20 l/ha/day. The pumps are used for an average of 100 days which corresponds to the three months of the campaign. Pumping is carried out 1 day out of 2, i.e. 50 days of effective use. On this basis, the average consumption per hectare per crop year is estimated at 1,000 liters. On 1500ha the fuel consumption amounts to 1,500,000 liters in the off-season. Considering that only half of this is consumed during the normal season, i.e. 750,000 liters, annual consumption amounts to 2,250,000 liters of fossil fuel per year. This is equivalent to 67.5 million liters over 30 years, corresponding to the life of the solar panels.
		Fossil fuel consumption reduction		
Ground water Surface water	Solar pumping and Irrigation of the plots	Sustainable management of groundwater resources		The irrigation system considered for the project is the Californian system with buried PVC pipes. This will enable a much more rational and efficient management of water resources than the current gravity system or the semi-Californian system. Indeed, the irrigation system currently practiced on the AHA is made up of open canals whose irrigation yield is estimated at 60%. With an average requirement of 15,000 m ³ per hectare of rice, the water pumped from the source and returned to the area is 25,000 m ³ per hectare. The water loss is 10,000 m ³ per hectare per season, or 20,000 m ³ per year for two seasons.

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				These current practices are therefore not resilient and their adoption in the current project would lead to an annual loss of 30 million m ³ for the 1,500 ha to be developed. On the other hand, the Californian system promoted in this project has a yield of 85% compared to 60% in the current system, a gain of 25%. The water losses avoided will therefore be 6,250 m ³ per hectare, or 12,500 m ³ per hectare per year. The water saving with the irrigation system proposed in this project will be 18,750,000 m ³ per year for the 1,500 ha to be developed.
			Lack of effective water management mechanisms	The lack of a system to control and maintain the operation of water collection and distribution equipment can waste the resource through uncontrolled leaks. Such a situation can lead to higher water extraction rates / volumes than expected
	Irrigation of the plots		Pressure on irrigation water	A full analysis was conducted on the project's impacts on water (Please, see Annex 28 Analysis of the Pressure of Irrigation Water Withdrawals from the Hydro-agricultural Development Project with Climate Smart Agriculture Practices on Groundwater Resources in Niger. See also the Word file " Irrigation water AHA-IAC Niger Water stress Analysis 11-12-2020 " associated on the

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				Sheet " Water stress analysis of the Annex 28's Excel file. As a result of this analysis, it was determined that the project will not have a significant negative impact on water resources.
	Discharge of drainage water into the environment		Pollution and degradation of surface water, groundwater and soil quality	The discharge, without prior treatment, of drainage water, loaded with residues of agricultural inputs, into nature or watercourses entails a risk of pollution and degradation of the quality of surface water, groundwater and soils in areas located downstream of irrigated areas.
			Lack of water points for watering livestock	To avoid damage to crops, the irrigated perimeters will be screened, at the same time preventing local breeders from coming to water their livestock there despite the permanent availability of water. Nomadic pastoralists will also be excluded from this benefit of the project.
Landscape	Loss of natural landmarks (trees, groves)		Landscape Modification	Throughout the operation phase of the project, the existing natural landscapes with features (trees, groves, etc.) that serve as orientation markers will be replaced by new developed landscapes characterized by the presence of irrigation infrastructure and crop fields as far as the eye can see. The disorienting effect associated with this change will be temporary and will only be observed during the first years of the project.
Flora	Reforestation around developed sites	Wildlife habitat restoration		Reforestation in and around the sites will result in the restoration of wildlife habitat.
	Sites' irrigation and drainage		Invasive plant proliferation	The large influx of water into the arid or semi-arid areas of the project will create local

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
				microclimates favorable to the proliferation of invasive plants both in the irrigated areas and downstream of these areas, along the drainage channels. Seven invasive plants, including four (4) in drained areas (<i>Prosopis juliflora</i> , <i>Sida cordifolia</i> , <i>Calotropis procera</i> and <i>Pergularia tomentosa</i>) and three (3) in aquatic areas (<i>Mimosa pigra</i> , <i>Eichornia crassipes</i> and <i>Typha australis</i>), have been identified in Niger. The spread of these invasive species is done through the transport of their seeds by the wind or by livestock. Particular attention should be paid to <i>Typha australis</i> which tends to invade drains and canals.
Health	Manipulation of agrochemical inputs (fertilizers, pesticides, etc.)		Population health damage	The manipulation of agrochemical inputs presents risks to the farmers' health. They may be exposed to poisoning if they do not follow the instructions for using pesticides, especially when they do not have appropriate personal protective equipment or when this equipment is not in good condition. In addition, the continuous presence of water in the project areas could lead to the development of breeding grounds for mosquitoes, which are malaria vectors, and the use of this irrigation water for domestic consumption during the dry seasons could cause intestinal infections (bilharzia, amoebic dysentery, etc.).
	Farming work (sowing, weeding, harvesting, etc.) (sowing, weeding, harvesting, etc.)		Child employment, Forced labor	Under normal circumstances, children help their parents with household chores and some farm work. Some parents may use this as an excuse to force their children to help with the activities of this project (e.g., harvesting and post-harvest activities, etc.).
Cultural Resources	Ploughing work		Unintentional destruction of	It is possible to discover prehistoric objects of cultural value to be protected during

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact/Risk
	Maintenance of technical installations		archaeological remains	the ploughing or maintenance of technical installations (irrigation and drainage networks).
Economic activities and income	Solar power generation	Reduction of energy bills		With both power sources currently used by producers (fossil fuel and electric power), the energy bill represents an average of 60 and 45% of production costs, respectively. The implementation of the project will enable the beneficiaries to considerably reduce this bill. The services offered in terms of energy are almost free of charge, with the exception of provisions for maintenance and depreciation of technical equipment and installations.
	Increase of agricultural production	Improvement of food security		The rehabilitation of 500 ha and the development of 1,000 new hectares will increase the availability of food both at the farmer level and at the national level, which will help support food security and improve nutrition. The implementation of the project will result in the annual production of 30,200 tons of food products.

3. Legal and institutional framework for environmental and social assessments of the country and reference to the BOAD Operational Policies, the requirements of which are met by the ESMF

- **The international legal framework**

The international legal framework includes, on the one hand, international conventions and agreements, treaties, signed and/or ratified by Niger and, on the

other hand, legislative and regulatory texts drawn up and adopted at the sub-regional level. These include the following:

- The Stockholm Convention Adopted in Stockholm on 22 May 2001 and ratified on 12 April 2006
- The Convention on Biological Diversity, ratified on 25 July 1995 and signed on 26 December 1996
- Convention to Combat Desertification adopted 14 October 1994 and ratified 19 Jan 1996
- The United Nations Framework Convention on Climate Change signed on 11/06/92 and ratified on 25/07/1995
- The Convention for the Protection of the World Cultural and Natural Heritage signed on 16 November 1972 in Paris by Niger
- The Paris Climate Agreements from the Conference of the Parties (COP 21) adopted on 12 December 2015
- Niger Basin Water Charter and its Environmental Protection Annex 1, ratified by Niger on 30 December 2008
- Regulation C/REG.3/05/2008 harmonizing the rules governing the registration of pesticides in the ECOWAS area of 03 May 2008
- The Ramsar Convention
- The Vienna Convention
- The Rotterdam Convention
- African Convention on the Conservation of Nature and Natural Resources
- **The national legal framework**

In order to ensure the protection and effective management of the environment, Niger has a Framework Law on the Environment, which provides that any development project or activity likely to harm the environment, as well as policies, the plans, the programs, will have to go through an environmental and social assessment.

Moreover, the national system is very rich in terms of texts on the protection of the environment and natural resources (water code, forestry code, hygiene code, etc.).

This national legal arsenal is reinforced within the framework of this project by the environmental and social requirements of the Green Climate Fund (GCF) and those of the West African Development Bank (BOAD)

The GCF Environmental and Social Performance Standards and the BOAD Environmental and Social Safeguards Policies that are met by this ESMF are:

- Environmental and social risk and impact assessment and management
- Labour and working conditions
- Resource Efficiency and Pollution Prevention
- Community Health, Safety and Security
- Biodiversity conservation and sustainable management of living natural resources

- Cultural Heritage

To meet these requirements, specific measures are proposed in the ESMF to enable the project to comply with triggered policies. The national legal framework directly related to the project is presented in the table below.

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Assessment and management of environmental and social risks and impacts	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 31 of the Act stipulates that: "Development activities, projects and programmes which, by virtue of their size or their impact on the natural and human environment, may adversely affect the latter shall be subject to prior authorization by the Minister responsible for the environment [...]"	The sub-projects of this project will be subject to in-depth ESIA's in order to comply with the legal and regulatory provisions relating to environmental assessment in Niger.
	Law n°2018-28 of May 14, 2018 determining the fundamental principles of Environmental Assessment in Niger.	Article 7 of this law stipulates that "on the proposal of the minister responsible for the environment, the Council of Ministers shall establish and revise by decree the types of policies, strategies, plans, programs and the list of development projects for which the public authorities may not, on pain of invalidity, decide, approve or authorize implementation without a certificate of environmental conformity issued by the minister responsible for the environment or a written authorization duly justified in accordance with the texts in force".	
	Decree n°2019-027 of January 11, 2019, implementing Law n°2018-028 of May 14, 2018, determining the fundamental principles of Environmental Assessment in Niger.	The appendix of decree n°2019-027 of January 11, 2019, relating to the modalities of application of law n°2018-028 of May 14, 2018, determining the fundamental principles of Environmental Assessment in Niger, stipulates that any construction, extension and or rehabilitation of hydro-agricultural development of less than 1000 ha is classified in category B.	The developments planned in each commune all have a total area of less than 1000 ha. Therefore, in accordance with this decree, the project is classified in category B.

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Workforce and working conditions	Law n°2012-45 of 25 September 2012, on the Labour Code of the Republic of Niger	Article 4 of the Labor Code prohibits forced or compulsory labor. According to paragraph 5, the following is not considered forced or compulsory labor: "any work performed in the family environment by children which does not endanger their development and fulfilment. "Chapter II of this Code deals with occupational health and safety.	The PMU will ensure that the provisions of this labor code are respected when signing employment contracts.
	Law n°2018-22 of 27 April 2018 determining the fundamental principles of social protection	Its purpose is to guarantee social protection to persons at risk of vulnerability and vulnerable persons in accordance with the National Social Protection Policy.	In the project area, there are vulnerable and disadvantaged groups; their consideration through the project activities will be done in accordance with the strategic orientations of the National Social Protection Policy.
	Order No. 93-13 of 2 March 1993 establishing the Public Health Code of the Niger.	This Order defines the concept of waste and prescribes general provisions on the protection or holding of waste that may harm the natural environment. When project activities will produce waste according to their specificities, they will comply with the provisions of this code.	All measures to guarantee the health of employees and local residents, including measures relating to the management of waste, nuisances, risks of all kinds, etc., must be taken at the various stages of project implementation.
Rational use of resources and pollution prevention	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 3 of Chapter 2 of this law sets out the principles of rational management of the environment and natural resources. These principles are: prevention, precautionary principle, polluter-pays principle, responsibility, participation and subsidiarity. According to article 97 of the framework law, there is provision for a prison sentence of 6 months to two years and/or a fine of CFAF 5 to 50 million for anyone who : (i) Without an impact study, has carried out development projects or programs requiring an impact study. (ii) has carried	The implementation of the ESIA's of the sub-projects falls within the framework of this law.

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		out the above-mentioned operations in violation of the criteria, standards and measures laid down by the impact study. Article 98 also provides for sanctions against any natural or legal person who has polluted, degraded the soil, altered the quality of air or water. According to the framework law: section 3, article 52 "the soil, subsoil and the wealth they contain, as limited resources, renewable or not, are protected against any form of degradation and managed in a rational manner". Article 56: " are subject to prior joint authorization by the minister concerned and the minister responsible for the environment, the use and development of land for agricultural purposes [...] likely to harm the environment".	
	Law N°2004-040 of 08 June 2004 on the forest regime of Niger	Forest resources are a national asset and, as such, everyone is obliged to respect and contribute to their conservation and regeneration.	In the event that the implementation of the project involves felling of trees, the provisions in force shall apply, in particular Articles 33 and 48.
	Law n°2015-35 of 26 May 2015 on plant protection	Article 21 of Chapter 5 states that: "A pesticide may not be placed on the market and used in the national territory unless it has a provisional authorization for sale. The importance of a pesticide is subject to a conformity check".	The project provides for the use of fertilizers and pesticides.
	Order n°2010-09 of 1 April 2010 on the water code	Article 9 of Title II requires that water management should aim to ensure the sustainable, equitable and coordinated use of water resources.	The provisions of this code apply to a project that is an irrigation project.
	Decree 2011-404/PRN/MH/E of August 31, 2011 determining the nomenclature of facilities, installations, works and activities subject to declaration, authorization and concession of water use.	Article 1: This decree determines the nomenclature of developments, installations, works and activities subject to declaration, authorization and concession for water use, as set out in the annex.	The present project is a total water control development with a surface area of more than 25 ha and is therefore subject to an "Authorization with EIA".

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
	Order n°93-014 of March 2, 1993 amended by Law n°98-041 of December 7, 1998 relating to the water regime.	Article 2 of this Law provides that all water use, creation, modification and use of hydraulic works must be designed within the framework of the hydrogeological basin in order to cause the minimum disturbance to the hydrological cycle, water quantity and quality.	
Community Health, Safety and Security	Law n°2001-32 of 31 December 2001 on the Orientation of the Regional Planning Policy	It aims to reduce intra- and inter-regional disparities through better coverage of the population's basic needs, particularly in terms of food, health, education, drinking water and housing.	The activities of this project will contribute to the achievement of some of the objectives of the national spatial planning policy. The location of the project sites will have to take into account the different land uses as defined in local, departmental and regional land use plans.
	Law n°2018-22 of 27 April 2018 determining the fundamental principles of social protection	It aims to guarantee social protection to persons exposed to the risks of vulnerability and to vulnerable persons in accordance with the National Social Protection Policy.	In the project area, there are vulnerable and disadvantaged groups; their consideration through the project activities will be in accordance with the strategic orientations of the National Social Protection Policy.
	Order No. 93-13 of 2 March 1993 establishing the Public Health Code of the Niger.	This Order defines the concept of waste and prescribes general provisions on the protection or holding of waste that may harm the natural environment. When project activities will produce waste according to their specificities, they will comply with the provisions of this code.	The management of waste, particularly solid and liquid waste generated by the project's activities will be carried out in accordance with the provisions of this code and other regulatory texts on the subject.
	Order No. 2010-54 of 17 September 2010 on the General Code of Territorial Communities as amended and supplemented by Order 2010-76 of 9 December 2010	Art. 163: "Local authorities may benefit from the State the transfer of competences in the following fields: land and property; land planning and development; town planning and housing; environment and management of natural resources; equipment, ».	The implementation of the sub-projects' ESMPs will be carried out in consultation with the regional, departmental, communal and village authorities.
	Order No. 93-15 of 2 March 1993 on the guiding principles of the Rural Code	It determines the setting up of land commissions in	The provisions of this ordinance will have to

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		order to promote equitable access to natural resources, a sustainable settlement of conflicts, securing agricultural and pastoral investments for a sound management of common natural resources in case the project activities should require these aspects.	be respected when registering and allocating plots to the project beneficiaries
Biodiversity conservation and sustainable management of living natural resources	Law 98-07 of 29 October 1998 establishing the hunting and wildlife protection regime.	Art. 8 - The following are prohibited throughout the national territory: - hunting outside opening periods; - hunting on board motorized vehicles or any vehicle except boats; - hunting with fire, nets and pits; - hunting and capture with drugs, poisoned bait, fixed rifles, explosives, weapons and munitions of war; - hunting at night with or without lighting devices. However, the Ministry responsible for wildlife, on the basis of a reasoned opinion from the Technical Directorate for Wildlife, may exceptionally authorize, under the supervision of the technical services in charge of wildlife, prohibited hunting methods for the protection of persons and property, the capture of live animals for the repopulation of certain national parks and reserves or for scientific purposes. Any authorization which does not conform to the technical advice is null and void.	During the phase of site development work and the opening of access roads, workers may engage in poaching activities.
	Law No. 2015-35 of 26 May 2015 on plant protection	It repeals Order No. 96-008 of 21 March 1996 on Plant Protection. This legislation introduces the following main innovations: - adaptation to regional, sub-regional and international texts; - the taking into account of all activities related to the phytosanitary protection of the national territory, to the management of pesticides;	The project provides for the use of fertilizers and pesticides.

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		<ul style="list-style-type: none"> - the clarification that the State guarantees the protection of plants throughout the national territory; - the institution of the oath and the specification of the competent jurisdiction; - the introduction of new forms of infringement of the Plant Protection Act and their repression. 	
	Law N°2004-040 of 08 June 2004 on the forest regime of Niger.	Forest resources are a national asset and, as such, everyone is obliged to respect and contribute to their conservation and regeneration.	In the event that the implementation of the project results in the felling of trees, the provisions in force shall apply, in particular Articles 33 and 48.
	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 3 of Chapter 2 of this Act sets out the principles for the rational management of the environment and natural resources. These principles are: prevention, precautionary principle, polluter-pays principle, responsibility, participation and subsidiarity.	The sub-projects of the present project will be subject to in-depth ESIA's in order to comply with the legal and regulatory provisions relating to environmental assessment in Niger.
Cultural Heritage	<ul style="list-style-type: none"> • Law No. 97-002 of 30 June 1997 on the protection, conservation and presentation of the national cultural heritage • Decree No. 97-407/PRN/MCC/MESRT/IA of 10 November 1997 laying down detailed rules for the application of Law No. 97-002 of 30 June on the Protection, Conservation and Presentation of the National Cultural Heritage 	<p>This Law determines the fundamental principles of the legal regime for the protection, conservation and development of the national cultural heritage. It defines and sets out the general rules applicable to the protection, conservation and development of the national cultural heritage: protection of monuments, cultural property, groups of buildings and sites, their identification, classification, presentation and rehabilitation; archaeological excavations and chance discoveries; import, export and international transfer of cultural property. It defines the mission, prerogatives and composition of public services for the protection, conservation and presentation of the national cultural heritage. It</p>	The provisions of this law and its decree are applicable to sub-projects in the event of accidental discoveries.

FVC Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		establishes the penalties applicable to infringements, laws and regulations relating to the protection, conservation and presentation of the national cultural heritage.	

5. Public Consultations

Public consultation refers to any process for obtaining public input to inform a decision. Rather, public consultation refers to formal processes governed by a defined procedure and often subject to a regulatory or legal obligation. Indeed, for the GCF and BOAD, information and consultation is a requirement of their respective policies, starting with the project design phase.

Similarly, Niger's environmental assessment regulations require all project proponents to establish an advertising mechanism to bring information to the attention of stakeholders and take their views into account, their concerns and expectations regarding the project to be incorporated into the project design.

In order to comply with these various requirements, public consultations and meetings with stakeholders were held with various categories of actors in the regions of Agadez, Diffa, Maradi, Tahoua and Zinder.

These public consultations were conducted in accordance with the terms of reference of the study. They took place at three levels: (i) consultation of technical services at central and regional levels, (ii) consultation of beneficiary communities at local level and (iii) national validation workshop of draft study reports.

These consultations resulted in comments and proposals that were considered in the preparation of the final reports.

From a methodological point of view, the meetings with the actors took the form of individual interviews for the technical services and focus groups for certain groups of actors such as cooperatives and other POs.

• Technical Services Consultations

These meetings concerned the following categories of actors: services for the environment, agriculture, livestock, rural engineering, ONAHA, the Permanent Secretariat of the Rural Code, organizations of agricultural producers, representatives of municipalities. The main technical services encountered are:

- Directorates of the Ministry of Agriculture and Livestock
- Green Climate Fund Designated National Authority

- Department in charge of the plan
- Ministry of Finance
- National Environmental Assessment Office
- **Consultation with local communities**

Local consultations took place in the following departments, municipalities and villages.

Regions	Departments	Communes	Villages
Maradi	Madarounfa	Gabi	Duma Gada
			Gabi Tajaé
		Sarkin Yamma	Guidan Chérifi
		Djirataoua	Djirataoua
	Dakoro	Korohane	Korohane
	Guidan Roumdji	Guidan Sori	Magadi
		Guidan Roumdji	Foura Guirke
Tahoua	Abalak	Tabalak	Tsaouna
		Keita	Boussaragué
	Bouza	Karofane	Karofane
Agadez	Ingall	Ingall	Agogh
	Arlit	Dannet	Techillé
	Bilma	Dabaga	Mararaba Elméki
			Mararaba Aouderas
	Tchirozérine	Tchirozérine	Tchintaborack
Zinder	Kantché	Dan Barto	Gazoura
		Doungou	Unguwal Malam Jatau
			Kantché
	Magaria	Magaria	Goabron Majé
		Wacha	Gayi
	Mirriah	Gouna	Guirari
	Damagaram Takaya	Guidimouni	Babban Sheme
Diffa	Diffa	Diffa	Digargo
		Chetimari	Dasa
	Mainé Soroa	Mainé Soroa	Chéri

- **Concerns expressed, suggestions and recommendations considered in the project**

The concerns expressed by the populations as well as the suggestions and recommendations made during the various meetings are presented in the following table. These suggestions and recommendations were taken into account in the formulation of the project documents.

Concerns expressed	Main suggestions and recommendations
Fear of a minority takeover of the project haunts some producers.	To avoid frustration, the involvement of customary and municipal authorities is essential in awareness-raising campaigns aimed at the various stakeholders. As the work is a regional development action, it must be approved by the Regional Council; the authorities must be involved in the launching of the work. This will make it possible to mobilize the region's contributions within the framework of the regional development plan.
The method of land transfer	Setting up a site management committee and providing this committee with statutory texts that define the conditions of access to the site, the roles and responsibilities of the actors, the rights and

	duties of the members. These texts must be the subject of a consensus between the operators.
Criteria for the availability of developed plots of land	When distributing the developed plots, the officials in charge of conducting the process must ensure that they are accessible to all village nationals, that they are representative of young people and women.
Soil degradation and a worrying decline in agricultural yields	Soil quality and agricultural yields will be enhanced by new cultivation techniques and the promotion of organic manure on irrigated perimeters (Activity 2.2.4).
Difficulties of water supply for small scale irrigation development	The project provides a solution to this problem through the implementation of a solar pumping system that minimizes the cost of access to the resource. The beneficiaries of the project must be made aware of the need for good individual and collective management of the installations set up. They must have access to this resource without any gender or social discrimination.
Lack of financial means to dispose of agricultural inputs (fertilizers, improved and resistant seeds, phytosanitary products)	The project will support the acquisition of agricultural inputs (fertilizers, improved and drought-resistant seeds) (Activity 2.2.3). It will also contribute to the improvement of the financial means of the beneficiaries through support to the development of income generating activities (IGA) based on the conservation and processing of agricultural products (Activity 2.4.2).
Repetitive pest attack with production losses	An Integrated Pest and Pesticide Management Plan (IPPMP) is being developed as part of the project to this end.
Silting of perimeters	One of the expected results of the project is the protection of productive capital against threats associated with the effects of climate change such as silting and flooding (Activity 1.1.1).
Flooding of perimeters with heavy rains over a relatively short period of time	
Involvement of technical services	They will provide technical guidance. This supervision will concern the management committee, which will need not only to provide the structure with texts but also to organize the production. At the producer level, the services will be responsible for training volunteers in production techniques. When ordering inputs, the technical services will be asked to select seeds that are adapted to the soil but also likely to resist pest attacks. On receipt of the seeds, the technical services will be responsible for testing the quality, which will help to avoid frustration and discouragement. In assembling the files, the Technical Services Officers will support the county management and in some cases the POs. In the field of production evaluation, the technical services will train the members of the management committee in the production of reliable statistical data and their archiving. They will train producers in the evaluation of yields and the transmission of data to the members of the management committee. In order to facilitate mentoring, Technical Service staff should be provided with logistical support for on-site

	travel. In the field of by-product conservation, it is the responsibility of the technical services to support producers through training sessions and to initiate study trips or experiments as needed
Animal damage	The landscaped perimeters will be fenced off with wire mesh to prevent any damage to the animals

6. Environmental and Social Management Framework Plan

6.1. Generic Environmental and Social Management Measures

To avoid or significantly reduce the impacts related to the implementation of the project, the following measures are proposed to strengthen environmental and social management. These include, but are not limited to: (i) Mitigation measures for adverse impacts and risks to bring the project into compliance with triggered environmental and social safeguards; (ii) Institutional strengthening measures (Strengthening of the environmental expertise of the Project Management Unit, the BNEE, the Directorate General of Rural Engineering and Local Authorities beneficiaries of infrastructure and equipment. These measures are presented in the GHGRP synoptic table (Cf. § 6.8).

6.2 Project Environmental and Social Procedure

To enable the integration of environmental and social dimensions into the design and implementation of sub-projects, it is essential to propose a process for assessing the environmental and social impacts of sub-projects, to identify and define the actors who will be responsible for their implementation and monitoring. Indeed, the process will be the approach that will determine the level and modalities of consideration of environmental and social impacts in the cycle of sub-projects. The formulation of ESIA and the implementation of the sub-project ESMP will be consistent with national ESIA procedures and the GCF Environmental and Social Performance Standards. This process involves the following steps.

Step 1: Environmental and social screening of sub-projects and formulation of terms of reference for the implementation of sub-projects

Step 2: Conduct environmental and social impact assessments of sub-projects

Step 3: Dissemination of ESIA results

Step 4: Approval of sub-project ESIA reports, issuance of environmental certificates and dissemination of final report

Step 5: Release of Final Report

Step 6: Implementation of environmental and social measures

Step 7: Environmental and Social Monitoring

Step 8: Follow-up

Step 9: Final assessment.

6.3. Project Grievance Management Mechanism

The management of complaints and grievances will be done at two levels: first at the informal level at the local level and then, in case of failure, at the level of the BOAD or the FVC.

- **Local Grievance Management**

At the local level, the management of complaints will be based primarily on existing practices that have demonstrated their effectiveness. Public consultations have shown that people prefer conciliation with customary officials (village chiefs, townships) rather than judicial proceedings.

Collection, processing and resolution of complaints

A directory for the collection of complaints will be made available to the public at all times at each municipality concerned by the work. Public information on the permanence of the collections on this booklet will be undertaken, in particular by organizations (NGOs) specialized in the field.

Resolution mechanisms

The following mechanisms are proposed to resolve conflicts that may arise amicably:

- the first level of resolution is provided by the village chief assisted by the notables;
- the second level, in case of failure of the first, is ensured by the Mayor of the municipality concerned by the conflict;
- the third level, in the event of a deadlock between the first two levels, involves the administrative authority.

- **BOAD and GCF Grievance Management**

BOAD has put in place a grievance mechanism through its Grievance Policy and Procedures Manual which is an independent mechanism through which individuals who have suffered harm as a result of a project funded or implemented by BOAD may file a complaint. The grievance mechanism, which is made available to stakeholders, is part of environmental, social and economic sustainability to address non-compliance and grievance resolution arising from projects implemented by BOAD. This manual defines the mechanism for resolving complaints in the implementation of any project funded or implemented by BOAD. It aims to establish an effective dialogue between project stakeholders. It aims to establish an effective dialogue between the people involved in the projects they are funding and all interested parties, to resolve the problem or problems giving rise to an application, without seeking to attribute responsibility or fault to any of these parties.

At the OPOD level, the grievance mechanism is coordinated and managed by the Compliance and Regulatory Division (DCR). Affected communities and other stakeholders that will be affected by the project may submit complaints to BOAD, the implementation entity of this proposal, by mail, e-mail, fax or telephone. The full address is provided below:

Banque Ouest Africaine de Développement
62 av. de la Libération,
BP 1172 Lomé, Togo
Tel : +228 22 21 59 06
Fax : +228 22 21 52 67
E-Mail : boadsiege@boad.org
Web : www.boad.org

Complaints may also be lodged with the GCF Secretariat:

Songdo Business District
175 Art center-daero
Yeonsu-gu, Incheon 22004
Republic of Korea
+82.32.458.6059(KST)
info@gcfund.org

Procedures on how to submit a complaint are available on the OPOD website (www.boad.org) or directly at <https://www.boad.org/en/policies-procedures-guidelines/> (under “COMPLIANCE DOCUMENTS AND GRIEVANCE”).

If the CRD determines that a complaint is admissible, it shall form an internal and/or external team of experts to investigate the case and propose options for the complainant to consider.

6.4. Environmental Monitoring Program

Environmental and social monitoring (proximity control) is carried out by a Control Office or Control Mission (MdC), which will have as its main tasks:

- Enforce all current and specific project mitigation measures;
- remind contractors of their environmental obligations and ensure that they are met during the construction period;
- prepare environmental monitoring reports throughout the work;
- Monitor work and request appropriate corrective action if required;
- Write the final report of the environmental and social monitoring program.

The environmental and social monitoring mainly carried out by the monitoring missions simultaneously with their technical mission, under the authority of the UGP, which must ensure that the service provider complies with its contractual clauses. Control missions must report information from their control to the PMU and the BNEE on a monthly basis. In addition, the MoC will be able to act as an interface between riparian populations and entrepreneurs in the event of complaints.

6.5. Environmental and Social Monitoring Program

Environmental monitoring is an extension of the impact assessment, which consists of verifying the validity and accuracy of the assessment of anticipated impacts both during the construction period and during the operation and maintenance of the infrastructure put in place as part of the project. The monitoring program also verifies the effectiveness of mitigation and/or compensation measures to minimize the actual impacts of the project. Where appropriate, some of the proposed measures that have

become unnecessary may be abandoned, while new measures may be implemented to address unintended adverse effects induced by the project.

The environmental monitoring program must be effective throughout all phases of the project in order to integrate the necessary corrective actions along the way.

As part of the normal course of project activities, a monthly environmental monitoring report is produced. However, any incident or activity that could have a significant impact on the environment must be reported immediately so that appropriate corrective measures can be put in place as quickly as possible.

A comprehensive environmental monitoring report is produced at the end of the construction phase. This report must set out the guidelines and the procedures for carrying out the monitoring program to be implemented during the period of operation and maintenance of the project's installations and equipment, based on data acquired during the construction phase and new concerns expressed by the various stakeholders.

In the case of this project, the PIU ESR/NLG and SSO/G must ensure that the triggered GCF Environmental and Social Performance Standards and national environmental regulations are met. Follow-up reports should be sent to PMU, BNEE and OPOD. Environmental and social monitoring must also involve the beneficiary municipalities, the technical services concerned (Agriculture, Livestock, Rural Engineering, etc.).

6.6. Monitoring indicators in the execution of sub-projects

The indicators below are proposed to be monitored during the implementation of the sub-projects. Particular emphasis will be placed on monitoring the following: the basins of the Niger River and Lake Chad, particularly spawning areas; soil erosion, deforestation and silting of rivers during development; land conflicts; the health of populations and producers (water-borne diseases, accidents, etc.). As an indication, the table below presents an environmental and social monitoring program for the sub-projects.

Elements to follow	Monitoring indicators	Monitoring activities	Collection frequency	Collection method	Actors	
					Implementation	Monitoring
Water	Pollution level Bacteriological parameters	Monitoring of water resource use activities; Water quality monitoring (wells, drilling, etc.) Physico-chemical and bacteriological controls at water points	Annual	Analyses Physicochemical and bacteriological	DRH UGP	BNEE
Soil	Salinization level	Periodically monitor salt concentration levels in irrigation water	At the end of each campaign "	AHA Sampling	DGA UGP	BNEE

	Quality (structure, texture)	Monitoring of nuisances and various soil pollution and contaminations (pollutants, oils, greases, etc.)				
Flora	Cleared areas; Composition, pressure level	Evaluation of reforestation/ planting measures and the regeneration rate Monitoring the level of implementation of the internal regulations on the protection of natural resources	Once a year for 3 years from the end of the works	Sampling in reforestation areas	DEF UGP	BNEE
Fauna	Specific Abundance	Identification of species population	Annual	Population surveys and sampling	DEF UGP	BNEE
Loss of cropland	Loan area surfaces ; Rehabilitated areas	Visit of loan sites	twice a year	Visual finding; population surveys	DGA Municipalities UGP	BNEE
Measures for the prevention of hazards, risks and accidents	Number of awareness sessions for workers and the general public on safety and health risks Number of accidents; Presence of regulations and instructions	Strict application of the rules of procedure on health, hygiene and safety measures Checking compliance with the provisions for the prevention of risks, hazards and accidents on construction sites Monitoring of compliance with the implementation of labor legislation: provision and wearing of adequate protective equipment for site personnel Checking the installation of safety and hygiene measures on the building site	4 times a year	-Neighborhood surveys - On-site inspections	DHPES Municipalities UGP	BNEE

6.7. Institutional arrangements

The main institutions involved in the implementation of the ESMF are the following.

- **The Project Management Unit (PMU):** It will coordinate the implementation of the ESMF and serve as an interface with other relevant stakeholders. It will coordinate the capacity building and training of agricultural agents and producers and other technical structures involved in the implementation of the ESMF. The UGP will recruit two Experts in Environmental and Social Safeguards (ESES/GRN and ESS/G) who will coordinate the local monitoring of environmental and social aspects for work and interface with other actors. These experts will coordinate the preparation and

proximity monitoring of the implementation, in connection with the municipalities and the technical services concerned (environment, agriculture, forestry, hydraulics, etc.). These experts do not have environmental and social autonomy. They will have to work closely with the BNEE.

- **The BNEE:** It will provide environmental and social monitoring (compliance monitoring of work and environmental and social protection standards) and implementation of the ESMF and support the capacity building of officers in the field. At the local level, the BNEE will be supported by WEESE housed in DREDD. The control performed by the BNEE will in fact be a contradictory audit based on monitoring and follow-up reports. The project will provide institutional support to the BNEE in this monitoring under the Memorandum of Understanding. The BNEE will forward a copy of its reports to OPOD for disposition.

- **The technical services responsible for the implementation of the project:** The technical services responsible for the implementation (DGA, DGGR, DGEF, ONAHA, etc.) will have to designate Focal Points that will support the Communes and Producers, and participate in monitoring the implementation of the work.

- **Private service providers:** Construction companies and Control Mission: Project activities, including environmental and social measures, will be implemented by private service providers who will have to have a Safety and Environment Health Manager within their organization. The proximity monitoring of the works will be carried out by Control Missions recruited by the UGP for this purpose. These offices will have to have an environmental and social expert within them who will mainly have to ensure permanent control of the implementation of environmental and social measures.

- **Producer Organizations:** They must apply the procedures and good environmental and social practices in the realization and management of the hydro-agricultural structures of which they will be beneficiaries.

- **NGOs:** Environmental NGOs will also be able to participate in informing, educating and raising awareness among agricultural producers and populations on the environmental and social aspects related to the implementation of sub-projects, but also implementation monitoring and environmental monitoring.

6.8. ESMF Synoptic Table

All the mitigation measures, the actors involved in the implementation of the ESMF, the monitoring indicators as well as the costs and the different periods of implementation of the recommended measures are presented in the following synoptic table.

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
PHASE OF CONSTRUCTION									
Assessment and management of environmental and social risks and impacts	Compliance with FVC performance standards and national legislation		Conduct sub-project ESIA Ensuring proper implementation of the ESMPs, the PGIPP and the GAP	BNEE, ONAHA, beneficiaries, DRE, DRGR, UGP works contractors, NGOs	PMU, Beneficiaries, contractors, NGOs	RDGR, EARB, DRE, Control Office	-Follow-up reports, -Visit of the sites	Throughout the project	8000000/EIES That is 184 000000
Workforce and working conditions		Discrimination against certain marginalized groups, including women and young people	-Establish criteria for fair competition in hiring, -Respect the provisions of the Labor Code	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies, NGOs	DRGR, BNEE, DRE, Control Office	-Percentage of women as a percentage of all employees;	Throughout the project	PM
	Gender mainstreaming and the process of integrating equity concepts in the execution of activities		Ensure proper implementation of the Gender Plan of Action	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, Construction companies, NGOs	Ministry responsible for gender, BNEE	-Percentage of young people	Throughout the project	15 000000 all sub-projects
	Job creation and income improvement		-Respect the provisions of the Labor Code and the International Labor Conventions; -Adopt the same wage level for men, women	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction	PMU, construction companies, NGOs	BNEE, Ministry in charge of Gender	Follow-up reports, -Payroll and Employee Survey	Throughout the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			and young people for the same level of work.	companies, NGOs		Employment Inspectorate			
Rational use of resources and pollution prevention		Modification of soil structure	Avoid overrunning the routes of construction machinery on the surrounding fields by marking out the work rights-of-way and access roads to the borrow sites and make truck and machinery drivers aware of this.	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies, NGOs	BNEE, DRGR, ONAHA	-Follow-up reports, - Number of awareness sessions -Total length of marked site -Number of people sensitized	Construction phase	1,000000/ site, i.e. 23,000000
		Loss of arable land	Rehabilitate borrow material sites as soon as they are no longer in operation	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, works companies; site owners	BNEE, DRGR, ONAHA	-Percentage of borrow sites rehabilitated -Types of rehabilitation (new assignment)	Throughout the project	PM
		Surface and groundwater pollution	-Sensitize the staff and workers of companies on the risks of chemical pollution of surface water, -To ensure a rigorous control of the liquid wastes of the building site as well at the base of the building site as at the level of the perimeters in development, -Equip the construction site baseboards with a	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Report and number of awareness sessions, -Quantity of waste treated -Existence of a toilet on the building site	Construction phase	2 000000/site that is 46000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			toilet facility for the personnel, -Collecting and tightly packing materials and rags soiled with chemical products and handing them over to specialized institutions for treatment and disposal						
		Poor siting of boreholes	On each site, carry out several pumping tests in the water tables present and only retain the borehole (s) with sufficient flow rates that can meet the water requirements of the project at all times.	BNEE, ONAHA, DRE, DRGR, PMU, advisory support services,	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Number of drilling tests carried out on each site Percentage of productive boreholes	Construction phase	PM
		Air Pollution	-Do not leave the engines of trucks and machinery running when stationary, -Educating truck drivers on the regular maintenance of their vehicles, -Cover loads of powdery materials with tarpaulins, -Watering the tracks under rehabilitation/construction in dry periods.	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Engine noise, -Percentage of drivers aware, -Number of loads covered with tarpaulin, -State of humidity of the tracks	Construction phase	1000000/site that is 23 000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
Community Health, Safety and Security		Potential risks of sexual exploitation, abuse and harassment	-Sensitize all project stakeholders and beneficiaries to issues of violence against women -Establish a mechanism for reporting and resolving cases of sexual exploitation, abuse and harassment	PMU, ONAHA, DGGR,	PMU, ONAHA	The gender mainstreaming expert	-Effective implementation of the reporting mechanism -Number of awareness sessions -Number of cases observed	Construction and operation phases	FTR
		Damage to the health and safety of workers and the population	-Sensitize workers to the risks of accidents related to their activities and to the non-observance of safety instructions, -Equipping all workers with personal protective equipment (boots, gloves, nose mask, helmet, etc.), -Equipping the construction site bases with a first aid unit equipped with basic pharmaceutical products, -Sensitize staff, workers in enterprises and the population on the risks of contamination by sexually transmitted infections (STIs) and HIV-AIDS and make	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, Contractors	BNEE, DRGR, ONAHA	-Effective wearing of EPI -Presence of a first-aid unit equipped with essential pharmaceutical products -Number of awareness sessions, -Number of condoms distributed	Construction phase	2 000000/site that is 46000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			condoms available to them, -Sensitize the population and drivers of lorries and other vehicles to the risks of accidents when driving through built-up areas.						
		Traffic disruption	Avoid total blockage of traffic by providing temporary diversions if necessary.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Contractors, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	Work in half-roadway	Construction phase	PM
Biodiversity conservation and sustainable management of living natural resources		Loss of vegetation and grazing cover	-Limit tree felling to the strictly necessary spaces -Pay the slaughter tax in accordance with national regulations. -Redistribute the wood from the clearing of the land to the populations of the villages concerned. -Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of developed perimeter in the commune). -compensate for losses of cash crops and trees with economic value	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Reforested area in the commune -Number of trees of economic value felled -Area of forage crops	Construction phase	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			(teak, doum palm, shea, date palm, néré...) -develop forage crops in the project area						
		Changing the landscape	Carry out selective tree cutting.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	Number of saved trees	Construction phase	PM
		Disturbance, destruction of wildlife habitat and poaching	Mark out work rights-of-way and avoid any unnecessary overflow, especially when opening new access roads to the sites.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Works companies, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	-Length of marked site -Consumption of wild meat on the construction site	Construction phase	PM
Indigenous Peoples		Reduction of grazing areas nationally	Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of perimeter developed in the municipality)	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Works companies, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	Reforested area in the municipality -	Construction phase	PM
Cultural Heritage		Unintentional destruction of archaeological remains	-Stop work and put in place devices to secure the remains discovered and inform the competent authorities of	BNEE, ONAHA, Beneficiaries, DRE, DRGR,	PMU, Contractors	BNEE, DRGR, ONAHA	-Number and location of incidental findings	During all phases of the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			the appropriate measures to be taken. -Comply with the provisions of Articles 51 to 53 of Ordinance No. 97-002 of 30 June 1997 on the protection, conservation and presentation of the national cultural heritage.	Contractors, NGOs					
OPERATING PHASE									
Assessment and management of environmental and social risks and impacts	Compliance with FVC performance standards and national legislation		Ensuring proper implementation of the ESMPs, the PGIPP and the GAP	BNEE, ONAHA, Recipients, DRE, RDGR, PMU, Advisory Support Services, NGOs	PMU, Beneficiaries, Contractors, NGOs	DRGR, BNEE, DRE, Audit Office	-Follow-up reports, -Visit of the sites	Throughout the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
Workforce and working conditions	Gender mainstreaming and the process of integrating equity concepts in the execution of activities		<ul style="list-style-type: none"> -Ensure the proper implementation of the Gender Action Plan. -Ensure an equitable distribution of plots between men, women and young people. 	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, construction companies, NGOs	Ministry in charge of Gender, BNEE	<ul style="list-style-type: none"> -Percentage of women as a percentage of all employees -percentage of plot respectively exploited by men, women and young people 	Throughout the project	
Rational use of resources and pollution prevention		Soil Salinization	<ul style="list-style-type: none"> -Periodically monitor salt concentration levels in irrigation water. -Ensure that drainage systems are in good condition and working order. - Soil leaching (remediation) after harvesting 	NEB, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	<ul style="list-style-type: none"> -Periodic report of salt level control -Condition of drainage devices 	During the entire operating phase	100,000/ha/year, i.e. 150,000,000/year for the entire project.
	Reduced energy bills		Periodic maintenance of solar panels and electrical installations	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	Cleanliness of the solar panels	Operation phase	69 000000
		Disruption of ecosystem services	-Ensure effective implementation of the Integrated Pest	BNEE, ONAHA, beneficiaries, DRE, DRGR,	PMU, consulting support	DRGR, BNEE, DRE	- Number of awareness sessions	Operation Phase	FTR

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			Management Plan (IPMP) -Use only registered pesticides Use non-chemical fertilizers -Raise awareness among project beneficiaries about the risks of soil, air and water pollution due to the massive and uncontrolled use of agrochemicals	consulting support services, NGO	services, , NGO		-Brand names of agrochemicals used -Results of soil and water analysis		
	Improvement and/or maintenance of soil quality		Ensure that all farmers master techniques to improve soil quality.	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Support and Advisory Services, NGOs	DRGR, BNEE, DRE, Control Office	Number of people trained	During the entire operating phase	95 000 000
	Reduced consumption of fossil fuels		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	State of operation of the solar equipment and the evolution of the budget allocated to their maintenance.	Operation phase	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
	Reduction of GHG emissions		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Operating status of solar equipment and the evolution of the budget allocated to their maintenance	Operation phase	PM
	Sustainable management of groundwater resources	Lack of effective water management mechanisms	Further reduce water losses by ensuring proper operation and maintenance of drip and California drip irrigation systems Establish, on each site, a periodic maintenance system for water collection and distribution installations and equipment Replace, as soon as possible, defective, damaged or dilapidated installations and equipment Locally train, among the beneficiaries of the project, young technicians capable of urgently carrying out certain small jobs such as closing a valve and replacing a broken pipe letting water flow, etc	BNEE, ONAHA, beneficiaries, DRE, DRGR, PMU, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Evolution of the quantity of water pumped Evolution of the budget allocated to the maintenance of irrigation systems	Operation phase	90 000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
		Pollution and degradation of surface and groundwater quality	-Lagooning of drainage water before discharge to the wild, -Privileging biological pest control and limiting the use of registered pesticides	BNEE, ONAHA, beneficiaries, DRE, DRGR, PMU, DPV, NGOs	PMU, Advisory Support Services, Beneficiaries, NGOs	DRGR, BNEE, DRE, DPV	Evolution of drainage water quality	Operation phase	20 000/site that is 460 000
Community Health, Safety and Security		Impacts on the health of populations	<p>-Training and raising awareness among farmers on the optimal use of agrochemicals (nitrogen fertilizers), on the harmful effects of phytosanitary treatments.</p> <p>-Sensitize plant protection officers to wear protective equipment (nasal masks) when applying pesticides.</p> <p>-Inform and sensitize project beneficiaries on water-related diseases (malaria, typhoid fever, amoebic dysentery, etc.);</p> <p>-Develop and implement the IFMP.</p> <p>-Include the project communes in the intervention program of the epidemiological surveillance system.</p>	BNEE, ONAHA, Recipients, DRE, DRGR, PMU, DPV, NGOs	PMU, Advisory Support Services, Beneficiaries, NGOs	DRGR, BNEE, DRE, DPV	<p>Number of awareness-raising sessions for farmers and plant protection officers</p> <p>-effective wearing of EPI</p> <p>-Change in the number of people affected by waterborne diseases</p>	Operation phase	23 000000/year

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
	Improved access to energy for irrigation		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	State of operation of the solar equipment and the evolution of the budget allocated to their maintenance.	Operation phase	PM
	Improving food security		-Ensure the proper implementation of the recommendations of the ESMPs, PGIPPs and PAGs in order to achieve the project's objectives. -Ensure the achievability of the project through capitalization and sharing of lessons learned.	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	-Evolution of agricultural yields during the different campaigns, -Number of farmers with a good command of irrigation techniques, soil quality improvement, biological control,	Throughout the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
Biodiversity conservation and sustainable management of living natural resources		Proliferation of invasive plants and pests	<ul style="list-style-type: none"> - Proceed with regular weeding of the fields, - cutting and uprooting unwanted seedlings - Ensure proper implementation of the integrated pest and pesticide management plan - Use chemical or biological control in consultation with the specialized services of the Ministry of Agriculture (plant protection). 	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Advisory Support Services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, control office	<ul style="list-style-type: none"> -Type of invasive plant and percentage of colonized area -Methods of control adopted -Types of pests 	Operation phase	PM
	Wildlife Habitat Restoration		<ul style="list-style-type: none"> -Planting hedges and compensatory reforestation, -Utilize endogenous species for reforestation 	BNEE, ONAHA, Recipients, DRE, DRGR, Advisory Support Services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control office	<ul style="list-style-type: none"> -Rate of recolonization of sites by endogenous species -Reforested area 	During the period of operation of the project	PM
Indigenous Peoples		Lack of water points for watering livestock	Install, outside the irrigated perimeters, water points intended for the watering of the livestock of local herders and nomadic herders	BNEE, ONAHA, DRE, DRGR, Works companies, ONG	UGP, Works companies,	BNEE, DRGR, ONAHA	<ul style="list-style-type: none"> Number of water points installed around the perimeters - 	Construction Phase	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs CFA
					Implementation	Monitoring			
			during their seasonal transhumance						
Cultural Heritage		Unintentional destruction of archaeological remains	Stop the work and put in place devices to secure the remains discovered and inform the competent authorities of the appropriate measures to be taken.	BNEE, ONAHA, Beneficiaries, DRE, DRGR	PMU Ministry of Culture	BNEE	Number, nature and location of remains	All phases of the project	PM

6.9 Cost of implementing the ESMP

The cost of implementing measures to mitigate the negative impacts of the project amounts to CFA 1,456,460,000 over 5 years. To this amount must be added the cost of implementing the Environmental and Social Monitoring Plan worth CFA 49,450,000. The overall cost of implementing the project's ESMP thus amounts to CFA 1 505 910 000.

INTRODUCTION

This report constitutes the Environmental and Social Management Framework (ESMF) for the "Hydro-agricultural Development Project with Climate Resilient Smart Agriculture Practices", which aims to enable better consideration of environmental and social dimensions. Indeed, with regard to the investments and activities planned within the framework of the project, the regulatory provisions on environmental protection in Niger require the identification and assessment of environmental and social impacts related to its implementation and the adoption of procedures and measures to mitigate and/or compensate negative impacts and enhance positive impacts.

The project involves different levels of governance: (i) the local level to reduce vulnerability and increase knowledge about the effectiveness of AIC interventions and identify potential best practices; (ii) the regional level to promote cross-border knowledge sharing on climate adaptation and IYC, particularly with regard to effective options for a southward expansion of the Sahelian zone and (iii) the national level for strengthening the capacity of rural extension services and government ministries responsible for designing effective IYC strategies and integrating them into development plans and programs.

The methodological approach adopted to develop this CGES, is based on the concept of a systemic approach, in consultation and dialogue with all the actors concerned by the project. It has favored a participatory and iterative approach that has made it possible to integrate the opinions and arguments of the various stakeholders as they emerged. This methodological approach has been articulated around the following major areas of intervention:

Documentary review: This phase consisted of the pre-collection and use of documentation relating to the environmental assessment reports and the project. This included :

- national environmental assessment regulations, socio-economic studies, environmental studies already carried out, similar reports carried out in the project areas. This pre-collection took place mainly during public consultation missions with the various stakeholders;
- analysis of project documents (concept note) and other strategic and planning documents at the local, national and sub-regional levels.

Meetings with the institutional and socio-professional actors mainly concerned by the project. These are the national and regional technical services (environment, agriculture, meteorology, hydraulics and rural engineering), the regional representations of NGOs (see list of people met in annex). During this phase, several groups of producers were met in the different project intervention zones;

Visits to potential sites and interviews with farmers. In accordance with the terms of reference, visits to potential sites were organized. These visits provided a clear picture of some of the elements that constitute the subject of the study, and also helped to complete the information collected with the technical services. In addition, during the site visits,

public consultation meetings were also held with the local communities in order to gather their opinions.

The information collected was processed to support the development of the CGES. This report is structured as follows :

- a non-technical summary ;
- an introduction that puts the project in context and provides the rationale for the development of the CGES;
- a description detailing the context and justification of the project, highlighting its alignment with sectoral policies and strategies, objectives and expected results, activities by component, target areas and environmental and social classification;
- a description of the biophysical and socio-economic characteristics of the project areas through the diagnosis of the regions concerned;
- a description of the political, legal and institutional framework through the political and legal aspects at the international and national levels related to the project activities as well as the institutional aspects at the national level;
- an assessment of the generic impacts (positive and negative) associated with the project,
- a description and proposal of preventive, control and/or mitigation measures ;
- a description of the environmental and social procedure of the project, which details the whole process that will be applied to eligible sub-projects or activities (with priority focus on the national procedure), to enable the environmental and social dimensions to be taken into account during project implementation ;
- an Environmental Monitoring and Follow-up Plan framework that integrates the monitoring program, the environmental follow-up program, the follow-up indicators, the institutional arrangements for implementing the CGES, the intervention strategy and the implementation modalities, including the costs of the CGES ;
- the public consultation mechanism, which describes in detail the objectives, the public consultation process, the themes addressed, the concerns raised by category of stakeholders, summary of recommendations and dissemination of information ;
- a general conclusion;
- appendices.

CHAPTER I: FULL PROJECT DESCRIPTION

1.1. Justification of the project

Niger is a Sahelian country where three-quarters ($\frac{3}{4}$) of the surface area is desert, and whose economy depends essentially on the primary sector (agriculture and livestock). Indeed, agriculture represents the main socio-economic activity that employs more than 87% of the active population. However, it is strongly affected by climatic hazards which manifest themselves in increased droughts, frequent floods and locust attacks. Despite the initiatives taken for several decades through agricultural development projects and programs to combat poverty and improve the living conditions of the population, the population remains in a situation of food insecurity. According to the results of the joint survey on vulnerability to household food insecurity in Niger in 2015, 15.7% of the population is food insecure and 33% are exposed to it. The malnutrition rate has risen from 13.3% in 2013 to 14.8% in 2014 and then to 15% in 2015, thus reaching the "emergency threshold" of 15% set by the World Health Organization (WHO). As for poverty, it affects nearly 65% of rural households and 41% of urban households.

The present project is in line with the strengthening of past initiatives, and concerns the rehabilitation of 500 ha of AHA in the Maradi region and the development of 1,000 ha of new perimeters distributed in the regions of Agadez, Tahoua, Diffa and Zinder with solar pumping systems. In addition, the project is involved in the implementation of the 3N Initiative's action plan, Food and Nutritional Security Strategy and Sustainable Agricultural Development, "Nigériens Nourrissent les Nigériens", which has the overall objective of *"contributing to the sustainable protection of Nigerien populations from hunger and malnutrition and guaranteeing them the conditions for full participation in national production and the improvement of their income"*.

Specifically, the aim is to strengthen national capacities for food production, supply and resilience in the face of food crises and disasters. The project's activities fall within the 3N initiative's axes 1, 2 and 3, namely Axis 1: Increase and diversification of agro-sylvo-pastoral and fisheries production; Axis 2: Regular supply of rural and urban markets with agricultural and agro-food products; and Axis 3: Improving the resilience of populations to climate change, crises and disasters.

The project activities are also part of the priority actions of the 2016-2020 Investment Plan of the 3N Initiative, which aims to increase the area under irrigation from 120,000 ha in 2015 to 358,000 ha in 2020 in order to achieve an irrigated production of 1,200,000 tons. To this end, the investment plan provides for the rehabilitation of 10,000 ha of poorly functioning facilities and the establishment of 40,000 ha of new facilities between 2015 and 2020.

The project also has its origins in the National Agricultural Investment Plan, which aims to « *contribute to increasing and securing agricultural production in a sustainable manner with a view to improving food security* ».

For the Green Climate Fund, the project falls within two of the eight high-impact development sectors identified by the Board of Directors. These are: (i) the health, food and water security sector and (ii) the individual and community livelihoods sector.

1.2. Objectives of the project

The overall objective of the project is to contribute to the increase of national agricultural production by strengthening the resilience of populations to the adverse effects of climate change. In terms of specific objectives, this project aims to:

- to sustainably intensify agricultural production by improving crop yields through hydro-agricultural developments designed with innovative irrigation and solar pumping systems;
- protecting productive capital against the threats associated with the effects of climate change (silting, flooding, etc.);
- to ensure the operation and sustainability of infrastructures through the strengthening of the technical and organizational capacities of operators and technical services.

These objectives are fully in line with the objectives set by the Green Climate Fund, in particular that related to the promotion of a paradigm shift towards low-emission and climate resilient development, taking into account the needs of countries that are particularly vulnerable to the impacts of climate change.

1.3. Scope of the project

The perimeters developed within the framework of this project cover a total area of 1750 ha located in the regions of Agadez, Tahoua, Maradi, Zinder and Diffa. The distribution of these perimeters by region is presented in Table 1.

Table 1 : Distribution of developed perimeters according to project intervention regions

Regions	Perimeter areas (ha)	
	To develop	To be rehabilitated
Agadez	168,6	
Tahoua	200	237,00
Maradi	198,2	512,00
Zinder	289,80	
Diffa	144,4	
Total	1001	749

1.4. Presentation of the Promoter

The promoter of the project is the Ministry of Agriculture and Animal Husbandry, based in Niamey. In accordance with Decree No. 2016-376 /PRN/MAG/EL of 22 July 2016 on the organization of the Ministry of Agriculture and Livestock, the Ministry is organized into a Central Administration comprising the General Directorates and the National Directorates. The Directorates directly involved in the development and implementation of this project are:

- the Directorate General of Agriculture divided into four (4) directorates, namely:
 - the Directorate of Extension and Technology Transfer;
 - the Directorate for the Promotion of Plant Industries and Quality;
 - the Directorate of Agricultural Mechanization;
 - the Directorate of Seed Control and Certification.
- the Directorate General of Rural Engineering subdivided into four (4) directorates namely:
 - The Directorate of Land Management and Irrigation;
 - the Directorate of Water Mobilization;
 - the Directorate of Agricultural Rural Equipment;
 - the Mechanical Directorate of Water and Topographical Works; and
- the Directorate General for Plant Protection divided into four (4) directorates namely:
 - the Directorate of Plant Health Interventions and Training;
 - the Directorate of Biological Studies;
 - the Directorate of Plant Health Regulations and Environmental Monitoring;
 - the Directorate of Logistics and Phyto-sanitary Equipment.

These directorates have branches at the regional, departmental and communal levels.

The development and implementation of this project is also part of a partnership between the promoter, the Green Climate Fund and the BOAD.

The West African Development Bank (BOAD) is the accredited entity for this project. As the Implementing Entity of the project, the Bank will sign a grant agreement with the GCF for the benefit of the Republic of Niger. As Co-financier, the Bank will approve a loan for the co-financing of the project. In its two roles as Implementing Entity and Co-financier, the Bank will sign a grant and loan agreement with the Government of Niger represented by the Ministry of Planning. For the implementation of the project, the WADB will serve as the interface between the FVC and the Government of Niger represented by the Ministry of Agriculture, itself represented by the Implementing Entity (ONAHA) and the Project Management Unit (DGGR). As a result, the BOAD is responsible for supervision, monitoring and evaluation of the project, disbursement of funds, and reporting to the VCF on project management. The Bank has a Directorate for Environment and Climate Finance (DEFIC) and other directorates such as those in charge of project monitoring and evaluation, finance and accounting, and legal affairs, all of which have competencies that are assessed by the CVF during the Bank's accreditation process. If necessary, DEFIC will use the services of a consultant to provide the necessary support.

1.5. Duration and overall cost of the project

The duration of the project is 5 years at a total cost of CFAF 24.9 billion.

1.6. Expected project results

The expected results of the project are as follows:

- Crop yields through hydro-agricultural developments designed with innovative irrigation and solar pumping systems are intensified and improved;
- the productive capital is protected against the threats associated with the effects of climate change (silting, flooding, ...);
- the technical and organizational capacities of farmers and technical services are strengthened; and.

1.7. Project components

The project is structured around three components: (i) Sustainable development and rehabilitation of areas vulnerable to the adverse effects of climate change, (ii) Support for the development of developed and rehabilitated areas, and (iii) Development of the technical and organizational capacities of stakeholders for the promotion of climate-resilient agricultural practices.

Component 1: Sustainable development and rehabilitation of areas vulnerable to the adverse effects of climate change

This component aims to develop new hydro-agricultural perimeters and to strengthen old hydro-agricultural perimeters that are victims of the adverse effects of climate change. Thus, through this component, actions aimed at ensuring the sustainable development of AHAs will be undertaken. Two results are expected in the implementation of this component: (i) the perimeters are developed with techniques that are resilient to the adverse effects of climate change; (ii) the perimeters are developed with total water control and a clean energy system;

Outcome 1.1: Perimeters are developed with techniques that are resilient to the adverse effects of climate change. To achieve this outcome, the following activities are planned:

- Activity 1.1.1: Development of 23 hydro-agricultural perimeters totaling 1000 ha with climate resilient techniques. This activity includes: site preparation and parcelling, protection of sites against water erosion by building anti-erosion structures, protection of perimeters against flooding, strengthening anti-erosion control by planting trees around parcels and sites.
- Activity 1.1.2: Rehabilitation of 749 ha of former hydro-agricultural developments in Djiratoua and Galmi affected by the adverse effects of climate change.

Outcome 1.2. The perimeters are developed with total water control and a clean energy system. To achieve this result, two activities are envisaged:

- Activity 1.2.1. Drilling of boreholes and installation of a solar energy system for dewatering water. This activity includes the execution of boreholes and storage basins and their equipment with solar pumps and installation of solar panels.

- Activity 1.2.2 Installation of drip and California irrigation systems

Component 2: Support for the development of developed and rehabilitated perimeters

This component aims to ensure the rational use of developed or rehabilitated areas to support the sustainable increase in agricultural productivity and farmers' incomes. It includes actions that will make it possible to develop the physical investments planned under component 1 "development of perimeters with techniques resilient to the adverse effects of climate change". It will also be consolidated by the activities of component 3, "Technical capacity-building for the promotion of climate-resilient agriculture".

Outcomes 2.1. Producers organized for optimal development of the perimeters

Producer organization is as important in the development of the perimeters as physical investment. To achieve this result, the following activities are planned:

- Activities 2.1.1: Conduct of the land registration process for the selected sites
- Activities 2.1.2: Appropriate distribution of hydraulic districts and allocation of plots
- Activities 2.1.3: Support for the establishment of farmers' organizations and their operation
- Activities 2.1.4: Drawing up operating contracts with cooperatives and AUEi

Outcomes 2.2: Technical itineraries adapted to the major climatic risks of irrigated perimeters are adopted for crop production

The efficiency of the crop management system is a key factor in improving crop productivity. To achieve this result, the following activities are planned:

- Activity 2.2.1. Support to planning activities at site level
- Activity 2.2.2. Support to vulnerable groups for the acquisition of small operating equipment
- Activity 2.2.3. Reinforcement of agronomic monitoring and agricultural input acquisition mechanisms
- Activity 2.2.4. Support for organic manure production on site

Outcomes 2.3: Integrated system for outsourced water and energy management set up and operational for optimal development of the perimeters

Through this result, the project seeks to eliminate conflicts in water use, access to energy sources for irrigation, and abandonment of perimeters due to poor management of the equipment and works carried out. The activities planned under this result are

- Activity 2.3.1: Design and implementation of a mechanism for the upkeep and maintenance of hydraulic infrastructure
- Activity 2.3.2: Design and implementation of a care and maintenance mechanism for electrical equipment
- Activity 2.3.3: Implementation of a program for close monitoring of the functionality of hydraulic and electrical structures

Outcomes 2.4: Market access mechanisms for products from irrigated perimeters are strengthened

The project will improve market access mechanisms at the intervention sites in order to enable farmers' organizations to make their production more profitable and thus strengthen their resilience to the effects of climate change. It will provide support in the following areas.

- Activity 2.4.1. Support for the implementation of business plans developed at the level of groups and cooperatives
- Activity 2.4.2. Support for the development of income-generating activities (IGAs) based on the conservation and processing of agricultural products
- Activity 2.4.3. Support for warrantage and bundled sales initiatives

Component 3: Development of technical and organizational capacities of stakeholders for the promotion of climate resilient agricultural practices

This component aims to build the capacity of technical services and producers on techniques that are resilient to the adverse effects of climate change in order to facilitate project implementation, ownership and sustainability. Three results are expected in the implementation of this component.

Outcomes 3.1: Knowledge and practices of climate-resilient agriculture are strengthened. The activities planned to support field actions are:

- Activity 3.1.1: Strengthening knowledge on rainfall trends and temperature variability in the project area
- Activity 3.1.2: Strengthening the technical capacities of local actors and producers to promote agriculture resilient to the adverse effects of climate change
- Activity 3.1.3. Training of project stakeholders in the use of tools for monitoring changes in natural resources to climate smart technologies for fighting against climate change in the framework of the implementation of environmental and social management plan
- Activity 3.1.4: Improvement and implementation of texts binding the State, ONAHA, cooperatives and operators.

Outcomes 3.2. The technical and organizational capacities of farmers' groups are strengthened for the implementation of climate-resilient actions. The activities planned to achieve this result are as follows:

- Activity 3.2.1. Training of producers in climate-smart farming practices that are likely to sustainably preserve soil and water resources.
- Activity 3.2.2: Strengthening the organizational capacities of operators
- Activity 3.2.3: Support for access to adapted agro-meteorological information by producer groups
- Activity 3.3.1: Building the capacity of the private financial sector to promote and scale innovative financing for climate-resilient agriculture
- Activity 3.3.2: Set up an attractive on-lending mechanism for climate resilient agriculture through local financial institutions in the form of a loan facility from GCF,

which could be scaled up at a later stage with the support regional or international development financial institutions (the “GCF Loan Facility”)

- Activity 3.4.1: Control and supervision of works.
- Activity 3.4.2: Monitoring and evaluation of the works
- Activity 3.5.1: Capitalization of results and compilation of lessons learned from the project
- Activity 3.5.2. Elaboration of technical sheets and user manuals for the operator
- Activity 3.5.3: Knowledge sharing and dissemination of good practices for a climate resilient agricultural sector in Niger.

1.8. Environmental and social classification of the project (Screening)

1.8.1. GCF Requirements and Applicable Standards

In the process of this screening, the activities account for has been evaluated according to IFC's 8 Environmental and Social Performance Standards and in accordance with the GCF's Environmental and Social Policy. These 8 standards and their requirements are presented in Table 2.

Table 2 : IFC's environmental and social performance standards

IFC Performance Standards	Requirements
NP 1: Assessment and management of environmental and social risks and impacts	<ul style="list-style-type: none"> - Identify and assess environmental and social risks; - In order of priority: avoid, minimize, repair or compensate for negative impacts; - Ensure that affected communities and other stakeholders are engaged in the management of issues that affect them; - Ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; - Improving environmental performance through an effective management system.
NP 2: Labor and working conditions	<ul style="list-style-type: none"> - Promote fair treatment, non-discrimination and equal opportunities for workers ; - Establish, maintain and improve relations between workers and management ; - Promote respect for national labor and employment law ; - Protect workers ; - Promote safe and healthy working conditions and protect the health of workers ; - Avoid the use of forced labor.
NP 3: Rational use of resources and pollution prevention	<ul style="list-style-type: none"> - Avoid or reduce negative impacts on human health and the environment by avoiding or reducing pollution generated by project activities. - Promote the more sustainable use of resources, especially energy and water.

	<ul style="list-style-type: none"> - Reduce GHG emissions linked to projects.
NP 4: Community health, safety and security	<ul style="list-style-type: none"> - Anticipate and avoid, during the life of the project, the negative impacts on the health and safety of the affected communities which may result from ordinary or non-ordinary circumstances. - Ensure that the protection of persons and goods is ensured in accordance with the applicable principles of human rights and in such a way as to avoid exposing the affected communities to risks or to minimize them.
NP 5 : Land Acquisition and Involuntary Resettlement	<ul style="list-style-type: none"> - Avoid, and whenever this is not possible, limit involuntary resettlement by considering alternative designs to projects ; - Avoid forced eviction; Anticipate and avoid, or where it is not possible to avoid, limit the negative social and economic impacts resulting from the acquisition of land or restrictions on its use by: <ul style="list-style-type: none"> - (i) providing compensation for loss of assets at replacement price; - (ii) ensuring that resettlement activities are accompanied by appropriate communication of information, consultation and informed participation of affected people ; - Improve or at least restore the livelihoods and living conditions of displaced persons ; - Improve the living conditions of physically displaced persons by providing adequate housing with security of tenure in resettlement sites.
NP 6 : Biodiversity Conservation and Sustainable Management of Living Natural Resources	<ul style="list-style-type: none"> - Protect and conserve biodiversity. - Maintain the benefits arising from ecosystem services. - Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities
NP 7 : Indigenous peoples	<ul style="list-style-type: none"> - Ensure that the development process promotes full respect for the human rights, dignity, aspirations, cultures and natural resource-based livelihoods of indigenous peoples. - Anticipate and avoid the negative impacts of projects on indigenous peoples' communities or, if this is not possible, reduce, restore and / or compensate for these impacts. - Promote benefits and opportunities related to sustainable development for Indigenous Peoples that are culturally appropriate. - Establish and maintain with the Indigenous Peoples affected by a project throughout its duration a permanent relationship based on Informed Consultation and Participation (ICP). - Obtain the Free, Prior and Informed Consent (FPIC) of Indigenous Peoples when the circumstances described in this Performance Note exist. - Respect and preserve the culture, knowledge and practices of indigenous peoples.
NP 8: Cultural heritage.	<ul style="list-style-type: none"> - Protect cultural heritage from negative impacts of project activities and support its preservation. - Promote the equitable sharing of benefits from the cultural heritage use.

The environmental and social classification of the project also took into account the BOAD's Operational Policies (OP). These policies are presented in Table 3.

Table 3 : BOAD Operational Policies

BOAD Operational Policies	Requirements
Operational policy in terms of environmental and social impact assessment	<p>The West African Development Bank (BOAD) requires that projects submitted to them for funding be subject to an Environmental and Social Impact Assessment (ESIA) which helps to ensure that such projects are environmentally sound and socially viable to facilitate the decision-making process.</p> <p>Environmental and Social Impact Assessment (ESIA) is a process, where the magnitude, complexity and analytical characteristics depend on the nature and scale of the proposed project and the impact it is likely to have on the environment. It consists of assessing the risks that the project may have on the environment and the effects that it is likely to have in its area of influence, studying alternatives to the project, identifying ways to improve project selection, location, planning, design and execution by preventing, minimizing, mitigating or compensating for its negative environmental effects, and enhancing its positive effects.</p> <p>The client, in agreement with responsible government agencies and other relevant stakeholders, will conduct an environmental and social impact assessment process, implement and maintain an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project and proportionate to the environmental and social risks and impacts. The ESMS includes the following elements: (i) policy statement; (ii) risk and impact identification; (iii) management program; (iv) organizational capacity and competencies; (v) emergency planning and response; (vi) stakeholder engagement; and (vii) monitoring and evaluation.</p> <p>The ESIA also includes the process of mitigation and management of nuisances throughout the life of the project. The BOAD advocates the use of preventive measures in preference to mitigation or compensation measures, whenever possible.</p>

Operational Policy on Natural Habitats	<p>According to this policy, the BOAD encourages and supports the conservation of natural habitats as well as better land use planning by funding projects designed to integrate into national and regional development strategies the protection of natural habitats and their rehabilitation, in case of degradation, in order to guarantee their various functions (paragraph 3 of this policy).</p> <p>BOAD does not support projects that, in its opinion, involve significant modification or degradation of critical natural habitats.</p> <p>Wherever possible, projects funded by BOAD are located on territories whose natural state has already been modified (excluding any natural areas converted, according to BOAD) in anticipation of the project. BOAD will only support projects involving significant degradation of natural habitats if there is no realistic alternative to the project and its location, and provided that an exhaustive analysis has demonstrated that the benefits derived from the project will substantially exceed the environmental costs.</p> <p>BOAD's decision whether or not to support a project likely to have negative impacts on a natural habitat takes into account the Borrowers' ability to implement appropriate nature conservation measures and to mitigate negative environmental and social impacts. Where there are potential institutional capacity problems, the project includes components for the development of national and local institutional capacity for effective environmental and social planning and management. Mitigation measures specified for a given project can be used to enhance the practical skills of national and local institutions on the ground.</p>
Operational Policy on Cultural Heritage	<p>The policy is designed to help borrowers protect and enhance the cultural heritage present in the projects that BOAD funds. The aim is to avoid or mitigate the negative effects that development projects can have on physical cultural assets. The effects on such property resulting from project activities must not be contrary to the borrower's national legislation or its obligations under applicable international environmental agreements and conventions.</p> <p>The analysis of the impact on physical cultural assets of a project for which BOAD funds are being considered is an integral part of the Environmental and Social Impact Assessment (ESIA). This analysis is done by the Borrower. The ESIA process involves the following stages: screening, preparation of Terms of Reference (ToR), collection of baseline data, impact assessment and formulation of mitigation measures and an Environmental and Social Management Plan (ESMP).</p> <p>This policy also describes the procedures to be applied in the event of accidental discoveries of physical cultural property.</p>

Operational Policy on Pest Management	<p>To best manage the impacts that may result from the implementation of projects funded by the Bank that directly or indirectly involve the use of pesticides, the Bank has developed an Operational Policy on Pest Management.</p> <p>In its policy, BOAD favors a strategy that encourages the use of biological or environmental methods and limits the use of synthetic chemical pesticides. And, in BOAD-financed projects, the Borrower deals with pest management as part of the Environmental and Social Impact Assessment carried out in connection with the project (Paragraph 1).</p> <p>In agricultural operations funded by BOAD, pest management is normally of an integrated nature, involving methods such as biological control, cultivation methods and the development and use of resistant or tolerant varieties. BOAD may fund the purchase of pesticides when their use is justified as part of an integrated pest management strategy (paragraph 4).</p> <p>Paragraph 6 of the policy states that the purchase of any pesticide under a BOAD funded project is subject to the results of an assessment and the nature and extent of the risks involved, based on the intended use and intended users. For the classification of pesticides and formulas specific to each of the products under consideration, the BOAD refers to the guidelines for the classification of pesticides by risk as recommended by the World Health Organization (WHO).</p> <p>This policy also defines the criteria for the selection and use of pesticides. The criteria to be applied to the selection and use of pesticides within the framework of the projects funded by BOAD are as follows:</p> <ul style="list-style-type: none"> - The products selected must have negligible effects on human health - Their effectiveness against target species must be established - They must have very limited effects on non-target species and on the environment. The methods, the time of the intervention and the frequency of the applications must allow the maximum protection of the natural enemies. Pesticides used in public health programs must be shown to be harmless to residents and pets in treated areas, as well as to the personnel applying them. - - Their use must take into account the need to prevent the appearance of resistant species. <p>In addition, BOAD requires that the pesticides it funds be manufactured, packaged, labeled, handled, stored, disposed of and applied in accordance with standards that it considers satisfactory. The BOAD does not fund chemical formulations that belong to classes not recommended by WHO, or the formulation of specific products, a) if their distribution and use are not regulated in the country in question or b) if non- specialists, farmers or others may use or have easy access</p>
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	to them without the training, equipment and facilities to handle, store and apply them correctly.
Operational policy on public participation in the environmental and social impact assessment process	<p>The West African Development Bank's policy on environmental and social impact assessment requires that the groups concerned as well as local NGOs be informed and consulted in a real way when carrying out an environmental and social impact assessment.</p> <p>The Operational Policy on Public Participation in the Environmental and Social Impact Assessment Process describes the procedures and types of consultation required during the environmental and social impact assessment process. For Category B projects, public consultation is organized once during the environmental impact assessment in order to take into account their opinions and concerns.</p>

A careful review of the GCF standards and BOAD's operational policies reveals that some of the requirements of the BOAD's operational policies are reflected in the performance standards of the GCF. For example:

- i. the BOAD's "Operational Policy on Environmental and Social Impact Assessment" and "Operational Policy on Public Participation in the Environmental and Social Impact Assessment Process" are covered by the GCF's "Environmental and Social Impact and Risk Assessment and Management" performance standard;
- ii. the BOAD's "Operational Policy on Natural Habitats" is taken into account by the GCF's "Biodiversity Conservation and Sustainable Management of Living Natural Resources" performance standard;
- iii. the BOAD's "Operational Policy on Pest Management" is taken into account by the GCF's "Rational Use of Resources and Pollution Prevention" performance standard;
- iv. the BOAD's "Operational Policy on Cultural Heritage" is addressed by the GCF "Cultural Heritage" performance standard.

This compatibility of the two standards makes it possible to present the risks and impacts of the project on the basis of any one of them.

1.8.2. GCF's Environmental and Social Performance Standards triggered

Based on the negative impacts and risks associated with the project, the GCF's Environmental and Social Performance Standards triggered are presented in the table 4 below.

Table 4 : Environmental and Social Performance Standards triggered based on the negative impacts and risks associated with the project

GCF Requirements	Impacts and risks	Environmental and Social Performance Standards triggered

ESS1 Assessment and management of environmental and social risks and impacts	<ul style="list-style-type: none"> • Risk of non-compliance with performance standards 	Yes
ESS2 Labor and working conditions	<ul style="list-style-type: none"> • Discrimination and marginalization of certain groups in employment • Child employment • Forced labor 	Yes
ESS3 Rational use of resources and prevention of pollution	<ul style="list-style-type: none"> • Modification of soil structure • Loss of cultivable land • Pollution of surface water and groundwater • Air pollution • Soil salinization 	Yes
ESS4 Community health, safety and security	<ul style="list-style-type: none"> • Damage to the health and safety of workers and population • Traffic disruption 	Yes
ESS5 Land acquisition and involuntary resettlement	<ul style="list-style-type: none"> • Land belongs to current farmers and current policy measures in the field of hydro-agricultural development allow to secure land by registering it. • The project does not involve involuntary resettlement. 	No
ESS6 Biodiversity conservation and sustainable management of vital natural resources	<ul style="list-style-type: none"> • Loss of vegetation cover • Landscape modification • Disturbance, destruction of wildlife habitats and poaching • Proliferation of invasive plants and pests 	Yes
ESS7 Indigenous Peoples	<ul style="list-style-type: none"> • According to Nigerien regulations, there are officially no indigenous peoples in Niger. However, some more or less nomadic communities, living mainly on livestock, such as the Tuareg, the Peuls and the Toubou, claim this status and are even recognized as such by the African Commission on Human and Peoples' Rights during its 40th ordinary session from November 15 to 29, 2006. The main negative impacts and risks to which these communities are exposed are: • the reduction in grazing areas due to land clearing, and 	Yes

	<ul style="list-style-type: none"> the exclusion of certain advantages of the project such as the use of water for watering livestock. 	
ESS8 Cultural Heritage	<ul style="list-style-type: none"> Unintentional destruction of archaeological remains 	Yes

1.8.3. Project Category

According to the Green Climate Fund's environmental and social policy, projects' E&S Categories are as follow:

- Category A. Activities with potential significant adverse environmental and/or social risks and impacts that, individually or cumulatively, are diverse, irreversible, or unprecedented;
- Category B. Activities with potential limited adverse environmental and/or social risks and impacts that individually or cumulatively, are few, generally site-specific, largely reversible, and readily addressed through mitigation measures; and
- Category C. Activities with minimal or no adverse environmental and/or social risks and/or impacts.

The current project is subdivided in 25 subprojects which are each on a small site with an average of 30 to 60 Hectares. With reference to the Green Climate Fund's performance standards and the BOAD's environmental and social safeguard standards:

- The project activities will cause potential limited adverse environment and social risks and impacts;
- The project environment and social risks and impacts, individually or cumulatively are few and all site-specific;
- The project environmental risks and impacts are largely reversible;
- The project environmental risks and impacts are readily addressed through mitigation measures.

The project does not affect indigenous populations. It is not developed in areas of dispute, in areas sensitive to land issues or in natural reserves. Nor it does require involuntary resettlement of populations.

With regard of the project environment and social risks and impacts characteristics described above, the project is classified in category B.

CHAPTER II. BIOPHYSICAL AND HUMAN CHARACTERISTICS OF THE PROJECT AREAS

2.1. Biophysical and human characteristics of the region of Agadez

2.1.1. Geographical location

The Region of Agadez, the largest in Niger, covers an area of 667,799 km² or 52.6% of the national territory. It is located in the northern part of Niger and lies between 15° and 23°23 North latitude and between 4° and 16° East longitude. It is bordered to the north by Algeria and Libya with which it shares 970 km and 350 km of border respectively, to the east by Chad over 600 km, to the west by Mali over 60 km and the Region of Tahoua and finally to the south by the regions of Zinder and Maradi. The map below shows the location of the region of Agadez in Niger.

Figure 1 : Location of the Agadez region in Niger



Source: Wikipedia

2.1.2. Biophysical characteristics of the region of Agadez

The relief

- The relief of the region of Agadez is marked by five major geomorphological groups, namely the high plateaus, the Aïr mountain range, the plains, the Ténéré desert and the oases.
- the high plateaus: they are in two groups: the high plateaus of the north-east and the Tadass plateaus.
- the Aïr mountainous massif: it stretches over more than 400 km north of the 17th parallel and covers an area of 65,000 km². It is located in the north-western part of the region and stretches from north to west over 100 to 200 km in the departments of Arlit (over its entire extent: Communes of Arlit, Timia, Gougaram, Dannel) and Tchirozérine: Communes of Tchirozérine, Tabelot and Dabaga.
- the plains: These are spreading areas for the waters drained by the koris. They are of various sizes. One can quote:
 - the Talak plain: narrow but stretches for nearly 80 km on the western foothills of the Aïr and extends north of the Irhazer plain. It is a spreading zone of the koris of the North-West of the Aïr.
 - The Irhazer Plain: The Irhazer is limited to the east by the Aïr massif, to the west and south by the Tiguidit cliff, and to the north by the Talak and Tamesna rivers. It is a plain located mainly in the department of Tchirozérine commune of Ingall. It is a vast clayey depression bordering to the South-East. It is also a spreading area, but it receives flows from the koris of the south and west of the Aïr which are lost in the fossil valley of the Azawak.
- the Ténéré desert,
- the Oases.

The Climate

The climate in most of the Agadez region is of the semi-arid to arid type, where the spatial and temporal variability of the rainfall regime is very high. Indeed, the Agadez region is marked by a rare rainfall, and is extremely irregular, often less than 200 mm per year. Temperatures are very contrasted (from -2°C to 46°C). As for the winds in the Agadez region, they are generally very strong and violent, and sometimes cause the uprooting of trees and the burial of young shoots and a more pronounced drying out.

The annual cycle of seasons highlights two main seasons:

- a very long dry season (October to May);
- a very short rainy or wintering season (June to September).

Sunstroke is also very intense in the Agadez region (an average of 3,192.9 hours/year observed from 1967 to 1996). Indeed, this strong insolation is mainly due to the nature of the climate (sub-desert), with a brutal thermal gradient decreasing from South to North characterized by high daytime temperatures (maximum 42°C and low night-time

temperatures (minimum -2°C). Moreover, this tendency to climate drying is exacerbated by a very intense potential evapotranspiration (PTE) of 2,500 to 2,600 mm/year.

The soils

From a pedological point of view, there are mainly two types of soils in the whole region of Agadez. These are:

- **Raw mineral soils:** These soils occupy almost the entire region of Agadez. Around the mountainous areas are vast flat surfaces, with runoff in some places, but mostly swept by the wind. Coarse elements (pebbles, gravel) remain in place, forming regs. These ablation soils occupy the entire northern part of the Agadez region. The sand has accumulated in dune massifs, which have soil additions. They are very extensive and there are on some slopes some evidence of old, thicker and more evolved soils. These are paleosols formed in less arid climates than the present one.
- **Poorly evolved soils:** These are soils with an A/C profile, whose A horizon is not very thick or poor in organic matter. The minerals are still little altered. These soils appear when the rains are a little more frequent.

Water resources

Groundwater

The main aquifers of the region's hydrogeological system are located in the sedimentary formations of the Eastern Niger and Iullemeden basins, but also in areas where the basement outcrops. These include aquifers in the sedimentary basins (primary reservoirs, infill continental reservoirs, Agadez sandstone aquifer and Tegama aquifer) and basement aquifers in the Agadez region.

The continental infill (CI) is the largest multi-layered aquifer system in the Iullemeden Basin. The piezometric level in the free part of the CI is generally quite deep, between 40 and 60 m. The deep aquifers of the Agadez and Tegama Sandstones are of regional extension and contain important water reserves. They contain captive aquifers with an artesianism gushing into the Irhazer plain.

The flows obtained by drilling vary from 50 to more than 100 m³/h with fresh water in general. The main constraint for mobilizing water from these aquifers is the depth of the required drilling (200 to 500 m). However, the artesianism gushing out (or not) would allow exploitation without recourse to means of dewatering or simply requiring high-capacity motor pumps (without the need for electricity).

There are the alluvial aquifers of the valleys which are shallow (less than 10 m) and easier to mobilize (boreholes 20 to 30 m deep). However, their small extension and their great sensitivity to pollution and climatic variations require in-depth investigations to plan their intense exploitation and monitor their behavior.

Generally speaking, according to the hydrological report of the present study in the Agadez region, the pH of the water is between 6 and 9. The water is fresh, with low

mineralization. The conductivity varies between 116 $\mu\text{S}/\text{cm}$ to 233 $\mu\text{S}/\text{cm}$. However, in In'Gall and Mararaba, there are very mineralized waters (conductivity up to 1600 $\mu\text{S}/\text{cm}$).

In the Irhazer plain, the natural water sources as well as the hydraulic works carried out (artesian boreholes, boreholes and OFEDES-type wells), highlight two types of aquifers:

- a phreatic groundwater, captured through the clayey sands. This aquifer is generally not very productive and is used for activities that do not consume much water (small gardening, water supply for people and animals). The complex faults that affect this aquifer lead to the appearance of tributary springs (Teguidda-n-Adrar, Teguidda-n-Tessoumt);
- pressurized groundwater located through sandstone formations of the Tchirozérine, Assawas and Agadez series. These fossil aquifers are artesian in some places. There are several natural water sources as well as artesian boreholes on this plain.

Surface water

From a hydrographic point of view, the Agadez region comprises two domains:

- the areic domain, marked by the absence of any flow, but where one sometimes finds the trace of a fossil network (Tamesna, Ténéré, ...);
- the endorheic domain, where there is a very important flow that sometimes causes floods (Koris de l'Aïr, de l'Irhazer, ...) and represent real threats (strong erosive capacity) at certain sites (Tiguirwit). Indeed, this strong turbulence in the activity of the koris causes scouring which drastically degrades the banks, even displacing the initial beds of the koris. This situation highlights the need for actions to fix the banks of the koris to be considered within the framework of this project, to protect future developments and also to allow the recharging of alluvial aquifers.

Generally speaking, with the exception of these koris that flow from the Air towards the Irhazer towards the Niger basin via the Azaouagh, we cannot speak of runoff water in the Agadez region. Most of the surface water is made up of ponds that form in the shallows and basins from rainfall. At present, all the permanent ponds have become temporary due to silting and low rainfall associated with high levels of sunshine.

Vegetation

The forest formations identified in the project areas are lowland formations in the form of forest galleries at *Acacia* sp. However, the nature of these forest formations at the selected sites depends mainly on the edaphic conditions and the climate, which is arid. Indeed, the vegetation is represented by steppes of arid climates, with a loose cover composed of xerophytic spiny plants and grasses. In addition, these plant formations are subject to great inter-annual variations due to the very random nature of the rainfall distribution and the very changing edaphic conditions.

The main woody species encountered are: *Acacia raddiana*, *Acacia ehrenbergiana*, *Balanites aegyptiaca*, *Maerua crassifolia*, *Salvadora persica*, *Calotropis procera*, *Frangula alnus* (*Ziziphus spina-christi*), *Cenchrus biflorus*, *Cornulaca monacantha*, *Stipagrostis pungens*, *Panicum*

turgidum, *Schouwia thebaica*, *Sorghum aethiopicum*, *Borreria radiata*, *Tribulus longipetalus*, *Clotalaria atrorubens*, *Aristida mutabilis*, *Chloris prieurii* et *prosopis juliflora*.

Wildlife

The fauna is represented by a relic of some species composed of: hares, fennec, bustards and gazelles. According to the information collected from the local populations, the fauna encountered at the sites of the Irhazer and Tamesna Irrigation Development Project can be divided into 3 groups: mammals, birds and reptiles.

- **Mammals:** Among the mammals encountered at the selected sites are: hares, squirrels, jerboas, mice, monitor lizards, fennec, wild cats and jackals. Mice and jerboas mainly damage irrigated crops (squash) at the sites of Aswan II, Tigart, Tagriss and Agharous. As for jackals, they are found in large numbers at all sites and pose a threat to livestock, especially small ruminants;
- **Birds:** They are encountered at all sites, especially in the forest galleries. The species generally encountered are black ravens and teals. These birds cause damage to irrigated crops and are considered predators at all sites. Bustards, and specifically partridges, are also found at the Agharous site;
- **Reptiles:** Reptiles are found at the project sites. Among them are snakes, monitors and lizards.

2.1.3. Socio-economic characteristics of the region of Agadez

Population

According to INS population projections, the population of the Agadez region is estimated at 487,620 inhabitants (INS, 2012) with a generally very low density, less than 10 inhabitants/km². The population growth rate of around 4.2% (SRAT of Agadez, 2011), and the high proportion of young people (1 in 2 inhabitants is under 15 years old), suggest that the area is under pressure from an increasingly strong social and economic demand for social benefits, food and employment. This population is mainly engaged in animal husbandry. However, handicrafts, trade and market gardening are also practiced on a few sites (Assoumamane II, Thagis, Agharous and Tiguirwit).

The ethnic groups that make up the population of the Agadez region are mainly: the Tuareg (majority about 85%), Fulani, Arabs, Kounta and Hausa in Ingall. These ethnic groups cohabit according to a way of life maintained by the beliefs, practices and social organization put in place. Marriage, baptism and death ceremonies show the bond of solidarity and mutual aid that exists between these populations.

The main demographic characteristics of the populations of the region of Agadez, are :

- a strong demographic growth of 3.17% against 3.10% at the national level;
- an unequal distribution in space with a very low average density of 0.5 hbt per km²;
- a young population, nearly 50% are under 15 years old;
- migratory flows towards neighboring countries, particularly Algeria, but statistically poorly known;

- an active population composed of 70.9% men against 29.1% women. Regardless of place of residence, the proportion of female workers is clearly below the proportion of male workers;
- an essentially rural population (99.7%) whose main activities are livestock raising and handicrafts;
- Livestock raising is the dominant activity of the population, 98% of which is nomadic (extensive);
- the return of a high number of young people from Libya, which has increased the already high unemployment rate in the project areas.

With regard to the socio-cultural environment, the distribution of the active population by level of education shows that more than 90 per cent of the population of the Agadez region has not attended modern schools and that about 13.4 per cent have attended Koranic courses (SRAT of Agadez, 2011).

Economic activities

Breeding

In the region of Agadez, livestock farming is rightly the main socio-economic activity of the population. It is practiced extensively over a huge territory, and contributes to the satisfaction of the needs of the populations up to 30%. Indeed, livestock products (milk and meat) are the basis of the diet integrated with others, including rice, wheat, pasta, etc.

Livestock is mainly made up of camels, cattle, sheep, goats and acorns. Small ruminants, especially goats, are reared for their ability to exploit all types of pasture, which makes it possible for them to survive in areas with very little vegetation cover. There are basically two types of farming:

- Nomadic (extensive) livestock farming: It is characterized by random mobility according to the availability of natural rangelands, particularly in the Tamesna plain. In this farming system, transhumance for salt cure causes the displacement of a large number of herds.
- Sedentary breeding: It is practiced by a few families of stockbreeders living in towns or in the outskirts. It is thus important to note that livestock farming is inseparable from agriculture, the animals feed on crop residues and grass from gardens and are supplemented with grains from the trade (wheat, cotton, sorghum, cereal bran, etc.).

Two types of water points are used for watering the animals:

- surface waters (ponds, which are of semi-permanent regime, and thermal springs) and
- groundwater exploited by means of wells (traditional and modern) and boreholes. It should be pointed out that wealthy families have a vehicle supply system for livestock watering.

Livestock farming is an important source of foreign exchange for the local economy through the income it generates for the population, thanks to the sale of livestock. It

should also be noted that livestock (camels and asins) serve as a means of transport for the local population.

Despite the vitality of the livestock sector in the region of Agadez, it is nevertheless facing enormous difficulties, among others :

- the free access to the breeding grounds in the Irhazer leads to an unsustainable pressure on the natural resources;
- a significant pressure on natural resources during the period of the salt cure, where the number of livestock doubles in this season ;
- the proletarianization of the breeders, which encourages some of them to farm around water points, encouraged by the success of the gardeners of the Aïr;
- the almost chronic shortage of forage potential;
- the insufficiency of zootechnical and veterinary products necessary for animal health;
- the frequency of epizootic diseases leads to significant livestock mortality. Indeed, the main diseases suffered by livestock in the region of Agadez are: foot-and-mouth disease in cattle, sheep pox and pasteurellosis in sheep and goats.

Agriculture

Agriculture is practiced only through irrigation along the valleys and in the mountain enclaves, due to the nature of the soils and the climate. The intensity of this activity varies greatly from one area to another depending on production factors (labor and capital) and the availability of land and water. Irrigated agriculture represents, in some places, a complementary source of satisfying the food needs of local populations. Indeed, irrigated agriculture is much more a subsistence activity, and the main crops grown are: Wheat, squash, maize, tomato, onion, lettuce, pepper, potato, sweet potato and chilli.

According to the report of the feasibility study of the Irhazer project, the contribution of irrigated agriculture to household income is estimated at about 2% in Irhazer and Tamesna and 15% in Aïr. However, in Irhazer and Tamesna, agriculture is in marked decline following climatic hazards and the failure of the trials to develop market gardening sites around boreholes, particularly in Agharous and Tiguirwit which were implemented for the benefit of ex-combatants. In addition, in Tamesna, attempts to fence off crops around wells are now used only for opportunistic land marking purposes.

However, development opportunities exist at the level of plains, lowlands and valleys. The exploitation of groundwater resources (groundwater flow and fossil aquifers) could contribute to the development of irrigated crops and ranching, as well as to the improvement of drinking water supply to the population and livestock.

Irrigated agriculture is considered as a supplementary activity in some parts of the Agadez region, and is nevertheless confronted with enormous constraints, including, among others :

- the lack of facilities (protective fencing, catchment equipment, rehabilitation and/or construction of water points, basins and irrigation canals) and organization (no grouping);
- the low level of modernization of agriculture;

- the difficulty of supplying seeds and other agricultural inputs (fertilizers and pesticides);
- the persistence of pests (parasites, insects and birds) and the ravaging of domestic animals;
- the lack of financial resources, supervision and storage infrastructure;
- pastoral pressure on cropland;
- the isolation of sites for the disposal of production.

2.2. Biophysical and human characteristics of the region of Diffa

2.2.1. Geographical location

The region of Diffa is located at the extreme East of Niger and is between 10°30' and 15°35' East Longitude, 13°04' and 18°00' North Latitude. It is bordered to the East by the Republic of Chad, to the West by the Zinder region, to the North by the Agadez region and to the South by the Federal Republic of Nigeria. It covers an area of 156,906 km² or 12.4% of the total area of the country which is estimated at 1,267,000 km². The map below shows the location of the Diffa region in Niger.

Figure 2: Location of the Diffa region in Niger



Source : Wikipédia

2.2.2. Biophysical characteristics of the Diffa region

The relief

The region of Diffa is characterized by a relief shaped by lacustrine and alluvial influences in the south and aeolian influences in the north. It is composed of sand dunes (Tal, Manga and Kadzel), basins (Mandaran) and rocky escarpments in the north. The entire Region belongs to the Lake Chad Basin. There are no abrupt changes in topography except in the vicinity of the Agadem massif. The relief is thus relatively flat, formed of plains and plateaus whose altitude varies between 300 and 400 m, except in the desert north at the level of the HOMODJI plateaus, where it reaches 500 m.

The Climate

The region of Diffa is characterized by a Sahelian climate in the southern part, and Saharo-Sahelian in the north where the spatial and temporal variability of the rainfall regime is very high. Indeed, rainfall varies respectively from North to South between 20 mm and 400 mm. The average annual rainfall (1952-1996) is 296 mm at Diffa, 398 mm at Mainé-soroa and 223 mm at N'Guigmi (DNM, 2012).

On the other hand, winds in the Diffa region are generally strong and violent, and remain almost constant for most of the dry season, and are mainly manifested by the alternation of two seasons:

- a long dry season from October to May, dominated by a dry, warm wind (the harmattan), which itself comprises two distinct periods, a cold period from October to February and a warm period from March to June;
- and a short rainy season from June to September, characterized by the wind from the Gulf of Guinea (the monsoon).

The monthly average wind speed varies between 1.3 m/s, observed in September, and 2.2 m/s, observed in July. Sunstroke is thus very strong in the Diffa region. Indeed, it is mainly due to the nature of the climate (Sahelian in the south and Saharo-Sahelian in the north) marked by high temperatures. The average temperature is 27°C, with a thermal difference of 30°C between day and night. The maximum temperature is around 40° and the minimum around 10°. This insolation decreases in June and July with the onset of the rainy season. The average annual evaporation is 2956.9 mm per year, with an average daily value of 8.1 mm and an average monthly value that varies between 110.8 mm observed in August and 347.6 mm observed in April.

The soils

The Diffa region is subdivided into three agro-ecological zones: an agricultural zone in the south, an agro-pastoral zone in the center and a pastoral zone in the north. Thus, the nature of the soils varies according to the agro-ecological zones:

- In agricultural areas, apart from soils used for rainfed millet and cowpea crops (low in organic matter and low water reserves), there are three types of soil:

- silty-sandy soils of average to good fertility, cultivated in market gardening with supplementary irrigation (2,000 ha for a potential of about 8,000 ha) and in fruit growing in wet basins. However, their development must take into account the gradual lowering of the water table, the increase in salinity and silting;
- hydromorphic soils at the level of the bed of the Komadougou Yobe, favorable for rice growing during winter, are associated with varied soils whose properties (texture, organic matter and salt content) considerably limit their development. In the off-season, the developed areas support peppers, onions, okra and wheat;
- Clayey soils in Lake Chad of very good fertility, but exploitation depends on Lake Chad floods. It is also limited by the alkalinity of the water used.
- In the agro-pastoral zone, there are brown-red soils with a sandy texture, poor in organic matter, fertilizing elements and water reserves. On the sides of cultivated dunes (in millet sometimes associated with cowpeas) and places where animals pass or trample, the sand is remobilized, threatening croplands, basins, roads and dwellings.
- In pastoral areas, the soils are red-brown, sandy, low in organic matter and subject to strong wind erosion.

Water resources

Groundwater

The groundwater resources of the Diffa region are represented by :

- the Manga water table which extends over an area of 150,000 km² between the edge of the Komadougou Yobe river and in the region of the oasis basins of Mainé Soroa. This water table will be drawn for the project in the villages of Digargo and Dassa.
- the Pliocene captive tablecloth below 325 m under Lake Chad,
- the captive tablecloth of the Hamadian mainland captured at N'guimi and finally,
- the alluvial water table of the Komadougou Yobe fed by the infiltration of flood water from the said river.

The Dillia is the only fossil valley that crosses the region. The mobilizable flow water potential is between 500 and 3000 million m³ per year.

Surface water

Surface waters are essentially made up of :

- the Komadougou Yobe which is the only river in the region with an annual flow duration of 6 months during which it carries an average of 500 million m³ and which serves as the border between Niger and Nigeria over a distance of 150 km. The watershed in the Niger part, which is elongated and deformed, has an estimated surface area of 120,000 km². It is bordered to the North and East by areic or locally endorheic reliefs, without notable amplitude. The bed of the Komadougou is entirely dug in very loose detrital geological formations of fine to medium sands and sandy clays.

- the waters of Lake Chad, the surface area of the Niger part of which is estimated at 3,000 km²;
- and the ponds with a regime varying from semi-permanent to permanent occur adjacent to the bed of the Komadougou Yobe. Indeed, according to the inventory study of potentially developable ponds carried out in 2005 by the National Directorate of Rural Engineering with funding from PADL Diffa, about 218 ponds were identified (201 temporary and 17 semi-permanent). However, these ponds are threatened by silting, which results in early drying by evaporation and infiltration. To mitigate the persistent threats, the ponds are subject to development and control (dikes equipped with regulation structures to prevent the return of water to the river). These are dikes equipped with gates that remain open during the flood to allow the ponds to fill, and are closed when the water recedes to trap the water in the ponds.

Vegetation

The nature of the forest formations in the Diffa region depends on the different agro-ecological zones. Thus, the natural forests consist of gallery and swamp forest stands along the Komadougou River and in the Lake basin, and dry clear formations in the northern and western part of the region. Dense forest stands cover an estimated area of 252,500 ha, including more than 140,000 ha of *Prosopis* spp. forest along Lake Chad. The dry clear formations are composed of shrubby and bushy steppe which predominates in the pastoral zone and shrubby and wooded savannah (480000 ha) in the agro-pastoral zone.

In general, the region has 12 classified forests totaling an area of about 71339 ha (OSS, CNEDD and CeSIA, 2001). Most of these forest formations are gum plantations (*Acacia senegal*) which total about 1630 ha in area.

Near the $\frac{3}{4}$ classified forests are transformed into cultivated fields. These anthropic actions have considerably accentuated the phenomenon of silting, which is the main environmental challenge facing the Diffa region.

However, the random nature of the rainfall and its poor spatial and temporal distribution have catastrophic effects on the recovery of the herbaceous cover that serves as pasture for domestic and wild animals. Also, wind erosion is causing significant advances in the sand dunes that are invading the herbaceous stratum, especially in areas where the woody cover is low.

Wildlife

The region of Diffa has a rich and varied fauna. You can meet dorcas and rufifron gazelles, Addax, bustards, jackals, monkeys, fennecs, hares, gerboises, squirrels, etc.

2.2.3. Socio-economic characteristics of the Diffa region

Population

The population of the Diffa region, which was 167,389 inhabitants in 1977, rose to 189,091 inhabitants in 1988, then to 3,495,695 in 2001 and to 593,821 in 2012. This population is very young, marked by the preponderance (+50%) of the 0-4 age group. The main ethnic groups in the region are:

- KANOURIPHONES groups that are numerically dominant in the region;
- the FULFULDEPHONES or PEUL subdivided into 5 sub-groups: the Fulbe, the Bokolodji, who are the custodians of the Bokolodji cattle species, and the Ouda, whose herds are made up exclusively of sheep.
- the ARABOPHONES composed of the subgroups Oulêd Sliman, Mogharba, Chirfa, Warfala and Gadatfa who are pure pastoralists, the Hassaouna whose mobility is generally quite reduced; the Choa Arabs who are agro-pastoralists nowadays present in the lake basin; finally, the Mohamid breeders especially of very mobile dromedaries and whose arrival in Niger is very recent (beginning of the 80s).
- the TOUBOU, who are divided into three sub-groups: the Daza, Teda and Azza.
- the BOUDOUMA who reside mainly on small islands in the Chadian basin;
- the TOUAREG who are agro-pastoralists established in the North-Western part bordering the Zinder region.
- the HAOUSSAPHONES, farmers living mainly in the large centers and who are the main animators of regional trade.

Economic activities

Breeding

The region of Diffa is essentially pastoral. In fact, more than 95% of the region's population is involved in livestock farming, which accounts for nearly 55% of the region's annual gross product. However, livestock marketing is dominated by unorganized economic operators. Cattle and small ruminants are exported live to Nigeria, while camels are exported live to Libya. The sub-sector has obvious potential in terms of livestock, drinking water, grazing and human resources. The region has a sizeable livestock capital consisting of cattle, sheep, goats, camels, horses and donkeys.

Livestock production in the Diffa region is extensive, and is practiced by groups of herders whose traditional production and living systems seem to be well adapted to the conditions of the environment and activity. These groups are: Peulhs, Kanouri, Toubous and Arabs. Among the Fulbe Fulani, livestock farming is most often combined with rainfed agriculture, whereas the Woodabé Fulani do not practice any form of agriculture. The Kanouri (Boudouma and Kanembou) are agro-pastoralists for whom livestock farming is a fundamental part of the economy. Among the Toubous and Arabs, the herds are essentially made up of camels and a few sheep and goats.

Agriculture

The Diffa Region is essentially an agro-pastoral region. Annual rainfall varies between 300 mm in the south and less than 100 mm in the north. Rainfall production in the region is characterized by high interannual instability linked to fluctuations in the area under cultivation, climatic hazards and pests, in particular grasshoppers and granivorous birds. Production trends show that cereal deficits in the region have become almost structural. However, the region has enormous potential for irrigated and flood-recession crops, which contribute to reducing the deficits observed in the rainy season. Overall, in the region, it is estimated that 265 000 ha can be used for irrigated and flood-recession crops, including 182 000 ha in the lake bed, 75 000 ha along the Komadougou River and 8 000 ha in the oasis basins of Maïné Soroa and Goudoumaria.

Despite the strong increase in irrigated crops (pepper, onion, rice, wheat, maize and barley) in the basins, on the banks and in the spreading zone of the Komadougou Yobe in recent years, millet is still largely dominant ($\frac{3}{4}$ of the cultivated area). However, this relative gain is far from making up for the large cereal deficit with the drastic drop in the decreasing production of sorghum and maize around the Lake: in the lowlands of Maïné, Goudoumaria and N'Guigmi and the AHAs where several cash crops are grown (dates, cassava, market gardening, peppers), the sale of which enables the purchase of the cereals needed to meet the population's food needs.

Rainfed agriculture is the most unpredictable, as it depends exclusively on the rainfall regime. This is why performance is rather limited and presents very few possibilities for intensification due to drought, the threat of silting, parasitic pressures (grasshoppers, flower insects, granivorous birds), the degeneration of seeds, particularly millet seeds, and the use of rudimentary farming equipment resulting in the slowness of the work, which is not compatible with the short season (50 to 70 days). Millet cultivation is widespread in the south-eastern fringe of the Region. It is practiced, for the most part in association with Sorghum and increasingly with cowpea. The areas under millet and cowpea cultivation have increased by 84% and 41%, respectively, compared to the average over the last five years.

Cereal deficits in rainfed crops, which have become almost permanent, easily explain the interest in irrigated agriculture. Irrigated agriculture is practiced by dewatering wells, boreholes, ponds, along the Komadougou River and in the oasis basins. The level of performance is appreciable, in the sense that this agriculture presents real possibilities for intensification because of the immensity of the land resources and the great expertise of the population in irrigation. The main constraints to irrigated agriculture in the region are:

- difficulties in the supply of quality agricultural inputs;
- producers' lack of organization (supply, marketing and processing); and
- the degeneration of seeds, especially of pepper;
- the impoverishment of the soil due to a lack of soil improvers, especially organic ones;
- the abusive use of mineral fertilizers, especially on peppers;

- the invasion by perennial weeds;
- the problem of soil and water salinity, particularly in the basins and around Lake Chad;
- the instability of water supply sources, particularly around Komadougou;
- Exposure to the phenomenon of silting due to exponential growth of areas resulting in uncontrolled land clearing.

Flood recession agriculture is practiced around Lake Chad. However, it remains dependent on climatic uncertainty, the movement of Lake Chad's waters and the invasion of the *Thypha australis* and *Prosopis Silencis* into the water bodies, which considerably limits the developed areas. It presents a low potential for intensification.

2.3. Biophysical and human characteristics of the Maradi region

2.3.1. Geographical location

The Maradi Region is situated in the center-south of the territory of Niger and lies between the following geographical coordinates: parallels 13° and 15° 26' North and meridians 6° 16' East. It is bounded to the east by the Region of Zinder, to the west by the Region of Tahoua, to the north by the Regions of Tahoua and Agadez and to the south by the Federal Republic of Nigeria. The area of the region is estimated at 41,796 km² or 3% of the national territory. This area is distributed as follows: 71.5% agricultural land, 25% pastoral land and 3.5% forest land. The map below shows the location of the Maradi region in Niger.

Figure 3: Location of Maradi region in Niger



Source : Wikipedia

2.3.2. Biophysical characteristics of the Maradi region

The relief

The Maradi region is characterized by a relief marked by a vast shelf of the intercalary continental shelf slightly sloping from south (550 m) to north (400 m). In the southern part, granite outcrops can be seen, which quickly give way to sand. The northern part is formed by a network of dune undulations (SRAT de Maradi, 2008-2023).

At the geomorphological level, the following formations can be distinguished in the Maradi region: Ferruginous shells and residual regs These shells can rest on sandstone directly (Aguié) or through sand (Tessaoua); the old stony alluvium (the valleys of the Maradi gully and its tributaries); the products and filling of the gullies; the ancient alluvial deposits of the goulbi N'kaba and its tributaries; the filling products of the valley of the goulbi N'kaba; and the recent and current deposits of the goulbi N'Maradi.

Geologically, the Maradi region comprises the following units :

- the base, in the South, notably between Dan Issa and Chirgué. It is made up of granodiorite and granito-gneiss around Chirgué, leptynites and gneiss towards Doufounbara, epimethamorphic shales towards South Maraka, porphyroid granites with amphibole or biotite between Garin Liman and Kandamao and undifferentiated clayey sandstone from the Cretaceous period for the rest as far as Madarounfa ;
- ancient stony alluvium further north and along the Goulbis up to 13°30' latitude;
- the Hamadian Continental which characterizes the South of GoulbinKaba.
- modern alluvium, in the GoulbinKaba and Tarka valleys, these are fossil valley fillers and in the Goulbin Maradi valley;
- ancient fixed dunes, located between the Gulbi N'Kaba and the Tarka.

The Climate

The climate of the Maradi region is Sahelo-Sudanian. It is characterized by three distinct seasons: a dry and cold season that runs from November to February; a dry and hot season that runs from March to May; and a rainy season that runs from June to September, which can exceptionally go up to mid-October.

Rainfall does not last more than 4 months. They are very irregular, badly distributed in time and space. Rainfall varies from minus 300 mm in the north to over 600 mm in the south.

Average annual temperatures vary from 23°C to over 33°C. Relative humidity reaches its maximum in August (93%), the rainiest month of the year, and the minimum is reached in March (8%).

Thus, the monthly average of maximum temperatures observed during the hot season can reach 40°C in April-May. On the other hand, the minimum values, which can fall below 15°C, are recorded between December and January. Between these two extremes, there is an intermediate situation corresponding to wintering, characterized by variable temperatures with a maximum of 38.3°C in June and a minimum of 22.6°C in August, a period during which rainfall is relatively abundant.

Soils

There are three types of soil in the Maradi region:

- Dune or "jigawa" soils (tropical ferruginous soils with sandy texture; sandy texture with low chemical fertility but good permeability. These types of soils are very sensitive to erosion. Plants on these soils can withstand long periods of interrupted rainfall without irreversible damage. These soils are low in organic matter and mineral elements. These soils are generally exploited for rainfed crops;
- The tropical ferruginous soils or gueza: these are threshing soils, with low permeability and favouring runoff. Unlike jigawa, they are difficult to work;
- Lowland soils or fadama: these are hydromorphic soils and vertisols with a sandy-clayey texture. They are generally rich in organic matter and are suitable for growing sorghum and other crops such as horticulture, arboriculture, etc.; They are also suitable for the cultivation of vegetables, fruit, etc.
- In the south, granitic outcrops appear which quickly give way to aeolian sands. Most of these soils are very sensitive to the action of the climate (intensity of rainfall and wind), as they are poor in organic matter, and consequently suffer the loss of the most fertile surface layer. Indeed, both in sandy soils and valley soils, these effects are remarkable throughout the region, especially when the soils are devoid of plant cover, and particularly in agricultural land where agricultural residues are systematically collected.

Water resources

Groundwater

In the Maradi region, groundwater is divided into three hydrogeological units, namely:

- the aquifer system of the Hamadian mainland;
- the alluvial aquifers of the Goulbis and Tarka which are of limited extension;
- the discontinuous aquifer systems of the South Maradi basement.

➤ The Continental Hamadian Aquifer

The Hamadian Continental is part of the Intercalary-Continental-Hamadian group, which includes all formations of continental origin after the Irhazer clays and before the Paleocene. The reservoir of the Hamadian Continental aquifer is made up of fluvial, deltaic or lacustrine formations with sandstone-silt clay sequences.

The groundwater contained in the Hamadian continental aquifer covers the entire region except for the southern edge or the outcropping basement. The Hamadian continental table is free in most of the region and can be locally charged towards the North. The altitudes of the wall of this aquifer vary from 360 to 280 m while those of the roof are between 380 and 300 m.

In the valleys of the gullies, the ancient alluvial deposits form the roof of the Continental Hamadian aquifer, which could be found between 30 and 60 meters deep. The Continental Hamadien constitutes an aquifer on a regional scale since it can reach several

hundred meters in depth and outcrops over more than 200,000 km² (BRGM, 1978). Static levels are between 20 and 50 m, the aquifer flow direction is from North-East to South-West with a hydraulic gradient of 0.4 to 0.7% in the Dakoro zone and from East to West with a hydraulic gradient of 1%. The transmissivity values, with a minimum of 5.10^{-4} m²/s and an average of about 10^{-3} m²/s, increase from North to South to reach the highest values (1.10^{-2} m/s) in the south of Guidan Roudji and 1.10^{-1} for the north-eastern zone of Mayahi.

According to the same source, this aquifer has an estimated reserve of between 1000 and 2000 billion m³. Its lateral extension, its power and its hydrodynamic performance make it an aquifer of capital interest for the region, both from the point of view of its reserves and its exploitability. Flows are low in the upper part. They exceed 5 m³/h and locally reach 50 m³/h in the lower terms. The recharge of this fossil CH table is almost insignificant. Nevertheless, the direct infiltration of rainwater replenishes the unique continental-alluvial hydraulic system. The renewal of this water is therefore low and the fossil nature of the resource limits its vulnerability.

➤ Alluvial groundwater

The groundwater of Goulbi N'Maradi

The Goulbi N'Maradi aquifer is formed mainly by ancient and recent alluvial deposits resulting from erosion and deep alteration of Precambrian formations in northern central Nigeria. It forms a unique aquifer system with the Hamadian Continental. The alluvial reservoir extends south of Maradi for 45 km from south to north and 70 km from east to west, and varies in width from about 1.5 km to 4 km. The lateral extension of the recent alluvial backfill corresponds approximately to the extension of the major river bed.

There are two zones located downstream and upstream of Aderawa:

- Downstream, the surface cover has an average thickness of about 6 m, and recent alluvial deposits can be reduced to about 10 m thick. As the roof of the Hamadian continental is about 30 meters deep, the old alluvium is about 15 meters thick;
- Upstream, the thickness of the cover varies between 5 and 15 m, that of recent alluvium is about 20 m thick and that of ancient alluvium between 20 and 30 m thick.

Very altered fillings of the goulbi valley, the old alluvium of varying granulometry is made up of coarse to medium sandstone, variegated sandy clay, more or less well rolled quartz gravel and pebbles with a red patina. Recent, less weathered alluvium consists of a mixture of fine to coarse angular quartz sands, quartz gravel and gravel, and a few levels of white to grey sandy clay. According to these measurements, the maximum depth of the piezometric level varies between 13.0 and 12.2 m and the minimum value between 3.2 and 2.3 m. The average depth of the water table is between 6 and 8 m in May and rises to 4 to 6 m in September. The highest level is reached towards the end of August/mid-September. The level is at its lowest at the end of the dry season in March-April. Seasonal fluctuations of the N'Maradi Gully aquifer from 1990-1991 are between 1.90 and 2.60 m, whereas before the Jibya impoundment they were between 1 and 2 m.

The flow rates of the boreholes exploited in the Goulbi vary between 50 and 80 m³/h. The drawdown is low, around 5 m for 80 m³/h. The pumping of water for exploitation can probably go up to 150 m³/hour. The renewable volumes available depend on direct replenishment by rainfall and replenishment by the Goulbi flow. Rainfall recharge by direct infiltration has been estimated at between 0.050m/year and 0.1m/year. The calculated transmissivities, from the base of recent alluvium collected by the Djirataoua boreholes, show values between 1 and 2.10-2 m²/s.

The direct infiltration of rain, a factor that is still poorly defined, is estimated at between 50 and 100 mm/year; this would give, counting an average width of the aquifer of 2 km, an annual volume of 100,000 to 200,000 m³ per kilometer of valley.

The infiltration of surface runoff is endangered by the Jibya dam in Nigeria. Since its impoundment, an increase of 1 m in the annual fluctuation of the piezometric level has already been observed. Simulation of the behavior of the aquifer in response to gully flood regulation shows that recharge of the aquifer can only take place in exceptional rainy years, instead of almost every year as was the case before the dam was commissioned.

The downstream part of the N'Maradi gully, like the N'Kaba gully, is poorly known. The depth of the static level does not seem to exceed 10 meters except in the Guidan Roundji area where higher values have been found. A plausible explanation is drainage by the Hamadian continental or ancient alluvial deposits. The depth of the static level increases regularly after the town of Maradi up to Guidan Roundji and decreases again as one approaches the border at Souloulou where there is a hydrographic network. Flows are not known precisely. The water is of good quality. Its conductivity is between 110 and 205 µsiemens/cm.

On the Goulbi N'Maradi, piezometric observations between 1991 and 1998 show that seasonal fluctuations reach 2.5 m. An upward trend in the alluvial groundwater table, ranging from 0.37 to 2.5 m, is also evident, with an average of 1.18 m. However, depending on local conditions, a decrease is also observed at the level of a few piezometers (Kartayé and HanouGazané).

➤ The Gulbi N'Kaba aquifer

The N'Kaba Gulbi is in the process of being fossilized. Located between parallels 13°50 and 14°, with a length of about 170 kilometers and an average width of 5 km. The superficial alluvial sediments are composed of coarse sand with quartz pebbles. The ancient sediments are very thick and can reach about 50 meters, alternating coarse sandstone with clayey, earthy, conglomerate-like appearance and beds of more or less worn quartz pebbles or metamorphic rocks. This ensemble rests directly on the Hamadian Continental. The piezometric levels vary from 360 to 280 meters, the direction of flow is from East to West with a hydraulic guard of 0.5%. The depth of the static levels in relation to the ground follows the direction of flow and increases from about 20 to 40 meters. The exploitation of the central valley and the immediate surroundings of the N'Kaba gully is generally carried out through wells with a depth of between 35 and 50 m. At 60 m or more, the Continental Hamadien aquifer is tapped.

➤ The water table of El Fadama Gulbi - May Farou

The May-Farou goulbi is a narrow valley born in Nigeria and which runs along the border of this country from the 8°30' meridian to the 8° meridian. At this level, it enters the Maradi region, becomes the El Fadama gulbi from Gazaoua and joins the N'Kaba at the parallel 13°30'.

Before 1975, this gulbi experienced partial flooding, but this valley has dried up since the dams built in Nigeria. From a geological point of view, this goulbi is made up of ancient quaternary stony alluvium. It consists of alternating lenses of quartz pebbles of variable size and shape and clayey earthy sandstones. Together with the Continental Hamadian water table, this constitutes a unique hydraulic system whose recharge was essentially by infiltration of rainwater or flood water caused by floods before the Jibya development in Nigeria. The water table flows from south to north with an almost imperceptible hydraulic gradient for 40 km, with the piezometric level varying from 382 to 380 metres. The depth of the static level varies from 6 to 12 meters upstream of Koubdou-Saboua, but can reach 20 meters downstream. The operating flows of the structures vary from 1 to 3 m³/h. Water quality is generally good. The groundwater resources of the alluvial aquifers seem to be the most suitable for irrigation.

➤ The water table of the Upper Tarka Valley

The Upper Tarka Valley has a general north-east/south-west direction. It starts in the Dakoro region, then runs along the Ader Doutchi plateau on its eastern flank and then goes south to Nigeria. Upstream of Karofan in the Madaoua department, the aquifer is almost non-existent and unusable, due to the lack of permeability of the very clayey alluvium. In this part of the valley, the wells will capture the Hamadian mainland at greater depths.

➤ Basement discontinuous aquifers

As for the basement acquisition systems, they are located in the extreme south of the region over a small area of about 75 km². They form part of the Lower Precambrian unit of Nigeria, delimiting the border between the two countries, and between longitudes 06°50' and 07°30'. In these basement aquifer systems, two groups of aquifer rocks can be distinguished :

- The eruptive series (granites, granodiorites and migmatites) with a success rate of 50% and whose water inflow is observed between 25 and 75 m. The depth of investigation is about 60 m with flows between 0.5 and 1.5 m³/h ;
- The metamorphic series (schists, Maraka gneiss and quartzites) with a success rate of 70% and the water occurrences are observed between 25 and 45 m. The depth of investigation is of the order of 60 m with flow rates reaching 2.6 m³/hour. The whole area is abruptly plunged from the southern limit to the north under the sandstone cover of Cretaceous age of the Hamadian mainland with a slope of 10 m per km.

The waters of the Continental Hamadien are generally fresh (350 to 600 mg/l). However, one notes the presence of certain elements such as fluorine which can be found in

abnormal concentrations. Toxic gas emanations are observed in the deep wells of the northern part of the region, especially in the Dakoro department. The quality of the water in the alluvial aquifers is very good; analyses indicate a dry residue of 44 to 296 mg/l. Mineralization is therefore very moderate, except in a few isolated areas where the effect of evaporation on the near-surface water table is noticeable, and the water is perfectly suitable for irrigation. It is highly corrosive.

Surface water

The region does not have a permanent watercourse, but it benefits from easily mobilized water resources, thanks in particular to the three large longitudinal valleys that cross it: the Goulbi de Maradi, the Goulbi N'Kaba and the Tarka Valley. Of these valleys, only the Goulbi N'Maradi has significant water flows, even if they are seasonal. But since the construction of the Jibbia dam, the flows have become very random.

Lake Madarounfa is the most important body of water in the region. Its surface area varies between 600 and 800 ha according to the seasons. Among the other ponds, the Akadaney pond is the most important and its vocation is essentially pastoral even if it has been stocked since 1990.

Seasonal runoff and recharge of the ponds are naturally dependent on rainfall. Silting is quite important and is partly due to water erosion (Madarounfa Lake). Considering the region's poor surface water resources, the development of ponds and associated watersheds appears to be a necessity in the perspective of sustainable exploitation of the resource.

Vegetation

The vegetation of the Maradi region is characterized by a grassy and shrubby steppe concentrated in classified forests, protected areas, the most isolated areas of the South-West (Guidan Roundji and Madarounfa Departments), where rainfall conditions are favourable, but also in the northern part of the region (Dakoro).

The species conserved in the fields are mainly *Combretum glutinosum*, *Piliostigma reticulatum*, *Guiera senegalensis*, *Combretum Glutinosum*, *Sclerocarya birrea* and *faidherbia albida*. There is a residual settlement of *Hyphaene thebaica* (dower) along the fossil valley of Goulbi Kaba from Gazaoua to Guidan Roundji via Mayahi and Dakoro, which is 170 km long. The northern zone of the Tarka constitutes the largest part of the herbaceous resources of the region and therefore represents the ideal areas for pastoralism (estimated at more than 800,000 ha).

The fauna

Wildlife resources are mainly located in the Gadabédji total wildlife reserve (Bermo Department), the protected forest of Baban-Raffi (Madarounfa Department) including the biodiversity reserve. The Baban Raffi forest has been registered as a biosphere reserve, with an area of 3,419 ha containing a diversity of wildlife species: gazelles,

bustards, guinea fowls, migratory birds and patas monkeys, rodents (Squirrel, Hare). It often experiences incursions of elephant herds two (2) to three (3) times a year.

2.3.3. Socio-economic characteristics of the Maradi region

Population

According to the final RGP/H results for 2012, the region had 3402094 inhabitants, i.e. 1673 783 men (49, 19%) against 1728311 women (50, 81%) (INS, 2012). The main ethnic groups that make up the region's populations are Hausa, Peuhls, Tuareg and Arabs. The Maradi region is one of the most densely populated in Niger (72.3 hbt/km²).

From an ethnic point of view, the population is essentially composed of Hausa (83%), Peulh (10%) and Tuareg (6%). The other ethnic groups, namely the Djerma and Kanouris (Manga) represent 1% of the total population.

Economic activities

Breeding

Livestock farming is the second most important economic activity. With its 2,065,460 TBU, livestock represents 17.5% of the national herd (2011). Nearly 90% of households are involved in this activity. Livestock is a source of savings, a source of income to free oneself from monetary dependence (for women), a means of managing the risks of food insecurity or to meet social and religious obligations. The region has twelve (12) industrial units, which ranks it second after Niamey.

Agriculture

About 95% of the rural population is engaged in agriculture. The region produces about a quarter of the national cereal production. It is the leading producer of millet (22.7% of national production), cowpea (37.5% of national production) and tigernuts (60% of national production). It ranks second for sorghum and cowpea production. Maradi is also known for its production of sesame and vegetables.

2.4. Biophysical and Human Characteristics of the Tahoua Region

2.4.1. Geographical location

The region of Tahoua covers an area of 113,371 km², or 8.95% of the national territory and is bordered to the north by the region of Agadez, to the south by the Federal Republic of Nigeria, to the east by the region of Maradi and to the west by the region of Dosso and Tillabéry and the Republic of Mali. The map below shows the location of the Tahoua region in Niger.

Figure 4: Location of the Tahoua region in Niger



Source : Wikipédia

2.4.2. Biophysical characteristics of Tahoua region

The relief

The geomorphology of the Tahoua region is characterized by two main groups: (i) the plateau area (Ader-Doutchi-Maggia) with an average altitude of between 300 and 500 m and a highest point (746) located at the border of the departments of Keita and Abalak. This plateau is cut by valleys with slopes of 200 m to the east and only 30 m to the west; (ii) The area of plains to the east of Madaoua, south-west of Konni, west of Illéla and in the north the plains of Tamesna and Azaouagh.

Climate

The Tahoua region has a Sahelian-type climate, characterized by a highly variable rainfall contrast, and is thus marked by rainfall that is generally insufficient, irregular and poorly distributed in time and space. Over the last ten years, the average annual cumulative rainfall hardly exceeds 450 mm (DRA of Tahoua, 2012).

The monthly average of maximum temperatures observed during the hot season can reach 47°C in April-May. On the other hand, minimum values, which can drop below 17°C, are recorded between December and January. Between these two extremes, there is an intermediate situation corresponding to wintering, characterized by variable temperatures with a maximum of 36°C in June and a minimum of 23°C in August, a period during which rainfall is more or less important.

There is a high level of sunshine. It is mainly due to the nature of the climate (Sahelian) marked by very high temperatures (47°C) at certain times of the year (April and May). As for the winds, they are subject to the influence of atmospheric movements which are the main factors responsible for climate variation. The annual wind regime is thus characterized by the alternation of two seasons:

- a long dry season (October to May) characterized by a hot, dry wind (harmattan) blowing in a north-easterly and south-westerly direction. Given the high speed of the harmattan (about 10 m/s, especially during tornadoes), the harmattan causes significant sand movement and dust uplift.
- a short rainy season from June to September, characterized by a humid wind (the monsoon or Gulf of Guinea wind) that blows from mid-June to September in a south-westerly and north-easterly direction.

In addition, this trend of climate drying is exacerbated by very intense potential evapotranspiration (PTE) in the Tahoua region (Tahoua DRA, 2012).

Soils

Soils play a key role in the socio-economic life of the communities in the Tahoua region. Indeed, they are the foundation on which agriculture and livestock farming are practiced, which are the two main socio-economic activities in the Tahoua region.

In the Tahoua region, we distinguish between:

- the lithosols that occupy the upper parts of the valleys, and the rocky outcrops;
- ferruginous upland soils;
- the hydromorphic soils of the basins;
- Slope and foothills soils;
- soils of valleys and alluvial plains (Badaguichiri, Keita, Maggia, Tarka)..

Water resources

Groundwater

There are four slicks with a predominantly northeast to southwest flow direction. These are :

- The alluvial groundwater table: It is of the quaternary age and can produce a water flow of 10 m³/hour and is generally made up of medium to coarse sand;
- The terminal continental table consisting of two aquifers: CT2 and CT1;
- The terminal continental 2 (CT2): Commonly called the upper terminal continental, this layer is located above the coal layer. It has a thickness of 60 m with a productivity rate of 0.006 l/s, a flow rate of 0.24 m³/day and a radius of influence of 6.5m. The CT2 tablecloth is generally characterized by clayey sand with the presence of lignites. The roof of this tablecloth is located at about 10 m from the ground and its wall at about 70 m ;

- The terminal continental 1 (CT1): Commonly called the lower terminal continental is located directly below CT2 and is composed of sandstones, compact oolitic sands with clay passages. This nappe is about 90 m thick. It is more or less fractured and is 30 m below the coal layer. It would have a flow of 50-80 m³/h. The roof of this tablecloth is about 70 m away.
- The Hamadian interbedded nappe: It is made up of detrital formations of secondary age with alternating sands, sandstones and clays that accumulated before the Middle Cretaceous transgression. Joulia, in 1959, subdivided the Continental Intercalary into four ensembles classified from top to bottom:
 - Tegama Group, which is the main aquifer in the licence area ;
 - The Irhazer clays;
 - The Agades sandstone group;
 - The Izegouandane arkoses, which lie in concordance with the Tagora River..

The roof of the Continental Intercalaire slopes down gradually from north to south and from east to west. At the North and South ends, the two drillings Tin El-Bagra and Dig Diga show that the altitudes of the roof of the Continental Intercalary are (+395m) and (-400 m) in relation to the sea level and this over a distance of 350 km. The average slope is about 2.3 m per km. Underground flows are in an E-W direction. NW-SE and NE-SW with hydraulic slopes of 6.67×10^{-4} , 6.25×10^{-4} and 5.40×10^{-4} respectively.

Surface water

They are limited to the ponds generated in low-lying areas during the rainy season, some of which are permanent (Gaweye, Dandoutchi and Tabalak). The region also has several dams (Ibohamane and Moulléla in particular). These surface waters are, to varying degrees, subject to silting due to significant sand deposits resulting from the erosion of river banks following major floods. The Tabalak pond still contains appreciable quantities of water used for agro-pastoral and fishing purposes.

Vegetation

In the region, most of the forest formations have given way to shrub steppes, lateritic plateaus, dunes and cultivated fields. This degradation has led to the rarefaction or even disappearance of certain plant species (PDR, 2016-2020). The woody cover dominated by *Acacias* is generally scattered over the hills and rocky plateaus, except on certain plateaus or in certain flood valleys where small pockets of relatively dense vegetation are found in places where large stands of *Balanites* and *Acacias* ssp. coexist. A form of forest gallery develops as a result of runoff from the watersheds; this is also the case on plateaus where a real formation of *Acacia* species (*A. seyal*, *A. nilotica*, *A. radiana*, *A. senegal*) develops.

The dune zones constitute the shrubby savannah area where species such as: *Combretum glutinosum*, *Guiera senegalensis*, *Prosopis africana*, *Sclerocarya birrea*, *Balanites aegytiaca*, *Ziziphus mauritiana* can be found. In the valleys, where cereal crops are grown, some large trees grow, the most dominant of which are: *Cenchrus biflorus*, *Euphorbia forsklii*,

Eragrostis tremula, *Pennisetum pedicelatum*, *Diheteropogon hagerupii*, and *Acacia*. The herbaceous stratum consisting mainly of annual plants is very rich and varied. Among other species are: *Cenchrus biflorus*, *Euphorbia forsklii*, *Eragrostis tremula*, *Pennisetum pedicelatum*, *Diheteropogon hagerupii*, etc.

The fauna

In the past, the Tahoua region was one of the most game-rich in the country. Both Saharan and Sahelian species (*damask gazelles*, *dorcas*, *Addax*, *Oryx*, *Bustards*, *Ostriches*, etc.) were found there and numbers were very high. Nowadays, as a result of the combined effects of man (overgrazing, poaching, destruction of habitats, etc.) and climate (drought), numbers have declined considerably and most of these species have even disappeared. However, despite the unfavorable climatic conditions for the proper development of its habitat in the northern part (Abalak and Tchintabaraden), wildlife continues to exist. Thus, we note the presence of avifauna, gazelles and other rodents (PDR, 2016-2020). Also, we note the return of fauna in the areas where recovery actions have been carried out, which have made it possible to restore the vegetation cover and improve the habitat for fauna.

2.4.3. Socio-economic characteristics of the Tahoua region

Population

According to the final results of the fourth General Census of Population and Housing (RGP/H) 2012, the population of the Tahoua region is 3,328,365. The distribution of this population by sex shows a slight predominance of women, who represent 50.1% of the region's inhabitants. Moreover, it appears that 6 departments (Madaoua, Bouza, Tahoua, Keita, Illéla, and Birni N'Konni) concentrate more than 72% of the population. The population is made up of three main ethnic groups: the Hausa (78.2%), the Tuareg (17.5%) and the Peulh (2.5%). (RGPH, 2001).

Economic activities

Breeding

The Tahoua region is a livestock area par excellence and represents the second socio-economic activity of the local communities. There are two types of animal husbandry in this zone: the husbandry of stable communities carrying out small movements with the animals within the permit area and in the surrounding area, and another type of husbandry known as transhumant characterized by a high mobility of pastoralists.

Agriculture

Agriculture is the main socio-economic activity of the local population. It mobilizes the family unit as a whole and concerns all socio-professional categories. This agriculture is rainfed and the main crops are millet, sorghum and cowpea. Cowpea is a cash crop. On the other hand, millet and sorghum are the food crops of households in the project area. In addition to food crops and on plots of land, women grow okra and sorrel, the production of which is mainly for self-consumption and sale on the local market. This agriculture is still traditional with the use of rudimentary tools (hoe, daba and hiler).

Almost all (about 90%) of cereal production is for self-consumption in order to cope with food insecurity. In general, the food situation is difficult. Agriculture has recently come up against enormous constraints, including the following:

- the impoverishment of cultivated land due to the lack of organic and mineral matter input (soil erosion);
- the disappearance of the fallow system due to the insufficiency of cultivated land in the face of a very important demographic increase;
- the insufficiency and poor distribution of rainfall in time and space (climatic hazards);
- the lack of modernization of agriculture due to the inadequacy of technical supervision;
- the difficulties of access to phytosanitary products and improved seeds due to the insufficiency and/or lack of financial means;
- the persistence of pests (recurrent attacks by pests).

2.5. Biophysical and human characteristics of the Zinder region

2.5.1. Geographical location

The Zinder Region is located in the central-eastern part of the Republic of Niger (12°48' and 17°30' North, 7°20' and 12°00' East). It is bordered to the East by the Diffa Region, to the West by the Region of Maradi, to the North by the Region of Agadez and to the South by the Federal Republic of Nigeria over a border of about 300 km. The surface area of the region is estimated at 155,778 km², i.e. 12.3% of the national territory. The map below shows the location of the region of Zinder in Niger.

Figure 5: Location of Zinder region in Niger.



Source: Wikipedia

2.5.2. Biophysical characteristics of the Zinder region

The relief

The relief is relatively flat (450 to 500 m), with peaks reaching more than 600 m in places, particularly in the Koutous (Kellé) from where the relief is characterized by a succession of medium plateaus extending over several kilometers, control hills and plains. Given the areas occupied by the plateaus, there is even talk of a decrease in agricultural areas, with a peak at 710 m at Termit. To the south, there are depressions (320 m), old stabilized and indurated sand dunes, talwegs and basins. The southwest and extreme east, Gouré and Tesker, are dominated by sharp dunes, further east are stabilized dunes and inter-dune basins. This can also be observed in the South-East Dungass and South Damagaram Takaya. In the North, the relief is uniform and the landscape monotonous. The Damergou corresponds to a sandy plain dotted with low and middle plateaus, witness mounds and vast fossil valleys. Quite in the North we have the fossil valleys of Anékar, Anouar, Tigar, etc., all fed by runoff water.

The Climate

The Zinder region presents a climatic zone of transition between the Sudanese and Sahelian climate, characterized by two distinct seasons, namely:

- a short rainy season that generally lasts four months from mid-June to mid-October;
- a long dry season that lasts the rest of the year (about eight months).

As a result, the natural environment is characterized by heterogeneity in all its components (temperature, precipitation, winds, evaporation and insolation). This results in marked disturbances in the appearance of the landscape. Temperatures in the Zinder region are marked by a high monthly variability, which is mainly due to the factors governing the alternation of the seasons. The average monthly maximum temperatures observed during the warm season can exceed 40°C in May. On the other hand, minimum values are recorded between December and January, with a minimum value that can fall below 15°C. Between these two extremes, there is an intermediate situation corresponding to wintering, characterized by variable temperatures with a maximum of 36.3°C in June and a minimum of 23.3°C in August, a period during which rainfall is relatively abundant.

Precipitation is thus irregular and very unevenly distributed in time and space. This reveals the random nature of rainfall, with intra-annual variations observed during the different rainy seasons. Indeed, rainfall heights vary from the North (Tanout 159.1 mm) to the South (Magaria: 532.2 mm). Generally speaking, this significant variation in annual rainfall heights is at the root of the displacement of isohyets from the north to the south, thus reducing the potential for agro-pastoral production in a zone where agriculture and animal husbandry are the main employers of the local population. This displacement of isohyets has led to the subdivision of the Zinder region into the following agro-climatic zones:

- a desert area north of the 100 mm isohyet (extreme north of the department of Gouré);

- a pastoral and agro-pastoral zone, between the 200 and 400 mm isohyets, which extends over the north of the departments of Gouré and Tanout, with a theoretical limit in the south, the 350 mm isohyet (considered as the northern legal limit for rainfed crops);
- an agricultural zone between 400 and 700 mm, covering the departments of Magaria, Kantché and southern Mirriah.

The winds in the Zinder region have essentially two periods of maximum intensity, with an average speed of around 3 m/s which is generally recorded during the month of September. The annual wind regime is thus characterized by alternating:

- the monsoon or Gulf of Guinea wind which blows from May to October in a south-west-north-east direction. This wind is charged with humidity and carries rainfall;
- the harmattan or North Trade Wind which blows during the months of December to April, following a North-East and South-West direction. This very desiccating wind causes significant movement of sand and dust which causes the silting up of bodies of water.

As for evaporation, which is the result of the combined effects of several factors, including temperature variation, wind speed, type of season, geographical position and surface area of water points, it is very high in the Zinder region and is estimated at between 2,500 and 2,600 mm/year. Finally, the insolation, for its part, is generally important in May and July with a maximum value of more than 300 h/month, mainly due to the conditions of a Sahelian type climate marked by high temperatures, strong winds and rainfall concentrated only during the wintering period.

The soils

The majority of the soils in the Zinder region are predominantly sandy. There are five main soil units. Some are characteristic of the climate (zonal soils), others are related to local peculiarities (inter-zonal soils and a-zonal soils). These are the:

- *Alluvial soils with green character*: These soils are deep and are characterized by a clay texture and a polyhedral structure on the surface and compact at depth. The horizons are coherent and hard in the dry state and on the whole not very porous. Root development is good in the first few centimeters and shallow at depth;
- *Vertisols*: They are characterized by the presence of large shrinkage cracks on their surface. These soils have very hard horizons in the dry state that are not very porous although root development is good. Their structure is polyhedral and the texture is heavy, which causes their clogging in the rainy season;
- *Subarid brown soils of sandy loamy to sandy clayey texture located in the high-water tidal zone*: Shallow soils in places with a polyhedral structure on the surface and compact at depth, very coherent and hard horizons, color dominated by brown, little porosity, root development down to the deep horizons.;
- *Subarid brown soils with a sandy-gravelly glacial texture*: Skeletal soils in some places and deep in others. They are characterized by a high gravel load and are

conductive to runoff. They have a massive structure and moderate porosity. The rooting varies from nil to moderately dense;

- *Subarid brownish-red soils of sandy glaxis*: Sandy, massive, fairly porous soils with good root development. Drainage is good, indicating light, filtering soils. They are not very suitable for irrigation.

All in all, the major soil units in the Zinder region are weakly acidic to neutral with a good saturation rate of exchangeable bases and an average cation exchange capacity (CEC) to be raised. With population pressure (high human density), even non-cultivable land is being colonized for agricultural production in order to find a livelihood. This explains the high rates of reclamation in the departments of Kantché, Magaria and Mirriah.

Water resources

Groundwater

Groundwater in the region is divided into three aquifer systems:

- the discontinuous basement aquifer found over almost the entire geological domain of the Zinder region where hydrogeological conditions are less favorable ;
- the tablecloth of the intercallacial-hammadian continental. This aquifer system is of a multilayer type and extends over almost the entire Zinder region;
- the Manga aquifer, which corresponds to the outcrop of the Quaternary formations composed of sandstones surmounted by sands and silts, sometimes clayey. This nappe presents average and good hydraulic and hydrogeological characteristics.

It is in this latter formation that the majority of cemented wells and shallow drill holes (less than 80 meters) are found. According to the HRD of Zinder, there are more than 1100 modern water points for the supply of water to the populations that catch the Korama's water tables. To this must be added thousands of wells and market gardening boreholes, made in the agricultural valleys of the region. It is the aquifer most solicited by the population, including that of Zinder city (Gogo Machaya wellfield). The flow rate of the structures is generally higher than 9 m³/h and can reach 60 m³/h (communes of Bandé, Doungou, Doungass), but given the phreatic character of this aquifer, these flows fluctuate a lot, especially in the Gogo-Machaya catchment fields from which the town of Zinder is supplied (pumping of more than 7,000 m³/day).

The average depth of the village structures is 48 m. In the valleys, the static level does not exceed 5 m. However, it varies from North to South, reaching 40 m towards the Nigerian border in the Malawa sandstones. Water quality is good with an average conductivity of 132 s/cm. Furthermore, this resource is characterized by significant piezometric fluctuations, due to the increasingly high demand and random inputs related to rainfall in the region.

Surface water

The Zinder region has no permanent watercourse, but it benefits from easily mobilizable water resources, thanks in particular to the presence of the few temporary watercourses

such as the korama and Zinder ponds, the Tarka valley (Belbedji), the Guidimouni pond, the dams (Kassama, Toumbala, Bakatchiraba...) as well as the weirs built for spreading. All these watercourses are dependent on rainfall. Seasonal runoff and the recharge of ponds naturally depend on rainwater inputs. However, all these surface waters suffer from silting problems, which is quite significant.

Vegetation

The forest resources of the region are made up of important agroforestry parks located in the southern strip, gum trees and other *Acacia* formations as well as numerous artificial plantations. According to the DRE/LCD of Zinder, there are thirty-two (32) classified forests covering an area of 44,000 ha representing about 5% of the forest estate of the region. As for the protected domain, it represents 866700 ha, or 95% of the region's forest area. In addition, there are a hundred or so artificial stands covering nearly one million hectares, including 200,000 ha of gum trees.

Generally speaking, the physiognomy and composition of the vegetation reflects the soil and climatic conditions of a given area. Indeed, in the Zinder region, the woody vegetation is essentially dominated by species such as: *Acacia albida*, *Sclerocarya Birrea*, *Acacia Raddiana*, *Boscia senegalensis*, *Piliostigma Reticulatum*, *Acacia seyal*, *Maeroua Crassifolia*, *Combretum micranthum*, *Acacia macrostachya*, *Grevia bicolor*, *Balanites aegytiaca*, and *Acacia nilotica*.

Wildlife

The Zinder region has a wildlife nature reserve of 9,700,000 ha (DR/EDD). The diversity of the ecosystem of Zinder makes it a rich environment in terms of wildlife and avifauna (birds) diversity. Thus, we can distinguish the mammalian fauna composed of dama gazelle, dorcas gazelle, mouflon and Addax. The most observed birds are the Arabian Bustard, the Oricou, the Desert Sirli, the Raptors, the Cape Dove, the White Stork, the Harrier, the Falcon, the Guinea Fowl.

Habitat degradation (droughts, bush fires) and anthropic pressure (agricultural clearing, poaching, etc.) have caused the disappearance of certain wildlife species.

2.5.3. Socio-economic characteristics of the Zinder region

Population

The population of the Zinder region is 4,132,321 inhabitants (INS 2016), i.e. 2,069,817 men (49.40%) against 2,062,504 women (INS 2016). The main ethnic groups that make up the population of the Zinder region are: Haussa, Kanouri, Tuareg, Peuhls, and Arabs. It is one of the densest populations in Niger (26.5 hbt/km²) (INS 2016). The population is characterized by a high proportion of young people. Indeed, 53.6% of this population is under 15 years old. This high proportion of young people justifies the increase in certain social needs and motivates an equally high demand for agricultural production, education, health and employment.

Economic activities

Breeding

The main assets of the Zinder region in the field of animal husbandry can be summarized as follows:

- the vast size of the pastoral zone (more than a third of the area of the region) ;
- a rich and varied forage potential (natural pastures, agricultural by-products and reserve areas);
- the existence of water points and water bodies (traditional and cemented wells, water reservoirs and ponds) for livestock watering;
- the existence of 252 pastoral enclaves, more than 600 corridors and about 30 grazing reserves made up of defensive perimeters covering about 50,000 ha;
- the existence of about a hundred livestock markets, 21 of which are regularly monitored by the animal resources services, and 4 are reference markets surveyed by the SIMB.
- the existence of promising channels for export activities thanks to the demand for live cattle from neighboring countries, particularly Nigeria and Libya;
- the existence of some industrial units (Mallam Yaro Tannery, Refrigerated Slaughterhouse);
- the existence of a poultry station and a livestock multiplication center;
- relatively satisfactory coverage in terms of infrastructure and institutional equipment: 1 regional directorate, 5 departmental directorates, 3 communal services, 5 veterinary posts, 48 operational basic intervention cells, 5 pastoral centers, 8 animal health huts, 1 poultry station, 1 multiplication center, 1 laboratory antenna, 1 slaughterhouse, 1 cattle feed factory, 2 private veterinary pharmacies, 5 pharmaceutical depots, 1 tannery and dairy.

Despite the assets available to the livestock sub-sector, it faces enormous constraints that constitute bottlenecks to its development:

- environmental degradation, particularly around pumping stations;
- the degradation and inadequacy of grazing areas due to the rise of the agricultural front towards pastoral areas in the face of demographic pressure;
- the invasion of enclaves and corridors of passage by the cultural front and the non-appetible plant species;
- poor networking of the pastoral zone into water points, due to the inadequacy of hydraulic infrastructures;
- a lack of support organizations and structures for the supply and marketing of zootechnical and veterinary inputs and low private investment in the sub-sector;
- the practice of extensive livestock rearing leads in most cases to conflicts between farmers and livestock breeders;
- a notorious insufficiency of human (design frameworks), material and logistical resources;
- the financial resources allocated to the functioning of the state structures of supervision are clearly lower than necessary.

Agriculture

The region's economy is mainly based on agriculture and livestock farming, which alone account for more than 85% of the region's primary sector GDP. In addition to these activities, trade, handicrafts, exploitation of forest resources and quarries. The region's economy is essentially agropastoral, with 90% of households engaged in agriculture and animal husbandry (SRAT, 2008-2023). In spite of their importance, agriculture and livestock farming are marked by their rudimentary nature. As far as agriculture is concerned, it is classified as subsistence agriculture because of the low investment that prevents its modernization. As a result, agricultural production is insufficient with little or no surplus and no added value in terms of money.

The Zinder region has enormous agricultural potential, including, among others:

- the availability of cultivable and irrigable land in the northern part, particularly in the Tanout and Gouré areas;
- an irrigable potential estimated at about 18,000 ha;
- the Korama valley, an irrigation area par excellence, contains important shallow and easily renewable groundwater resources estimated at 5000000000 m³ ;
- 19 water reservoirs with a mobilizable volume in the order of 7000000 m³ ;
- promising sectors such as: cowpea, sesame, cabbage, pepper, sugar cane, wheat, tomato, and manioc;
- Relatively satisfactory coverage of infrastructure and institutional equipment: 1 regional directorate, 5 departmental agricultural development directorates, 5 departmental directorates for rural development and equipment, 3 agricultural communal services, 2 communal services for rural development and equipment, 1 improved seed multiplication center, 36 agricultural districts, 4 agricultural posts, 47 housing offices, 43 village warehouses, 25 PV stores and 3 airstrips for crop-processing aircraft..

The major constraints undermining the development of the agricultural sector in the Zinder region can be summarized as follows:

- the irregularity of the rains in space and time;
- land saturation, especially in the southern part of the region (100% in the urban community and in the department of Kantché, 97% and 87% respectively in the departments of Magaria and Mirriah ;
- the absence of fallow land (overexploitation) and wind and water erosion which have resulted in land degradation (estimated at around 100,000 ha);
- the agricultural equipment is of traditional type, therefore archaic and not very efficient;
- the supply circuit for inputs (fertilizers, seeds and pesticides) and rural equipment is informal and unorganized, and therefore inefficient;
- the limited incomes of farmers do not allow them to access agricultural inputs and equipment, especially dewatering and irrigation;

- the low rate of technical supervision (6 design frameworks for the region), in a context of new technologies for adaptation to climate change, does not allow the emergence of the sub-sector;
- the isolation of agricultural production areas, despite the efforts made by development partners to rehabilitate rural tracks, is a hindrance to the development of off-season activities;
- the human, material and financial resources available to the region in the field of agriculture are far from covering the needs of the management structures.

CHAPTER III: POLITICAL, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1. Policy framework

The national policy framework includes a number of policies and strategies covering both general areas such as economic and social development, as well as sectoral areas such as agriculture, but also cross-cutting areas such as environmental protection, climate change, etc.

3.1.1. International policy framework

Detailed Program for the Development of African Agriculture (PDDAA)

This program proposes a number of initiatives with the aim of providing a solution to the agricultural crisis on the African continent and establishing the conditions for the development of agriculture. The PDDAA has identified the following key areas that need to be emphasized through increased investment. These are:

- Increasing the area under sustainable cultivation and served by reliable water control systems;
- Improving rural infrastructure and trade capacity to facilitate market access;
- Increasing food supplies and reducing hunger;
- Agricultural research, dissemination and adoption of new technologies.

CEDEAO Common Agricultural Policy (ECOWAP)

The regional policy adopted by ECOWAS affirms this vision: "modern and sustainable agriculture, based on the effectiveness and efficiency of family farms and the promotion of agricultural enterprises through the involvement of the private sector. Productive and competitive on the intra-community and international markets, it must ensure food security and provide decent incomes for its assets". It has a general objective which is to "contribute in a sustainable manner to meeting the food needs of the population, to economic and social development and to reducing poverty in the Member States, as well as inequalities between territories, areas and countries".

UEMOA Agricultural Policy (PAU)

The Agricultural Policy of the Union (PAU) was adopted on 10 December 2001 by Additional Act No. 03/2001. It aims to provide solutions to the three major challenges facing agriculture in the West African Economic and Monetary Union (UEMOA) area, namely: 1. feeding the region's population in a context of high population growth and urbanization; 2. increasing agricultural production in a sustainable manner through intensification and concerted management of natural resources, which are now regional public goods threatened by growing competition; 3. reducing poverty in rural areas by improving the income and status of farmers. Its overall objective is to contribute, in a sustainable manner, to meeting the food needs of the population, to the economic and social development of Member States and to poverty reduction. This means that, from its conception, PAU was therefore oriented towards the search for food security.

Common Policy for Environmental Improvement (PCAE-UEMOA)

UEMOA adopted the Common Policy for the Improvement of the Environment (PCAE) by Additional Act No. 01/2008/CCEG/UEMOA of 17 January 2008. The PCAE responds to the orientations contained in the WAEMU Treaty, particularly its Additional Protocol No. II on Sectoral Policies, which establishes the environment as a sector of intervention of UEMOA.

Dakar Declaration on Irrigation

This declaration signed in 2013 by the CILSS countries aims to increase the irrigated areas in the field of agricultural hydraulics from 400,000 ha today to 1,000,000 ha by 2020.

Strategic Framework for Agricultural Water in the Sahel

Following the Dakar Declaration, CILSS through its Initiative for Irrigation in the Sahel (i2S) has developed a strategic framework for agricultural water in the Sahel with an action plan for 2016. The aim of the Sahel Irrigation Initiative is to contribute to the growth and resilience of the Sahel region by improving the competitiveness of irrigated agriculture and increasing its added value in the agricultural development of the countries concerned, thus contributing to job creation and poverty reduction. The objective of the Initiative is to support States and stakeholders in irrigated agriculture with a view to increasing the area under agricultural water control to one million hectares, while ensuring the viability, performance and environmental sustainability of existing and future irrigated systems and related agricultural development. At the heart of this approach, three pillars are being promoted to change the current practice of irrigation. These are: (i) promoting not just one type of irrigation, but a diversity of irrigation types, (ii) moving from development to the production system, and (iii) involving producers more in the process of irrigation from mere consultation to engagement.

3.1.2. Environmental and Social Policy of the Green Climate Fund

The Green Climate Fund (GCCF) Social and Environmental Policy outlines the Global Climate Fund's commitments and sets out the principles and standards to which it will be held accountable. As part of this policy, the GCCF requires that all activities supported by the GCCF commit to:

- Avoid, and where avoidance is impossible, mitigate negative impacts on people and the environment;
- Improve equitable access to development benefits; and
- Take due account of vulnerable and marginalized populations, groups and individuals, local communities, indigenous peoples and other marginalized groups of persons and individuals affected or potentially affected by activities financed by the Fund.

The implementation of this policy is based on the 8 environmental and social performance standards, the principles of which are set out below.

NP 1: Assessment and Management of Environmental and Social Risks and Impacts

- Identify and assess environmental and social risks;
- In order of priority: avoid, minimize, repair or compensate for negative impacts;
- Ensure that affected communities and other stakeholders are engaged in the management of issues that affect them;
- Ensure that grievances from affected communities and external communications from other stakeholders are addressed and managed appropriately;
- Improve environmental performance through an effective management system.

NP 2: Labor and Working Conditions

- Promote fair treatment, non-discrimination and equal opportunities for workers;
- To establish, maintain and improve relations between workers and management;
- To promote respect for national labor and employment law;
- To protect workers;
- Promote safe and healthy working conditions and protect the health of workers;
- Avoid the use of forced labor.

NP 3: Rational Use of Resources and Pollution Prevention

- Avoid or reduce negative impacts on human health and the environment by avoiding or reducing pollution generated by project activities.
- Promote more sustainable use of resources, including energy and water.
- Reduce project-related GHG emissions.

NP 4: Community Health, Safety and Security

- Anticipate and avoid, during the life of the project, negative impacts on the health and safety of the affected communities that may result from ordinary or non-ordinary circumstances.
- Ensure that the protection of persons and property is provided in accordance with applicable human rights principles and in a manner that avoids or minimizes risks to the affected communities.

NP 5: Land Acquisition and Involuntary Resettlement

- Avoid, and whenever not possible, limit involuntary resettlement by considering alternative project designs;
- Avoid forced eviction; Anticipate and avoid, or where it is not possible to avoid, limit the negative social and economic impacts resulting from the acquisition of land or restrictions on its use in:
 - (i) providing compensation for the loss of assets at replacement cost;
 - (ii) ensuring that resettlement activities are accompanied by appropriate information provision, informed consultation and participation of affected persons;
- Improving or at least restoring the livelihoods and living conditions of displaced persons;

- To improve the living conditions of physically displaced persons through the provision of adequate housing with security of tenure in resettlement sites.

NP 6: Biodiversity conservation and sustainable management of living natural resources

- Protect and conserve biodiversity.
- Maintain the benefits of ecosystem services.
- Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

NP 7: Indigenous peoples

- To ensure that the development process promotes full respect for the human rights, dignity, aspirations, cultures and resource-based livelihoods of indigenous peoples.
- Anticipate and avoid negative impacts of projects on Indigenous Peoples' communities or, if this is not possible, reduce, restore and/or compensate for such impacts.
- Promote benefits and opportunities related to sustainable development for Indigenous Peoples that are culturally appropriate.
- Establish and maintain an ongoing relationship with Indigenous Peoples affected by a project throughout the life of the project based on Informed Consultation and Participation (IPC).
- Obtain the Free, Prior and Informed Consent (FPIC) of Aboriginal Peoples where the circumstances described in this Performance Note exist.
- Respect and preserve the culture, knowledge and practices of Aboriginal Peoples.

NP 8: Cultural Heritage.

- Protect cultural heritage from the negative impacts of project activities and support its preservation.
- Promote the equitable sharing of benefits from the use of cultural heritage.

3.1.3. BOAD Safeguard Standards applicable to the project

• Operational policy for environmental and social impact assessment

The West African Development Bank (BOAD) requires that projects submitted to it for financing be subject to an Environmental and Social Impact Assessment (ESIA) which helps to ensure that such projects are environmentally sound and socially viable to facilitate the decision-making process.

Environmental and Social Impact Assessment (ESIA) is a process, the scope, complexity and analytical characteristics of which depend on the nature and scale of the proposed project and the impact it is likely to have on the environment. It consists of assessing the risks that the project may pose to the environment and the effects that it is likely to have in its area of influence, studying alternatives to the project, identifying ways to improve project selection, location, planning, design and execution by preventing, minimizing,

mitigating or compensating for its negative environmental effects, and enhancing its positive effects.

The client, acting in agreement with responsible government agencies and other appropriate stakeholders, will conduct an environmental and social impact assessment process, implement and maintain an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project and commensurate with the environmental and social risks and impacts. The ESMS includes the following elements: (i) policy statement; (ii) risk and impact identification; (iii) management program; (iv) organizational capacity and competencies; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and evaluation.

The ESIA also includes the process of mitigation and management of disturbances throughout the life of the project. The BOAD advocates the use of preventive measures in preference to mitigation or compensation measures, whenever possible.

- **Operational Policy on Natural Habitats**

According to this policy, the BOAD encourages and supports the conservation of natural habitats as well as better land use planning by financing projects designed to integrate into national and regional development strategies the protection of natural habitats and their rehabilitation, in case of degradation, in order to guarantee their various functions (paragraph 3 of this policy).

The BOAD does not support projects that, in its view, involve significant modification or degradation of critical natural habitats.

Wherever possible, projects financed by the WADB are located on territories whose natural state has already been modified (excluding any natural areas converted, according to the BOAD) in anticipation of the project. The BOAD will only support projects involving significant degradation of natural habitats if there are no realistic alternatives to the project and its location, and provided that a comprehensive analysis has demonstrated that the benefits of the project will substantially outweigh the environmental costs.

The BOAD's decision whether or not to support a project that is likely to have negative impacts on a natural habitat takes into account the Borrowers' ability to implement appropriate nature conservation measures and to mitigate negative environmental and social impacts. Where there are potential institutional capacity problems, the project includes components for the development of national and local institutional capacities for effective environmental and social planning and management. Mitigation measures specified for a given project can be used to enhance the practical skills of national and local institutions on the ground.

- **Operational Policy on Cultural Heritage**

The policy is designed to help borrowers protect and enhance the cultural heritage present in the projects that WADB finances. The objective is to avoid or mitigate the negative effects that development projects may have on physical cultural assets. The effects on such property resulting from project activities must not be contrary to the borrower's national

legislation or its obligations under applicable international environmental treaties and agreements.

The analysis of the impact on physical cultural assets of a project for which BOAD financing is being considered is an integral part of the Environmental and Social Impact Assessment (ESIA). This analysis is done by the Borrower. The ESIA is carried out in the following stages: screening, preparation of Terms of Reference (TdR), collection of baseline data, impact assessment and formulation of mitigation measures and an Environmental and Social Management Plan (ESMP).

This policy also describes the procedures to be followed in the event of accidental discoveries of physical cultural property.

- **Operational policy on pest control**

To best manage the impacts that may result from the implementation of projects financed by the Bank that directly or indirectly involve the use of pesticides, the Bank has developed an Operational Policy on Pest Management.

In its policy, the BOAD favors a strategy that encourages the use of biological or environmental methods and limits the use of synthetic chemical pesticides. And, in BOAD-financed projects, the Borrower addresses pest management as part of the Environmental and Social Impact Assessment carried out in connection with the project (Paragraph 1).

In agricultural operations financed by BOAD, pest management is normally integrated, involving methods such as biological control, cultivation methods and the development and use of resistant or tolerant varieties. The BOAD may finance the purchase of pesticides when their use is justified as part of an integrated pest management strategy (paragraph 4).

Paragraph 6 of the policy states that the purchase of any pesticide under a BOAD-funded project is subject to the results of an assessment and the nature and extent of the risks involved, based on the intended use and intended users. With regard to the classification of pesticides and the formulas specific to each of the products under consideration, WADB refers to the guidelines for the classification of pesticides by risk as recommended by the World Health Organization (WHO).

This policy also defines the criteria for the selection and use of pesticides. The criteria applicable to the selection and use of pesticides within the framework of the projects financed by BOAD are as follows:

- The products selected should have negligible effects on human health.
- Their efficacy against the target species must be established
- They should have very limited effects on non-target species and the environment. The methods, timing and frequency of applications must be such that natural enemies are protected to the greatest extent possible. Pesticides used in public health programs must be shown to be safe for people and pets in treated areas, as well as for the personnel applying them.

- Their use must take into account the need to prevent the emergence of resistant species.

In addition, the BOAD requires that the pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of and applied in accordance with standards that it deems satisfactory. The BOAD does not finance chemical formulations that belong to classes not recommended by WHO, or the formulation of specific products, (a) if their distribution and use are not regulated in the country in question, or (b) if non-specialists, farmers or others may use them or have easy access to them without the training, equipment and facilities necessary to handle, store and apply them properly.

- **Operational Policy for Public Participation in the Environmental and Social Impact Assessment Process**

The West African Development Bank's policy on environmental and social impact assessment requires that the groups concerned as well as local NGOs be informed and consulted in an effective manner when carrying out an environmental and social impact assessment.

The Operational Policy on Public Participation in the Environmental and Social Impact Assessment Process describes the procedures and types of consultation required during the environmental and social impact assessment process. For Category B projects, public consultation is organized once during the environmental impact assessment in order to take into account their opinions and concerns.

3.1.4. National policy framework

The national policy framework for the project is presented in the table below.

Table 5 : National policy framework related to the Green Climate Fund performance standards

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
Assessment and management of environmental and social risks and impacts	National Policy on Environment and Sustainable Development in Niger	The overall objective of this policy is to provide general conditions conducive to economic, social and cultural development through the preservation and sustainable management of the environment and natural resources and the strengthening of measures to adapt to the negative effects of climate change in order to ensure the long-term food security of the people of Niger and improve their living environment. It is articulated in four (4) strategic axes which all contribute to the achievement of the overall objective and specific objectives defined within the framework of this policy.	The sub-projects of this project will be subject to in-depth ESIA's in order to comply with the provisions of the national policy on Environment and Sustainable Development in Niger.
	National Policy on Spatial Planning	It is defined by law n°2001-32 of 31 December 2001 on the orientation of the Regional Planning Policy. Its purpose is "to set the legal framework for all interventions by the State and other actors that have the effect of structuring, occupying and using the national territory and its resources" (art.1). It defines spatial planning as a tool "consisting of a coherent set of guidelines, strategies and measures aimed at promoting sustainable and spatially balanced development" (art. 2). Spatial planning policy must, among other things, contribute to "the preservation and improvement of natural factors of production" (Art. 3).	The activities of this project will contribute to the achievement of some of the objectives of the national spatial planning policy. The location of the project sites will have to take into account the different land uses as defined in local, departmental and regional land use plans.

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
	National Environment Plan for Sustainable Development (PNEDD)	Developed in 1998, it serves as Agenda 21 for Niger. Its aim is to create favorable conditions for improving food security, solving the domestic energy crisis, improving health conditions and the economic development of the population. One of the sub-objectives of this policy is the integration of environmental concerns in the definition of policies, programs and projects implemented in each of the main development sectors.	The implementation of the activities of this project will have to take into account the strategic plans of the PNEDD.
Workforce and working conditions	National Social Protection Policy	<p>This policy was adopted in 2011 and defines the strategic axes and priority areas of intervention for social protection in Niger. Its general objective is to "contribute to reducing the vulnerability of underprivileged groups and help populations to cope with the most significant risks of life". Specifically, it aims to</p> <ul style="list-style-type: none"> - Contributing to the fight against food and nutritional insecurity; - Strengthening social security and promoting work and employment; - Reducing barriers related to access to basic social services and infrastructure; - Intensify specific actions in favor of vulnerable groups; - Strengthen the consolidation of the legislative and regulatory framework. 	In the project area, there are vulnerable and disadvantaged groups; their consideration through the project activities will be in accordance with the strategic orientations of the National Social Protection Policy.
	National Gender Policy	Niger adopted a national gender policy in 2008 to reduce the gaps that exist in the distribution, control and management of resources between men and women in Niger. The purpose of the National Gender Policy is "to contribute to the achievement	A gender analysis and a gender action plan will be developed as part of this project.

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		<p>of equity and equal access of men and women in Niger" through two overall objectives</p> <ul style="list-style-type: none"> - The establishment of an institutional, sociocultural, legal and economic environment conducive to the achievement of equity and equal access for men and women in Niger; - The effective integration of gender as a variable at all stages of the processes of study and research on the socio-economic conditions of the populations, analysis, planning, implementation, monitoring and evaluation of development programs and the systematic consideration of gender-related needs in the interventions of the sectors of activity in terms of objectives, strategies and actions. 	
Rational use of resources and pollution prevention	Energy Policy of Niger	<p>The national energy policy aims to create the framework to ensure that energy needs are met for sustainable development. This energy policy is presented according to the following main axes:</p> <ul style="list-style-type: none"> - the guarantee of long-term security of supply; - social and territorial cohesion by ensuring access for all to energy at an affordable price; - the development of national energy resources; - the preservation of the environment; - strengthening the capacities of actors in the sector. 	The use of solar energy within the framework of this project reflects the development of the national energy resources which represents one of the strategic axes of the Energy Policy of Niger.
	National Action Plan for Integrated Water Resources Management (PANGIRE)	<p>The development objective of the PANGIRE and its implementation is to promote socio-economic development, poverty alleviation, environmental conservation and the enhancement of the resilience of human and natural systems to climate change. The overall objective of PANGIRE is to define the national framework for water resources</p>	The use and management of water within the framework of the project will have to comply with the legal and technical provisions of the PANGIRE.

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		<p>management and to serve as an operational tool for the implementation of the National Water Policy, while allowing better integration of the planned actions of the various sectoral and intersectoral water strategies and programs. The specific objectives of the PANGIRE express the operationalization of the strategic orientations to achieve the overall objective. For the period from 2017 to 2030, the specific objectives of the PANGIRE are the following:</p> <ul style="list-style-type: none"> - Improving knowledge and monitoring of water resources and their uses; - Improving the mobilization and development of water resources to satisfy economic uses; - To improve equitable and sustainable access of populations to drinking water and sanitation facilities, taking into account gender issues; - To improve good governance of the water sector; - Protect and preserve the environment and build resilience to the effects of climate change. 	
	Sustainable Management Framework Land Policy	<p>Adopted in October 2010, the Strategic Framework for Sustainable Land Management (SLM), covering the period 2015 - 2029, aims to prioritize, plan and guide the implementation of current and future GDT investments by both the public and private sectors and with all actors from the local to the national level. The specific objectives of the CS-GDT are as follows:</p> <ul style="list-style-type: none"> - to create a framework for mobilizing financial resources for GDT in Niger 	Sustainable land management is one of the specific objectives of this project. It will consist in "protecting productive capital against threats associated with the effects of climate change (silting, flooding, etc.).

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		<ul style="list-style-type: none"> - to ensure the sustainability of the productive base of Agriculture (water, land, vegetation, wildlife) with an emphasis on the sustainable management of ecosystems; - to increase forest production; - strengthen the capacities of all stakeholders; - set up a monitoring and evaluation system and a dedicated GDT database to measure the impact of GDT and disseminate relevant information to support the scaling up of GDT in Niger, at regional and sub-regional levels. 	
Community Health, Safety and Security	Economic and Social Development Plan 2017-2021	<p>The Economic and Social Development Plan is the reference framework for all development interventions in Niger. It is a five-year plan for the operationalization of the Sustainable Development and Inclusive Growth Strategy (SDDCI) Niger 2035. It is based on the Niger Renaissance Program, and aims to promote the economic, social and cultural well-being of the population through 5 strategic axes:</p> <p>Axis 1: Conditions for the sustainability of a balanced and inclusive development;</p> <p>Axis 2: Consolidation of the credibility and effectiveness of public institutions;</p> <p>Axis 3: Food security and sustainable agricultural development;</p> <p>Axis 4: Competitive and diversified economy for accelerated and inclusive growth;</p> <p>Axis 5: Promotion of social development.</p>	The implementation of this project falls under axis 3, "food security and sustainable agricultural development" of the PDES.
	Sustainable Development and	The objective of the Niger 2035 SDDCI is to build a modern, democratic, united, well-governed and	Carrying out the activities of this project will contribute to a certain

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
	Inclusive Growth Strategy (SDDCI Niger 2035)	peaceful country, open to the world, and an emerging economy based on a balanced sharing of the fruits of progress. The main strategic outcomes of the Niger 2035 SDDCI are as follows: The internal security of the country and its borders is ensured; the State is modernized; the level of human capital is significantly raised; the rural sector is radically transformed; the private sector is competitive; the demographic transition is effective.	extent to improving the living conditions and incomes of the beneficiaries, thus contributing to one of the expected results of this strategy in rural areas.
	National Strategy for Disaster Prevention and Risk Reduction	<p>The National Strategy for Disaster Prevention and Risk Reduction aims to:</p> <ul style="list-style-type: none"> - create the conditions for a social environment in which the population is less vulnerable and better prepared for disaster risks, - to increase the resilience of populations by raising their awareness of the importance of disaster prevention, - involves every individual and stakeholder group to reduce the loss of human life, socio-economic devastation and environmental damage caused by natural hazards. - This strategy is based on three components: prevention, preparedness and protection. 	The project provides for the treatment of koris, which represent, at the site level, sources of risk of flooding and erosion at ground level
	National Agricultural Investment Plan (PNIA)	Niger's PNIA provides a comprehensive overview of the economy, structure and performance of the agricultural sector and provides a roadmap for the agricultural sector. The PNIA is a strategic plan covering the period 2011-2015, which outlines the costs and activities needed to achieve an annual growth of 7.4% for agricultural GDP by 2015. The general objective of the National Agricultural	The State's contribution to the financing of the activities of this project is (%)%.

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		Investment Plan is to "contribute to increasing and securing agricultural production in a sustainable manner with a view to improving food security".	
	Food and Nutritional Security and Sustainable Agricultural Development Strategy (i3N/SAN/DAD)	<p>Commonly known as the "3N Initiative", this strategy was adopted in 2012 and has the overall objective of "contributing to protecting the people of Niger from hunger and guaranteeing them the conditions for full participation in national production and the improvement of their income". It specifically aims to "strengthen national capacities for food production, supply and resilience to food crises and disasters". It is structured around 5 strategic axes which are:</p> <ul style="list-style-type: none"> - Increase and diversification of agro-sylvo-pastoral and fisheries production - Regular supply of agricultural and agri-food products to rural and urban markets - Improving people's resilience to climate change, crises and disasters - Improving the nutritional status of Nigerien men and women - - Animation and Coordination of the I3N. 	Through its activities, this project is in line with the objectives of the Food and Nutritional Safety and Sustainable Agricultural Development Strategy.
	Small Scale Irrigation Strategy in Niger (SPIN)	It constitutes the single framework for harmonization and programming of the small-scale irrigation sub-sector by grouping together all the actions in response to expressions of demand for strengthening the productive apparatus. The overall objective of the SPIN is to improve the contribution of small-scale irrigation to the achievement of food and nutritional security in Niger. It should make it possible to respond effectively to producers'	Through its activities, this project is in line with the objectives pursued by the Small Irrigation Strategy in Niger.

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		demands, harmonize approaches, set up mechanisms for easy access to financing, and define and respect environmentally sustainable development standards. The SPIN covers all the activities related to the development of small-scale irrigation in Niger, i.e. development, support upstream and downstream of production.	
	Updated Master Plan for Water Resources Development and Management	<p>The renewed Master Plan, whose action planning covers the period 2021-2040, is based on the results of the evaluation of the first phases 2016-2020 of PROSEHA and 2017-2020 of PANGIRE. It comprises multifaceted actions divided into five priority axes which are:</p> <ul style="list-style-type: none"> - improving knowledge of water resources; - meeting drinking water and sanitation needs; - increasing and protecting water resources; - water management in support of the production sectors; - restoration of the environment in support of plant production and the protection and/or preservation of water resources; - water governance. <p>It is the sole technical reference for the national Water and Sanitation Policy and Strategy document and serves as a support for the formulation of all plans and programs in this sector.</p>	The present project is an irrigation project operating on the basis of groundwater abstraction. Its implementation will therefore have to take into account the constraints and easements related to the use of water as defined in the master plan.
Biodiversity conservation and sustainable management of living natural resources	Niger Seed Policy	The main objective of this policy is to ensure the availability in quantity and quality of selected seeds to meet farmers' needs. It integrates a set of actions and measures capable of strengthening the different components of the seed sector in order to enable	The project provides for the supply of selected seeds to producers. Such an activity will have to be carried out in

GCF Performance Standards triggered	National Policies, Strategies, Plans and Programs	Summary	Links with the project
		<p>them to evolve harmoniously in the direction of the emergence of a reliable national seed industry. More particularly, it aims at: (i) regularly provide Nigerien producers with quality seeds of improved varieties in sufficient quantity, at the right time and at an affordable price; (iii) strengthen the institutional and legal framework of the seed sub-sector.</p>	<p>accordance with the provisions set up under the national seed policy.</p>

3.2. Legal framework

3.2.1. International legal framework

The international legal framework comprises, on the one hand, international conventions and agreements, treaties signed and/or ratified by Niger and, on the other hand, legislative and regulatory texts drawn up and adopted at the sub-regional level.

Stockholm Convention Adopted in Stockholm on 22 May 2001 and ratified on 12 April 2006

This Convention was adopted in 2001 and concerns the management of persistent organic pollutants. The Convention aims to protect human health and the environment from the effect of Twenty-one (21) POPs known to be highly toxic, nine of which are pesticides used to effectively control crop pests. Irrigated rice cultivation induces a high stress on the soil and therefore a high input of pesticides, herbicides, and other agricultural inputs, the project in its implementation will have to pay particular attention to prohibit the use of POPS listed by this convention for pest control.

Convention on Biological Diversity ratified on 25 July 1995 and signed on 26 December 1996.

The main objectives of the CBD are: (i) the sustainable management of biodiversity; (ii) the wise use of its components; (iii) the equitable sharing of economic benefits arising from the use of these biological resources. The CBD has the Cartagena Protocol on Biosafety adopted on 29 January in Montreal, Canada) and a financial mechanism (Global Environment Facility - GEF).

Convention to Combat Desertification adopted on 14 October 1994 and ratified on 19 January 1996.

Article 5 of the Convention requires countries affected by desertification to "give due priority to combating desertification and mitigating drought and to allocate adequate resources commensurate with their circumstances and capabilities; establish strategies and priorities, within the framework of sustainable development plans or policies, to combat desertification and mitigate the effects of drought; address the root causes of desertification and give special attention to the socio-economic factors contributing to this phenomenon".

United Nations Framework Convention on Climate Change signed on 11/06/92 and ratified on 25/07/1995.

The objective of the UNFCCC is to stabilize greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with the climate system so that ecosystems can adapt naturally to climate change, food production is not threatened and economic development can proceed in a sustainable manner.

Bamako Convention adopted on 30 January 1991

Ban on the import into Africa of hazardous and radioactive wastes and on the control of transboundary movements and management of hazardous wastes generated in Africa

Convention concerning the Protection of the World Cultural and Natural Heritage signed on 16 November 1972 in Paris by Niger

In Article 4, "Each State Party to this Convention recognizes that the obligation to ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural [...], scientific and technical heritage".

Paris Climate Agreements resulting from the Conference of the Parties (COP 21) adopted on 12 December 2015

The first universal climate agreement, it follows the negotiations held at the Conference of the Parties to the United Nations Framework Convention on Climate Change.

Niger Basin Water Charter and its Annex 1 on environmental protection, ratified by Niger on 30 December 2008.

The objective of this Charter is to promote cooperation based on solidarity and reciprocity for a sustainable, equitable and coordinated use of the water resources of the Niger River Basin. It covers all the activities devoted to knowledge, governance, preservation, protection, mobilization and use of the water resources of the Niger Basin. Its annex 1 on environmental protection adopted in 2011 contains provisions relating to environmental and social assessments (chapter 3), pollution control (chapter 4), the fight against land degradation (chapter 6) and the quantitative and qualitative protection of water resources (chapter 8), among others.

Regulation C/REG.3/05/2008 on the harmonization of rules governing the approval of pesticides in the ECOWAS region of 03 May 2008.

It sets up a common regulatory framework for pesticides in the ECOWAS region. As the project is of an agricultural nature, it is likely that it will lead to the use of phytosanitary products, it is then important to respect the provisions of this regulation in the choice and use of these products.

Ramsar Convention

The RAMSAR Convention on Wetlands of International Importance as Waterfowl Habitat aims to stop the encroachment on and loss of wetlands of all kinds and to encourage member countries to protect wetlands by including these sites on a list of areas to be maintained by the convention. It was signed on 11 February 1971 and ratified on 30 April 1987 and consolidated by its Protocol on 3 December 1982. As a follow-up to the commitments of this convention, Niger has listed more than a dozen representative sites of major ecological importance for the migration of migratory species and the survival of indigenous species.

Vienna Convention

Articles 2 and 3 specify that the Parties shall co-operate in the field of research into substances and processes that modify the ozone layer, the effects on human health and the environment of such modifications and alternative substances and technologies, as well as in the systematic observation of changes in the state of the ozone layer. The Convention was followed by a Protocol allowing for more concrete actions by all Parties.

Rotterdam Convention

The objective of the Convention is to promote shared responsibility and cooperation among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm, and to contribute to the environmentally sound use of such chemicals by facilitating the exchange of information on their characteristics, by establishing a national decision-making process for their import and export and by making such decisions publicly available to Parties.

The Convention applies to pesticides and chemicals that are banned or severely restricted by Parties for reasons related to the protection of health or the environment. Any severely hazardous pesticide formulation whose use poses a risk within the territory of a developing country or a country with an economy in transition may also be listed.

The African Convention on the Conservation of Nature and Natural Resources (signed on 09.10.1969 and ratified on 26.02.1970)

Its objectives are: to improve environmental protection; to promote the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these areas with a view to establishing development policies and programs that are environmentally sound, economically sound and socially acceptable.

3.2.2. National legal framework

The National Legal Framework is presented in Table 6.

Table 6 : Compliance of national legal framework with GCF Performance Standards triggered

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Assessment and management of environmental and social risks and impacts	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 31 of the Act stipulates that: "Development activities, projects and programs which, by virtue of their size or their impact on the natural and human environment, may adversely affect the latter shall be subject to prior authorization by the Minister responsible for the environment [...]"	The sub-projects of this project will be subject to in-depth ESIA's in order to comply with the legal and regulatory provisions relating to environmental assessment in Niger.
	Law n°2018-28 of May 14, 2018 determining the fundamental principles of Environmental Assessment in Niger.	Article 7 of the present law stipulates that "on the proposal of the minister responsible for the environment, the Council of Ministers shall establish and revise by decree the types of policies, strategies, plans, programs and the list of development projects for which the public authorities may not, on pain of invalidity, decide, approve or authorize implementation without a certificate of environmental conformity issued by the minister responsible for the environment or a written authorization duly justified in accordance with the texts in force".	
	Decree n°2019-027 of January 11, 2019, implementing Law n°2018-028 of May 14, 2018, determining the fundamental principles of Environmental Assessment in Niger.	The appendix of decree n°2019-027 of January 11, 2019, relating to the modalities of application of law n°2018-028 of May 14, 2018, determining the fundamental principles of Environmental Assessment in Niger, stipulates that any construction, extension and or rehabilitation of hydro-agricultural development of less than 1000 ha is classified in category B.	The developments planned in each commune all have a total area of less than 1000 ha. Therefore, in accordance with this decree, the project is classified in category B.

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Workforce and working conditions	Law n°2012-45 of 25 September 2012, on the Labor Code of the Republic of Niger	Article 4 of the Labor Code prohibits forced or compulsory labor. According to paragraph 5, the following is not considered forced or compulsory labor: "any work performed in the family environment by children which does not endanger their development and fulfilment. "Chapter II of this Code deals with occupational health and safety.	The PMU will make sure that the provisions of this labor code are respected when employment contracts are signed. Within the framework of the present project, the ESIA's of each sub-project will specify hazardous work for children, such as landscaping work, construction and maintenance of infrastructure, transport of heavy loads (harvesting or other) and those that do not constitute a risk but for which supervision of the child is required (e.g. weeding, ridging, planting, harvesting)
	Law n°2018-22 of 27 April 2018 determining the fundamental principles of social protection	Its purpose is to guarantee social protection to persons at risk of vulnerability and vulnerable persons in accordance with the National Social Protection Policy.	In the project area, there are vulnerable and disadvantaged groups; their consideration through the project activities will be done in accordance with the strategic orientations of the National Social Protection Policy.
	Order No. 93-13 of 2 March 1993 establishing the Public Health Code of the Niger.	This Order defines the concept of waste and prescribes general provisions on the protection or holding of waste that may harm the natural environment. When project activities will produce waste according to their specificities, they will comply with the provisions of this code.	All measures to guarantee the health of employees and local residents, including measures relating to the management of waste, nuisances, risks of all kinds, etc., must be taken at the various stages of project implementation.

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Rational use of resources and pollution prevention	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 3 of chapter 2 of this law sets out the principles of rational management of the environment and natural resources. These principles are: prevention, precautionary principle, polluter-pays principle, responsibility, participation and subsidiarity. According to article 97 of the framework law, there is provision for a prison sentence of 6 months to two years and/or a fine of CFAF 5 to 50 million for anyone who : (i) Without an impact study, has carried out development projects or programs requiring an impact study. (ii) has carried out the above-mentioned operations in violation of the criteria, standards and measures laid down by the impact study. Article 98 also provides for sanctions against any natural or legal person who has polluted, degraded the soil, altered the quality of air or water. According to the framework law: section 3, article 52 "the soil, subsoil and the wealth they contain, as limited resources, renewable or not, are protected against any form of degradation and managed in a rational manner". Article 56: "are subject to prior joint authorization by the minister concerned and the minister responsible for the environment, the use and development of land for agricultural purposes [...] likely to harm the environment".	The implementation of the ESIAs of the sub-projects falls within the framework of this law.
	Law N°2004-040 of 08 June 2004 on the forest regime of Niger	Forest resources are a national asset and, as such, everyone is obliged to respect and	In the event that the implementation of the project involves felling of trees, the

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		contribute to their conservation and regeneration.	provisions in force shall apply, in particular Articles 33 and 48.
	Law n°2015-35 of 26 May 2015 on plant protection	Article 21 of chapter 5 states that: "A pesticide may not be placed on the market and used in the national territory unless it has a provisional authorization for sale. The importance of a pesticide is subject to a conformity check".	The project provides for the use of fertilizers and pesticides.
	Order n°2010-09 of 1 April 2010 on the water code	Article 9 of Title II requires that water management should aim to ensure the sustainable, equitable and coordinated use of water resources.	The provisions of this code apply to a project that is an irrigation project.
	Decree 2011-404/PRN/MH/E of August 31, 2011 determining the nomenclature of facilities, installations, works and activities subject to declaration, authorization and concession of water use.	Article 1: This decree determines the nomenclature of developments, installations, works and activities subject to declaration, authorization and concession for water use, as set out in the annex.	The present project is a total water control development with a surface area of more than 25 ha and is therefore subject to an "Authorization with EIA".
	Order n°93-014 of March 2, 1993 amended by Law n°98-041 of December 7, 1998 relating to the water regime.	Article 2 of this Law provides that all water use, creation, modification and use of hydraulic works must be designed within the framework of the hydrogeological basin in order to cause the minimum disturbance to the hydrological cycle, water quantity and quality.	The provisions of this Order must be observed when locating the sites of sub-projects and their dimensioning.
Community Health, Safety and Security	Law n°2001-32 of 31 December 2001 on the Orientation of the Regional Planning Policy	It aims to reduce intra- and inter-regional disparities through better coverage of the population's basic needs, particularly in terms of food, health, education, drinking water and housing.	The activities of this project will contribute to the achievement of some of the objectives of the national spatial planning policy. The location of the project sites will have to take into account the different land uses as

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
			defined in local, departmental and regional land use plans.
	Law n°2018-22 of 27 April 2018 determining the fundamental principles of social protection	It aims to guarantee social protection to persons exposed to the risks of vulnerability and to vulnerable persons in accordance with the National Social Protection Policy.	In the project area, there are vulnerable and disadvantaged groups; their consideration through the project activities will be in accordance with the strategic orientations of the National Social Protection Policy.
	Order No. 93-13 of 2 March 1993 establishing the Public Health Code of the Niger.	This Order defines the concept of waste and prescribes general provisions on the protection or holding of waste that may harm the natural environment. When project activities will produce waste according to their specificities, they will comply with the provisions of this code.	The management of waste, particularly solid and liquid waste generated by the project's activities will be carried out in accordance with the provisions of this code and other regulatory texts on the subject.
	Order No. 2010-54 of 17 September 2010 on the General Code of Territorial Communities as amended and supplemented by Order 2010-76 of 9 December 2010	Art. 163: "Local authorities may benefit from the State the transfer of competences in the following fields: land and property; land planning and development; town planning and housing; environment and management of natural resources; equipment, ».	The implementation of the sub-projects' ESMPs will be carried out in consultation with the regional, departmental, communal and village authorities.
	Order No. 93-15 of 2 March 1993 on the guiding principles of the Rural Code	It determines the setting up of land commissions in order to promote equitable access to natural resources, a sustainable settlement of conflicts, securing agricultural and pastoral investments for a sound management of common natural resources in case the project activities should require these aspects.	The provisions of this ordinance will have to be respected when registering and allocating plots to the project beneficiaries

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
Biodiversity conservation and sustainable management of living natural resources	Law 98-07 of 29 October 1998 establishing the hunting and wildlife protection regime.	Art. 8 - The following are prohibited throughout the national territory: - hunting outside opening periods; - hunting on board motorized vehicles or any vehicle except boats; - hunting with fire, nets and pits; - hunting and capture with drugs, poisoned bait, fixed rifles, explosives, weapons and munitions of war; - hunting at night with or without lighting devices. However, the Ministry responsible for wildlife, on the basis of a reasoned opinion from the Technical Directorate for Wildlife, may exceptionally authorize, under the supervision of the technical services in charge of wildlife, prohibited hunting methods for the protection of persons and property, the capture of live animals for the repopulation of certain national parks and reserves or for scientific purposes. Any authorization which does not conform to the technical advice is null and void.	During the phase of site development work and the opening of access roads, workers may engage in poaching activities.
	Law No. 2015-35 of 26 May 2015 on plant protection	It repeals Order No. 96-008 of 21 March 1996 on Plant Protection. This legislation introduces the following main innovations: - adaptation to regional, sub-regional and international texts; - the taking into account of all activities related to the phytosanitary protection of the national territory, to the management of pesticides; - the clarification that the State guarantees the protection of plants throughout the national territory;	The project provides for the use of fertilizers and pesticides.

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		- the institution of the oath and the specification of the competent jurisdiction; - the introduction of new forms of infringement of the Plant Protection Act and their repression.	
	Law N°2004-040 of 08 June 2004 on the forest regime of Niger.	Forest resources are a national asset and, as such, everyone is obliged to respect and contribute to their conservation and regeneration.	In the event that the implementation of the project results in the felling of trees, the provisions in force shall apply, in particular Articles 33 and 48.
	Act No. 98-56 of 29 December 1998, establishing a framework law on environmental management.	Article 3 of Chapter 2 of this Act sets out the principles for the rational management of the environment and natural resources. These principles are: prevention, precautionary principle, polluter-pays principle, responsibility, participation and subsidiarity.	The sub-projects of the present project will be subject to in-depth ESIA's in order to comply with the legal and regulatory provisions relating to environmental assessment in Niger.
Cultural Heritage	<ul style="list-style-type: none"> • Law No. 97-002 of 30 June 1997 on the protection, conservation and presentation of the national cultural heritage • Decree No. 97-407/PRN/MCC/MESRT/IA of 10 November 1997 laying down detailed rules for the application of Law No. 97-002 of 30 June on the Protection, Conservation and Presentation of the National Cultural Heritage 	<p>This Law determines the fundamental principles of the legal regime for the protection, conservation and development of the national cultural heritage. It defines and sets out the general rules applicable to the protection, conservation and development of the national cultural heritage:</p> <p>protection of monuments, cultural property, groups of buildings and sites, their identification, classification, presentation and rehabilitation;</p> <p>archaeological excavations and chance discoveries;</p> <p>import, export and international transfer of cultural property.</p> <p>It defines the mission, prerogatives and composition of public services for the</p>	The provisions of this law and its decree are applicable to sub-projects in the event of accidental discoveries.

GCF Performance Standards triggered	Corresponding national regulations		Application to the project
	National text promulgating the standard	Relevant passages	
		protection, conservation and presentation of the national cultural heritage. It establishes the penalties applicable to infringements, laws and regulations relating to the protection, conservation and presentation of the national cultural heritage.	

3.2.3. Institutional framework for environmental management

The institutional framework for environmental management concerns the National Public Institutions that must be involved in the implementation of project activities. Their interventions must take the form of environmental monitoring, assistance and support during the implementation of the said activities. The institutions are described as follows.

The National Environmental Council for Sustainable Development

Created by Decree No. 96-004/PM of 9 January 1996 amended and supplemented by Decree 2000-272/PRN/PM of 4 August 2000, the CNEDD is a deliberative body whose mission is to develop, implement, monitor and evaluate the implementation of the PNEDD. It is mainly responsible for ensuring that the environmental dimension is taken into account in Niger's socio-economic development policies and programs.

The Ministry of Environment, Urban Sanitation and Sustainable Development (MESUDD)

At the national level, environmental management is the responsibility of the Ministry of the Environment, Urban Sanitation and Sustainable Development, which is responsible for drawing up and implementing environmental policy. This ministry is organized through Decree n°2018-745 /PRN/ME/SU/DD of October 19, 2018 in central administration, decentralized technical services, decentralized services, public programs and projects. Within the framework of the project, the services mainly involved are: the National Environmental Evaluation Office (BNEE), the Directorate General for Sustainable Development and Environmental Standards and the Directorate General for Water and Forestry (DGEF).

The National Environmental Assessment Office

It is the national structure responsible for the administrative management of the country's environmental assessment procedure. It is an environmental assessment decision support body that has jurisdiction, at the national level, over all activities, projects, programs or development plans for which an EIA is mandatory or necessary in accordance with the provisions of Law No. 2018-28 of 14 May 2018 determining the fundamental principles of environmental assessment in Niger. Its missions include, among others, the following: (i) to conduct environmental inspections in order to enforce the laws and regulations on environmental assessment and to ensure compliance with the related requirements and (ii) to ensure the conformity control of the planned works and the environmental and social protection standards (...).

Within the framework of the project, the EEB will be a key player in monitoring its implementation, in particular to ensure compliance monitoring of the works and environmental and social protection standards.

Other institutions involved in environmental and social management

Several national, regional and local institutions and structures are involved in the preparation, implementation and environmental monitoring, the most important of

which are: the Ministry of Agriculture and Livestock (created by Decree No. 2016-207/PRN of 11 May 2016), which is responsible for overseeing this project, the Ministry of Hydraulics and Sanitation (created by Decree No. 2016-207/PRN of 11 May 2016).), the Ministry of Public Health (created by Decree No. 2016-207/PRN of 11 May 2016), the Ministry of Territorial Planning and Community Development (created by Decree No. 2016-207/PRM of 11 May 2016), the Ministry of Employment, Labor and Social Security (created by Decree No. 2016-208/PM of 11 May 2016), the Ministry in charge of Mines. There are also the Target Communes, development programs and projects in the targeted communes.

CHAPTER IV: DESCRIPTION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS OF THE PROJECT

4.1. Methodology for Impacts Identification

The methodological approach adopted to identify the impacts is based on the analysis of possible interactions between the project activities and the receiving environments (biophysical environment and human environment). This analysis made it possible to relate the sources of impacts associated with the construction phase and the operation phase to the various components of the environment likely to be affected (soil, water, air quality, wildlife, jobs, health and safety, etc.). Thus, for each environmental component, an inventory of the sources of impacts according to the different phases and activities of the project was carried out. This approach made it possible to take into account, for a given environmental component, all the sources of impacts likely to modify it.

4.1.1. Activities - sources of Impact

The sources of impact during the construction and operation phases are presented in Table 7.

Table 7: Activities - sources of impact

Phases	Activities- sources of impact
Construction	<ul style="list-style-type: none">• Installation and removal of the site• Clearing and stripping of soils• Opening and exploitation of quarries and borrow sites• Layout of plots and soil preparation• Drilling of boreholes and their equipment• Rehabilitation/construction of service roads• Construction of irrigation networks• Construction of drainage networks• Construction of crossing structures• Installation of solar equipment• Treatment of koris and gullies• Realization of anti-erosion works and tree planting around and in the sites
Operation	<ul style="list-style-type: none">• Operation and maintenance of solar installations• Maintenance of irrigation and drainage works• Water Resources Extraction/ withdrawal• Use of agrochemicals

4.1.2 Identification of Potentially Affected Environmental Components

The environmental components potentially affected by the project activities are: air, surface water, groundwater, soil, landscape, flora and fauna in the biophysical environment and health, safety, mobility, gender, socioeconomic activities and income in the human environment. The matrix of interactions between these environmental

components and the project activities are presented in Table 8. Positive impacts are marked (+) and negative impacts are marked (-).

Table 8: Matrix of interactions between project activities and environmental components

		Environmental Components													
		Biophysical Environment							Human Environment						
		Soil	Air	Surface Water	Groundwater	Landscape	Flora	Wildlife	Health	Safety	Mobility	Gender	Cultural Resources	Economic Activities	Income
(+)		Positive impact													
(-)		Negative impact													
PHASES	Project Activities														
CONSTRUCTION	Installation and removal of the site	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)				
	Clearing and stripping of soils	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)						
	Opening and exploitation of quarries and borrow sites	(-)	(-)	(-)	(-)	(-)	(-)	(-)		(+)			(-)	(-)	(+)
	Layout of plots and soil preparation	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)		(-)			
	Drilling of boreholes and their equipment				(-)				(-)	(-)			(-)		
	Rehabilitation/construction of service roads	(-)	(-)	(-)			(-)	(-)		(-)	(-)			(+)	
	Construction of irrigation networks	(-)	(-)						(-)	(-)					
	Construction of drainage networks	(-)	(-)				(-)	(-)		(-)					
	Construction of crossing structures	(-)					(-)	(-)		(-)	(-)				
	Installation of solar equipment									(-)					
	Treatment of koris and gullies	(+)		(+)						(-)					
	Realization of anti-erosion works and tree planting around and in the sites	(+)					(+)	(+)							
OPERATION	Operation and maintenance of solar installations		(+)											(+)	(+)

	Maintenance of irrigation and drainage works	(+)			(+)										
	Water Resources Extraction/ withdrawal				(-)										
	Use of agrochemicals			(-)	(-)				(-)						

4.2. Description of Project Impacts

The impacts of the project on the various components of the biophysical and human environment are presented in Table 9.

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
CONSTRUCTION PHASE				
Soils	Site development work (clearing brush, parceling out, construction of pipeline works, etc.)		Modification of the soil structure	This is mainly due to soil compaction caused by the maneuvering and circulation of construction equipment and trucks. These maneuvers and traffic often spill over the tracks and reserved lanes and affect crop fields located on the edges of the roads or at the level of the material collection sites. This compaction locally modifies the structure of the soils resulting in a reduction in their capacity to infiltrate rainwater.
	Opening of access roads to the sites		Loss of arable land	Lateritic sand extraction sites for runway rehabilitation/construction are often located on arable land with good agronomic qualities. The opening and operation of quarries on these sites thus represents a source of reduction in the amount of arable land in the project area
Air	<p>Site development work (clearing brush, parceling out, construction of pipeline works, etc.)</p> <p>Opening of access roads to the sites</p> <p>Gas emissions from construction machinery.</p>		Air Pollution	The cleanup of site areas, the collection and disposal of site waste to appropriate sites, the earthworks, and the movement of trucks and construction machinery will result in the release of dust particles during windy and dry weather, which may significantly increase the usual level of particulate pollution in the project area. Exhaust fumes from construction trucks constitute another source of air pollution during construction.

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Surface and groundwater	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites Use of chemical products by construction equipment		Pollution of surface and groundwater	This pollution will be caused by accidental discharges or uncontrolled leaks of oil, fuel and grease, but also in the absence of an appropriate waste management system, by the discharge into the environment of various chemical products, food and drink packaging, etc. In addition to the associated effect of clutter and ugliness of the landscape, this pollution may affect the quality of surface water (transfer of chemical pollutants by rainwater runoff) and groundwater (transfer of chemical pollutants by percolation and/or infiltration of rainwater).
	Drilling of boreholes		Poor siting of boreholes	In the same watershed, the productivity of boreholes varies depending on their location but also on a number of parameters such as transmissivity, depth, static level, thickness of the weathering layer, etc. It is even possible to fall, in the same basin, on non-productive boreholes, which can give rise to less quantities of water mobilized than those foreseen by the project
Landscape	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Landscape Modification	The landscape will be modified to a greater or lesser extent as a result of the cutting of trees and shrubs on the project sites. These modifications may also be caused by the opening of new access roads to certain sites and by the extension of the material borrow areas (sand, gravel)

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Flora	Site development work (clearing brush, parceling out, construction of pipeline works, etc.)		Loss of vegetation cover and wildlife resources	The clearing of rights-of-way for development and infrastructure will result in the cutting down of trees and shrubs on the sites, causing a reduction in local vegetation and a temporary or permanent displacement of certain wildlife species. Similarly, the rehabilitation and/or construction of access roads to the sites as well as the extension or opening of new quarries for the extraction of materials will result in the destruction of the vegetation cover
	Opening of access roads to the sites		Reduction of grazing areas nationally	The new AHAs to be developed cover a total area of 1001 ha which will be definitively subtracted from the total area of the country's grazing areas. The shortage of fodder thus created can disrupt, in certain localities, the activities of the indigenous peoples who are, in their great majority, transhumant herders.
Wildlife	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Disturbance, destruction of wildlife habitat and poaching	Noise generated by the presence of workers and the movement of construction equipment and trucks may cause some species to be temporarily displaced from the sites during the construction phase. Expansion of old material collection sites or the opening of new sites will result in further destruction of vegetation cover representing wildlife habitat. Poaching by the workers for commercial purposes or for personal consumption on the construction sites is also a disruptive factor in the natural wildlife regulation system of the area.
Health and safety	Site development work (clearing brush, parceling out, construction of pipeline works, etc.) Opening of access roads to the sites		Health and safety of workers and the population	The safety and health of workers and people living around the sites may be affected by the project activities. Indeed, in the absence of appropriate personal protective equipment (PPE) such as boots, gloves, muffs, etc., workers will be exposed to the risk of injuries and accidents at work and to respiratory ailments. The presence of workers from other regions, departments and communes in the village-sites often leads to unprotected sexual relations, which can lead to the contamination of the local population with sexually transmitted diseases such as HIV-AIDS. The movement of construction equipment and trucks can also cause traffic accidents in the open country or when crossing towns.

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Mobility	Opening of access roads to the sites		Traffic disruption	The movement of people in the project area will be slightly disrupted by the rehabilitation of existing trails or the construction of new access trails to the sites. These disturbances will be temporary.
Gender			Risk of discrimination and marginalization of certain social groups in terms of employment	Most of the time, the companies in charge of carrying out the work only hire able-bodied men and young men who can perform difficult and sometimes strenuous manual work, leaving out women, young people and disabled people who are considered unfit.
			Potential risks of sexual exploitation, abuse and harassment	Psychological/emotional abuse, rape, sexual assault, physical assault, forced marriage, and denial of resources, opportunities, or services are common phenomena in Niger and can be observed during project implementation, both during the construction and operation phases. According to the "Study on the scope and determinants of gender-based violence in Niger", the prevalence rate of all types of violence, regardless of gender, is 53%. The national prevalence of GBV is 28.4%. Women are victims of numerous forms of violence, especially physical (29%), sexual (20%), early or forced marriages (14%) and lack of access to their own resources (22%).
Cultural Resources	Site development work (clearing brush, parcelling out, construction of pipeline works, etc.)		Unintentional destruction of archaeological remains	It is possible to discover prehistoric objects of cultural value to be protected during the works. The implementation of the project will strongly contribute to the creation of jobs and to the improvement of the income of the local populations during the construction phase as well as during the exploitation phase. In fact, during the construction phase, all unskilled labor will be recruited from the local population in the intervention zone. Similarly, the presence of the construction sites in the villages where the work is being implemented will encourage the development of small commercial activities that can contribute to improving the income of the local population.
Economic activities and income	Overall work	Job creation and income improvement		

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
OPERATION PHASE				
Soils	Development of sites and Installation of technical equipment	Improvement and/or maintenance of soil quality		Strengthening the support of technical services and training producers in good input use and soil conservation practices will help maintain and/or improve soil quality. This will improve agricultural yields.
	Use of agrochemical inputs (fertilizers, pesticides, etc.)		Soil salinization	Salinization is the phenomenon that occurs when salts contained in irrigation water are deposited in the soil to the point of making the soil totally or partially infertile. Salinization can have several origins, among which the saline facies of the soil, the excessive use of chemical fertilizers, too much irrigation water, insufficient irrigation that allows salts to settle in the soil, or excessive irrigation that causes waterlogging and the rise of the water table by capillary action toward the rhizosphere. The phenomenon can also result from direct evaporation from the soil in areas where the evaporation potential is greater than that of precipitation. Soil salinization mainly affects arid or semi-arid areas; it hardly exists in humid areas.
Ecosystem services	Use of agrochemical inputs (fertilizers, pesticides, etc.)		Disruption of ecosystem services	<p>Misuse of agrochemicals can have serious consequences on all ecosystems and disrupt ecosystem services. Nitrates from nitrogen fertilizers are responsible for the pollution of surface and ground water. The elements that are not consumed by plants can harm the immediate ecosystem, the fauna (earthworms...) and the micro-organisms (bacteria, fungi...) present in the soil.</p> <p>After their application, pesticides could end up in the air, the soil, and the aquatic environment. They can thus directly and indirectly impact ecosystems and represent a major factor of incidence on biological diversity. The consequences of the use of pesticides are:</p> <ul style="list-style-type: none"> -disruption of nitrogen fixation by leguminous plants; -diminution of plants in the fields; -direct or indirect poisoning of organisms; -reduction of the food supply (weeds, seeds, insects) and therefore of the species that feed on them

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Air	Solar Energy production	Reduction of GHG emissions		Equipping the AHAs with solar energy will reduce the consumption of fossil fuels. According to the available data, the consumption of fossil fuel is 20 l/ha/day. The pumps are used for an average of 100 days which corresponds to the three months of the campaign. Pumping is carried out 1 day out of 2, i.e. 50 days of effective use. On this basis, the average consumption per hectare per crop year is estimated at 1,000 liters. On 1500ha the fuel consumption amounts to 1,500,000 liters in the off-season. Considering that only half of this is consumed during the normal season, i.e. 750,000 liters, annual consumption amounts to 2,250,000 liters of fossil fuel per year. This is equivalent to 67.5 million liters over 30 years, corresponding to the life of the solar panels.
		Fossil fuel consumption reduction		

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Ground water Surface water	Solar pumping and Irrigation of the plots	Sustainable management of groundwater resources		The irrigation system considered for the project is the Californian system with buried PVC pipes. This will enable a much more rational and efficient management of water resources than the current gravity system or the semi-Californian system. Indeed, the irrigation system currently practiced on the AHA is made up of open canals whose irrigation yield is estimated at 60%. With an average requirement of 15,000 m ³ per hectare of rice, the water pumped from the source and returned to the area is 25,000 m ³ per hectare. The water loss is 10,000 m ³ per hectare per season, or 20,000 m ³ per year for two seasons. These current practices are therefore not resilient and their adoption in the current project would lead to an annual loss of 30 million m ³ for the 1,500 ha to be developed. On the other hand, the Californian system promoted in this project has a yield of 85% compared to 60% in the current system, a gain of 25%. The water losses avoided will therefore be 6,250 m ³ per hectare, or 12,500 m ³ per hectare per year. The water saving with the irrigation system proposed in this project will be 18,750,000 m ³ per year for the 1,500 ha to be developed.
			Lack of effective water management mechanisms	The lack of a system to control and maintain the operation of water collection and distribution equipment can waste the resource through uncontrolled leaks. Such a situation can lead to higher water extraction rates / volumes than expected
	Irrigation of the plots		Pressure on irrigation water	A full analysis was conducted on the project's impacts on water (Please, see Annex 28 Analysis of the Pressure of Irrigation Water Withdrawals from the Hydro-agricultural Development Project with Climate Smart Agriculture Practices on Groundwater Resources in Niger. See also the Word file " Irrigation water AHA-IAC Niger Water stress Analysis 11-12-2020 " associated on the Sheet " Water stress

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
				analysis of the Annex 28's Excel file. As a result of this analysis, it was determined that the project will not have a significant negative impact on water resources.
	Discharge of drainage water into the environment		Pollution and degradation of surface water, groundwater and soil quality	The discharge, without prior treatment, of drainage water, loaded with residues of agricultural inputs, into nature or watercourses entails a risk of pollution and degradation of the quality of surface water, groundwater and soils in areas located downstream of irrigated areas.
	Livestock watering		Lack of water points for watering livestock	To avoid damage to crops, the irrigated perimeters will be screened, at the same time preventing local breeders from coming to water their livestock there despite the permanent availability of water. Nomadic pastoralists will also be excluded from this benefit of the project.
Landscape	Loss of natural landmarks (trees, groves)		Landscape Modification	Throughout the operation phase of the project, the existing natural landscapes with features (trees, groves, etc.) that serve as orientation markers will be replaced by new developed landscapes characterized by the presence of irrigation infrastructure and crop fields as far as the eye can see. The disorienting effect associated with this change will be temporary and will only be observed during the first years of the project.
Flora	Reforestation around developed sites	Wildlife habitat restoration		Reforestation in and around the sites will result in the restoration of wildlife habitat.
	Sites' irrigation and drainage		Invasive plant proliferation	The large influx of water into the arid or semi-arid areas of the project will create local microclimates favorable to the proliferation of invasive plants both in the irrigated areas and downstream of these areas, along the drainage channels. Seven invasive plants, including four (4) in drained areas (<i>Prosopis juliflora</i> , <i>Sida cordifolia</i> , <i>Calotropis procera</i> and <i>Pergularia tomentosa</i>) and three (3) in aquatic areas (<i>Mimosa pigra</i> , <i>Eichornia crassipes</i> and <i>Typha australis</i>), have been identified in Niger. The spread of these invasive species is done through the transport of their seeds by the wind or by livestock. Particular attention should be paid to <i>Typha australis</i> which tends to invade drains and canals.

Table 9: Project Impacts

Affected environmental components	Activities-sources of impact	Positive Impacts	Negative Impacts / risks	Description of the Impact
Health	Manipulation of agrochemical inputs (fertilizers, pesticides, etc.)		Population health damage	The manipulation of agrochemical inputs presents risks to the farmers' health. They may be exposed to poisoning if they do not follow the instructions for using pesticides, especially when they do not have appropriate personal protective equipment or when this equipment is not in good condition. In addition, the continuous presence of water in the project areas could lead to the development of breeding grounds for mosquitoes, which are malaria vectors, and the use of this irrigation water for domestic consumption during the dry seasons could cause intestinal infections (bilharzia, amoebic dysentery, etc.).
	Farming work (sowing, weeding, harvesting, etc.) (Sowing, weeding, harvesting, etc.)		Child employment, Forced labor	Under normal circumstances, children help their parents with household chores and some farm work. Some parents may use this as an excuse to force their children to help with the activities of this project (e.g., harvesting and post-harvest activities, etc.).
Cultural Resources	Ploughing work Maintenance of technical installations		Unintentional destruction of archaeological remains	It is possible to discover prehistoric objects of cultural value to be protected during the ploughing or maintenance of technical installations (irrigation and drainage networks).
Economic activities and income	Solar power generation	Reduction of energy bills		With both power sources currently used by producers (fossil fuel and electric power), the energy bill represents an average of 60 and 45% of production costs, respectively. The implementation of the project will enable the beneficiaries to considerably reduce this bill. The services offered in terms of energy are almost free of charge, with the exception of provisions for maintenance and depreciation of technical equipment and installations.
	Increase of agricultural production	Improvement of food security		The rehabilitation of 500 ha and the development of 1,000 new hectares will increase the availability of food both at the farmer level and at the national level, which will help support food security and improve nutrition. The implementation of the project will result in the annual production of 30,200 tons of food products.

CHAPTER V. DESCRIPTION AND PROPOSAL OF MEASURES

5.1.Measures to mitigate and avoid negative impacts and risks

Mitigation/avoidance measures for the negative impacts and risks of the project are presented in table 10.

Table 10 : Measures to mitigate and avoid negative impacts and risks

Triggered Performance Standards	Potential impacts / risks	Avoidance / Mitigation Measures
PHASE OF CONSTRUCTION		
Assessment and management of environmental and social risks and impacts	Risk of non-compliance with performance standards	Comply with the measures recommended by the sub-project ESIA's.
Workforce and working conditions	Discrimination and marginalization of certain groups in employment	-Establish criteria for fair competition for hiring, -Respect the provisions of the Labor Code
	Child employment, Forced labor	Sensitize parents on the prohibition of child labor
Rational use of resources and pollution prevention	Modification of soil structure	Avoid overflowing the routes of quarry trucks and construction machinery on the surrounding fields by marking out the right-of-way and access roads to the borrow sites and make truck and machinery drivers aware of this.
	Loss of arable land	Proceed with the rehabilitation of borrow material sites as soon as the project is completed.
	Poor siting of boreholes	- On each site, carry out several pumping tests in the water tables present and only retain the borehole (s) with sufficient flow rates that can meet the water requirements of the project at all times.
	Air Pollution	- Avoid running the engines of trucks and machines when stationary. - Make truck drivers aware of the regular maintenance of their vehicles - Covering loads of powdery materials with tarpaulins - Watering the roads being rehabilitated/constructed
Community Health, Safety and Security	Potential risks of sexual exploitation, abuse and harassment	- Sensitize all project stakeholders and beneficiaries to issues of violence against women - Establish a mechanism for reporting and resolving cases of sexual exploitation, abuse and harassment - Implement the measures recommended in the project's Gender Action Plan

Triggered Performance Standards	Potential impacts / risks	Avoidance / Mitigation Measures
	Damage to the health and safety of workers and the population	<ul style="list-style-type: none"> - To make workers aware of the risks of accidents linked to the non-observance of safety instructions and their activities. - Equip all workers with personal protective equipment (boots, gloves, nose mask, helmet, etc.). - Equip the construction site basements with a first-aid unit equipped with basic necessities. - To sensitize the staff, workers and the population on the risks of contamination by sexually transmitted infections (STIs) and HIV-AIDS. - Raise awareness among the population and drivers of lorries and machinery about the risks of accidents when driving through built-up areas. - Develop and implement a contingency plan for each sub-project
	Traffic disruption	Avoid total blockage of traffic by providing temporary diversions if necessary.
Biodiversity conservation and sustainable management of living natural resources	Loss of vegetation cover	<ul style="list-style-type: none"> - When rehabilitating/constructing site access roads, tree felling should be limited to areas strictly necessary for the widening of roads and machinery movement. - Avoid spillover of quarry trucks and construction equipment onto the surrounding fields by marking the right-of-way and access roads to the borrow sites and sensitizing truck and equipment drivers in this respect. - Pay the felling tax in accordance with national regulations. - Redistribute the wood from the clearing of rights-of-way to the populations of the villages concerned. - Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of developed perimeter in the commune). - Offsetting losses of cash crops and trees with economic value (teak, doum palm, shea, date palm, néré...)
	Changing the landscape	Carry out selective tree cutting.
	Disturbance, destruction of wildlife habitat and poaching	<ul style="list-style-type: none"> - Mark out the work rights-of-way and avoid any unnecessary overflow, especially when opening new access roads to the sites. - Prohibit raiding and poaching practices by staff and workers
Indigenous Peoples	Reduction of grazing areas nationally	Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of perimeter developed in the municipality)
Cultural Heritage	Unintentional destruction of archaeological remains	Stop the work and put in place devices to secure the remains discovered and inform the competent authorities of the appropriate measures to be taken.

Triggered Performance Standards	Potential impacts / risks	Avoidance / Mitigation Measures
OPERATING PHASE		
Assessment and management of environmental and social risks and impacts	Risk of non-compliance with performance standards	Comply with the measures recommended by the sub-project ESIA's.
Workforce and working conditions	Child employment, Forced labor	Sensitize parents on the prohibition of child labor
Rational use of resources and pollution prevention	Soil Salinization	<ul style="list-style-type: none"> - Periodically monitor salt concentration levels in irrigation water - Ensure that drainage systems are in good condition and working order. - Soil leaching (remediation) after harvesting
	Disruption of ecosystem services	<ul style="list-style-type: none"> - Ensure effective implementation of the Integrated Pest Management Plan (IPMP) - Use only registered pesticides - Use non-chemical fertilizers - Raise awareness among project beneficiaries about the risks of soil, air and water pollution due to the massive and uncontrolled use of agrochemicals
	Pollution and degradation of surface and groundwater quality	<ul style="list-style-type: none"> - Lagoon drainage water before it is released into the wild.
	Lack of effective water management mechanisms	<ul style="list-style-type: none"> - Establish, on each site, a periodic maintenance system for water collection and distribution installations and equipment - Replace, as soon as possible, defective, damaged or dilapidated installations and equipment - Locally train, among the beneficiaries of the project, young technicians capable of urgently carrying out certain small jobs such as closing a valve and replacing a broken pipe letting water flow, etc.
Community Health, Safety and Security	Impacts on the health of populations	<ul style="list-style-type: none"> - Train and raise awareness among farmers on the optimal use of agrochemicals (nitrogen fertilizers) and on the harmful effects of phytosanitary treatments. - Sensitize the plant protection brigadiers on the wearing of protective equipment (nasal masks) when applying pesticides. - Inform and sensitize project beneficiaries on water-related diseases (malaria, typhoid fever, amoebic dysentery, etc.); - develop and implement the IFMP - Include the project site villages in the intervention program of the epidemiological surveillance system.
Biodiversity conservation and sustainable management of living natural resources	Proliferation of invasive plants and pests	<ul style="list-style-type: none"> - Regular weeding of the fields. - Cut and pull out unwanted seedlings - Development of an integrated pest and pesticide management plan

Triggered Performance Standards	Potential impacts / risks	Avoidance / Mitigation Measures
		- Use chemical or biological control in consultation with the specialized services of the Ministry of Agriculture (plant protection).
Indigenous Peoples	Lack of water points for watering livestock	Install, outside the irrigated perimeters, water points intended for the watering of the livestock of local herders and nomadic herders during their seasonal transhumance
Cultural Heritage	Unintentional destruction of archaeological remains	Stop the work and put in place devices to secure the remains discovered and inform the competent authorities of the appropriate measures to be taken

5.2.Measures to enhance positive impacts

The positive impact enhancement measures are presented in **Erreur ! Source du renvoi introuvable.11**.

Table 11: Positive impact enhancement measures

GCF Performance Standard	Positive impacts	Improvement measures
Phase of construction		
NP1: Assessment and Management of Environmental and Social Risks and Impacts	Compliance with GCF Performance Standards and national legislation	Conduct sub-project ESAs Ensuring proper implementation of the ESMPs, the PGIPP and the PAG
	Acceptance of the project by the beneficiary community and all stakeholders	Plan the public consultation well and adopt communication methods adapted to the different communities.
NP2 : Workforce and working conditions	Gender and equity mainstreaming in the implementation of activities	Ensure proper implementation of the Gender Plan of Action.
	Job creation and income improvement	-Respect the provisions of the Labor Code and the ILO conventions;
	Compliance with the provisions of the Labor Code	-Adopt the same level of wages for men, women and young people for the same level of work.
Operating phase		
NP1: Assessment and Management of Environmental and Social Risks and Impacts	Compliance with FVC performance standards and national legislation	Ensuring proper implementation of the ESMPs, the PGIPP and the GAP
NP2: Labor Force and Working Conditions	Gender mainstreaming and the process of integrating equity concepts in the execution of activities	-Ensure the proper implementation of the Gender Action Plan. -Ensure an equitable distribution of plots between men, women and young people.
NP3: Resource Efficiency and Pollution Prevention	Sustainable management of groundwater resources	Sustainable management of groundwater resources
	Improvement and/or maintenance of soil quality	Improvement and/or maintenance of soil quality

GCF Performance Standard	Positive impacts	Improvement measures
	Reduced energy bills	Reduced energy bills
	Reduction of GHG emissions	Reduction of GHG emissions
NP4: Community Health, Safety and Security	Improving food security	-Ensure the proper implementation of the recommendations of the ESMPs, PGIPP and PAG in order to achieve the project's objectives. -Ensure the achievability of the project through capitalization and sharing of lessons learned.
	Better access to energy for irrigation for all	Ensuring the proper operation and maintenance of solar equipment
NP6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Wildlife Habitat Restoration	-Planting hedges and compensatory reforestation, -Utilize endogenous species for reforestation

5.3.Capacity-building for the implementation of the measures

Capacity building of actors is necessary to ensure a good implementation of the measures of the ESMP, PGIPP and PAG. It will make it possible to technically equip the stakeholders so that they can play their roles effectively. It involves:

➤ Environmental and social measures foreseen by the project

The project has provided for relatively significant environmental and social measures, particularly in components 1 and 2, which include : natural resource management, the development and enhancement of irrigated areas, the fight against land degradation, the creation of added value through post-harvest operations and the implementation of a value chain approach integrating agricultural risks; the promotion of water-saving and low-cost irrigation technologies (Californian and drip), and the rational management of water resources; access to land and securing the land rights of beneficiaries, particularly women and young people; the fight against land and water degradation. However, taking into account the environmental issues of the project area will require strengthening the environmental and social management of the project through the measures described below.

➤ Institutional strengthening measures

The measures below are aimed at building capacity in environmental and social assessments; in human and material resources for intervention, environmental and social monitoring and follow-up, and gender mainstreaming:

Capacity building of the Project Management Unit

The project management unit set up to steer and monitor the implementation of the project will have to ensure the presence within it of the services of the Ministry of the Environment, Urban Sanitation and Sustainable Development, which will make it

possible to better take into account strategic orientations of an environmental nature and to guarantee compliance with environmental and social standards.

The Project Management Unit (PMU) has planned the recruitment of two Experts: (i) an Expert in Environmental Safeguards and Natural Resource Management (ESE/GRN) and (ii) an Expert in Social Safeguards and Gender (ESS/G) who will be responsible, among other things, for supervising the implementation of all environmental and social safeguard measures. These experts must be fully conversant with WADB safeguard policies and national environmental legislation.

Reinforcement of the environmental and social expertise of the communes and technical services

At the level of the beneficiary communes and the main technical services concerned (Agriculture, Livestock, Rural Engineering, Water and Forestry; Hydraulics, etc.), focal points will have to be designated and given full time responsibilities, particularly in the close monitoring of implementation. These Focal Points will also have to be strengthened, particularly in the control of the environmental and social safeguard policies of the FVC and national environmental legislation.

Impulse of levers to ensure gender mainstreaming

Gender mainstreaming will have to be based on a two-pronged approach aimed at : (i) strengthening women's organizational dynamics, so that they can specialize in certain agro-sylvo-pastoral sectors and have a more decisive influence in decision-making processes within families and the community; and (ii) providing women with local support/advice, with a view to promoting their access to credit and efficient management of the activities they carry out. Within this framework, they will benefit from training in the development of entrepreneurial skills and in the management of their economic activities.

5.4.Grievance Management Mechanism for the Project

Complaints and grievances will be managed at two levels: first informally at the local level and then, if unsuccessful, at the BOAD or GCF level.

➤ Local grievance management

At the local level, the management of complaints will be based primarily on existing practices that have proven to be effective. Public consultations have largely shown that the population prefers to resort to conciliation with customary leaders (village and canton chiefs) rather than legal proceedings.

Collection, processing and resolution of grievances

A notebook intended for the collection of grievances will be made available to the public at all times in each commune concerned by the work. The public will be informed about the permanence of the collections in this book, in particular by organizations (NGOs) specialized in this field.

Resolution mechanisms

The following mechanisms are proposed for the amicable resolution of conflicts that may arise:

- The first level of resolution is provided by the village chief assisted by the notables;
- the second level, in the event of failure of the first, is ensured by the Mayor of the commune concerned by the conflict;
- the third level, in the event of an impasse at the first two levels, involves the administrative authority.

➤ Grievance management at the BOAD and GCF level

The BOAD has established a grievance mechanism through its Grievance Policy and Procedures Manual which is an independent mechanism through which individuals who have been harmed as a result of a project financed or implemented by the BOAD can file a complaint. The grievance mechanism, which is available to stakeholders, is part of the Environmental, Social and Economic Sustainability to deal with non-compliance and grievance issues arising from projects implemented by the AfDB. This manual defines the complaint resolution mechanism in the implementation of any project financed or implemented by the BOAD. It is intended to establish an effective dialogue between those affected by the projects they finance and all interested parties to resolve the problem(s) giving rise to an application, without seeking to attribute responsibility or fault to any of these parties.

At the BOAD level, the grievance mechanism is coordinated and managed by the Compliance and Regulatory Division (CRD). Affected communities and other stakeholders who will be affected by the project may submit complaints to the AfDB, the implementing entity of this proposal, by mail, email, fax or telephone. The full address is given below:

Banque Ouest Africaine de Développement
62 av. de la Libération,
BP 1172 Lomé, Togo
Tel : +228 22 21 59 06
Fax : +228 22 21 52 67
E-Mail : boadsiege@boad.org
Web : www.boad.org

Complaints can also be lodged with the GCF secretariat.:

Songdo Business District
175 Art center-daero
Yeonsu-gu, Incheon 22004
Republic of Korea
+82.32.458.6059(KST)
info@gcfund.org

The procedures on how to submit a complaint are available on the BOAD website (www.boad.org) or directly at <https://www.boad.org/en/policies-procedures-guidelines/> (under "COMPLIANCE AND GRIEVANCE DOCUMENTS").

If the DCR finds that a complaint is admissible, it will assemble a team of internal and/or external experts to investigate the case and propose options for the complainant to consider.

BOAD has its own grievance management policy and procedure. However, to make this system operational and accessible at the local, municipal, regional, national and international level, to all project stakeholders, the consultant will prepare an indicative Grievance Redress Framework (See Appendix 1 Typical Subproject ESIA's ToR).

CHAPTER VI. ENVIRONMENTAL AND SOCIAL PROCEDURE OF THE PROJECT

In order to enable the integration of environmental and social dimensions in the design and implementation of sub-projects, it is essential to propose a process for assessing the environmental and social impacts of sub-projects, in order to identify and define the actors who will be responsible for their implementation and monitoring. Indeed, the process will be the approach that will determine the level and modalities of taking into account environmental and social impacts in the sub-project cycle. The formulation of the ESIA's and the implementation of the sub-projects' ESMP will be in line with the national ESIA procedures and the FVC Environmental and Social Performance Standards. Before the beginning of the subprojects Environmental and Social Impact Assessment, it will be prepared the stakeholders engagement plan to be approved by the Project Management Unit (See Appendice 1 Typical Subproject ESIA's ToR).

Step 1: Environmental and social screening of the sub-projects and formulation of terms of reference for carrying out sub-project ESIA's

The beneficiaries, through the consultant hired for the formulation of the sub-projects and the carrying out of the environmental and social impact studies, will prepare an opinion of the sub-projects. In accordance with the environmental and social policy of the Green Climate Fund, the consultant will screen the sub-projects through an initial identification of environmental and social risks and impacts according to the 6 triggered Environmental and Social Performance Standards of the GCF (see Table 1). The results of these screenings will be transmitted to the Divisions of Environmental Evaluation and Ecological Monitoring (DEESE) housed in the Regional Directorates of Environment, Urban Sanitation and Sustainable Development, for the classification of the sub-projects. The screening form is presented in Annex 3.

The consultant will then prepare the terms of reference for the ESIA's, taking into account the triggered GCF Environmental and Social Performance Standards, which will be attached to the sub-project notification for transmission to the Minister in charge of the Environment. The Minister, after comment, will transmit the project notice and the TdR to BOAD. The BOAD will confirm the environmental classification of the sub-projects, analyze the ToRs and give its opinion of no objection for the realization of the study.

Step 2: Preparation of the environmental and social impact studies of the sub-projects

The environmental and social impact studies of the sub-projects will be carried out in accordance with the ToRs validated by the EEB. The Consultant will carry out the ESIA's of the sub-projects in accordance with the national impact assessment procedure and the triggered FVC E&M Performance Standards.

During the conduct of the environmental and social impact assessments of the sub-projects, the Consultant will organize a public consultation that will bring together stakeholders at the local level to ensure that the sub-projects are well understood by the beneficiaries and government support and advisory agents, NGOs and other

stakeholders. This will allow for the strong involvement of stakeholders in guiding the study, collecting their environmental and social concerns for inclusion in the ESIA reports. Each ESIA will be accompanied by an Environmental and Social Management Plan (ESMP) in line with the FVC E&S Performance Standards. Mitigation and prevention measures will be determined based on the level of impacts and risks identified in the field.

Step 3: Dissemination of ESIA results

The draft sub-project ESIA reports will be circulated by the Project Management Unit with the support of the AfDB to solicit stakeholder comments on the content of the ESIA. The summary of each ESIA report as well as the sub-project Environmental and Social Management Plan will be translated into local languages according to the intervention areas to enable beneficiaries to better understand the results of the ESIA and the proposed measures. This should not only allow them to comment on the ESIA report but also facilitate the implementation of the measures proposed in the ESMP during the implementation of the sub-project concerned. The comments of all stakeholders will be taken into account in the consultant's report.

Step 4: Approval of sub-project ESIA reports, issuance of environmental certificates and dissemination of the final report.

The project management unit in collaboration with the BNEE and the BOAD will organize validation meetings of the ESIA reports in each of the intervention communes.

Under the supervision of the BNEE, the sub-project ESIA reports produced by the Consultant will be submitted to an ad hoc committee set up by order of the Minister in charge of the environment, for evaluation and approval. Representatives of the beneficiaries of the concerned sub-projects will be part of the ad hoc committee set up.

The Minister in charge of Environment will issue an environmental permit or an environmental compliance certificate on the basis of the evaluation report of the ad hoc committee.

Once the environmental compliance certificate is obtained, the National Project Coordination Unit will ensure the implementation of the measures and recommendations.

Step 5: Disclosure of Final Report

The final subprojects' ESIA report will be published by appropriate means on dedicated websites (BOAD, GCF). The summaries will be translated into local language for the beneficiaries of the sub-projects and made available to them in physical or electronic version, if possible.

Step 6: Implementation of environmental and social measures

The implementation of environmental and social management measures is primarily the responsibility of the Project Management Unit. The Project Management Unit will therefore ensure the implementation of the environmental and social management plans of the sub-projects, including the integrated pest and pesticide management plan and the

gender action plan throughout the project life cycle (capacity building and coaching of enterprises and beneficiaries for better environmental management).

Step 7: Environmental and social monitoring

Environmental monitoring will be carried out by the Project Management Unit, which will ensure that the environmental and social management measures proposed in the ESMP are effectively implemented. The Project Management Unit will provide periodic reports on the implementation of the ESMP to the NEB and the BOAD.

The BOAD, based on the periodic reports from the Project Management Unit and field visits, will produce periodic reports on the implementation of the ESMP to the GCF.

Between 1.5 to 2 years after the project launch, a mid-term evaluation will be carried out to measure the effectiveness of the implementation of the ESMP. This activity will be conducted by an independent Consultant.

Step 8: Environmental and Social Monitoring and Control

Environmental and social monitoring will be the responsibility of the EEB.

Step 9: Final Assessment

At the end of the project, a final evaluation will be conducted to measure the level of success in implementing the ESMP and to draw lessons learned.

This activity will be conducted by an independent Consultant, recruited on the basis of the terms of reference prepared by the Project Management Unit and submitted to the BOAD for non-objection.

The final evaluation report on the implementation of the ESMP will be submitted to the Project Management Unit, the Steering Committee and the BOAD for validation. It should be noted that this evaluation is conducted at the same time as the final evaluation of the project. On the basis of this report, the BOAD will submit to the GCF the final implementation report of the ESMP.

CHAPTER VII: ENVIRONMENTAL AND SOCIAL MONITORING FRAMEWORK

The program will cover proximity surveillance, monitoring, inspection, supervision, mid-term and final evaluation. The technical services concerned and the beneficiary municipalities will have to be involved in the proximity monitoring. Finally, the project will have to provide for a mid-term and end-of-project evaluation.

7.1. Environmental Monitoring Program

Environmental monitoring describes the means and mechanisms proposed by the project proponent to ensure compliance with legal and environmental requirements. It makes it possible to verify the proper conduct of the work and the proper operation of the equipment and facilities set up and to monitor any disturbance to the environment caused by the project's implementation or operation.

The purpose of environmental monitoring is also to monitor and ensure compliance with standards in the implementation of the project:

- the measures proposed in the impact study, including elimination, mitigation and mitigation measures;
- the conditions laid down in the framework law on the environment and its implementing decrees;
- the proponent's commitments to the ministerial authorizations.

Environmental and social monitoring (proximity control) is carried out by a Control Office or “Mission de Contrôle” (MdC) whose main tasks will be to:

- enforce all common and specific mitigation measures for the project;
- reminding contractors of their environmental obligations and ensuring that these are met during the construction period;
- prepare environmental monitoring reports throughout the construction period; monitor the work and request appropriate corrective action if necessary;
- preparing the final report on the environmental and social monitoring program; and.

Environmental and social monitoring is essentially carried out by the control missions simultaneously with their technical mission, under the authority of the PMU, which must ensure that the service provider complies with its contractual clauses. The control missions will have to report on a monthly basis the information resulting from their control to the PMU and the BNEE. In addition, the MoC will be able to act as an interface between the local population and the contractors in the event of complaints.

7.2. Environmental and social monitoring

The environmental follow-up is an extension of the impact study, which consists of verifying the validity and accuracy of the assessment of anticipated impacts, both for the

construction period and for the period of operation and maintenance of the infrastructure put in place as part of the project. The follow-up program also verifies the effectiveness of mitigation and/or compensation measures designed to minimize the project's actual impacts. If necessary, some of the proposed measures that are no longer necessary may be abandoned, while new measures may be implemented to mitigate any unforeseen adverse effects induced by the project.

The environmental follow-up program must be effective during all phases of the project in order to integrate the necessary corrective measures along the way.

As part of the normal course of project activities, a monthly environmental follow-up report is produced. However, any incident or activity likely to have a significant impact on the environment must be reported immediately so that appropriate corrective measures can be implemented as quickly as possible.

A comprehensive environmental follow-up report is produced at the end of the construction phase. This report must present the orientations and procedures for carrying out the follow-up program to be implemented during the operation and maintenance of the project's facilities and equipment, based on the data acquired during the construction phase and the new concerns expressed by the various community stakeholders.

In this case, the ESE/GRN and ESS/G of the PMU must ensure that the triggered GCF Environmental and Social Performance Standards and national environmental regulations are met. The monitoring reports should be forwarded to the PMU, the BNEE and the BOAD. The environmental and social monitoring will also have to involve the beneficiary communes, the technical services concerned (Agriculture, Livestock, Rural Engineering; etc.).

The environmental follow-up is an extension of the impact study, which consists of verifying the validity and accuracy of the assessment of anticipated impacts, both for the construction period and for the period of operation and maintenance of the infrastructure put in place as part of the project. The follow-up program also verifies the effectiveness of mitigation and/or compensation measures designed to minimize the project's actual impacts. If necessary, some of the proposed measures that are no longer necessary may be abandoned, while new measures may be implemented to mitigate any unforeseen adverse effects induced by the project.

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7.3. Monitoring indicators

Indicators are parameters whose use provides quantitative or qualitative information on the environmental and social impacts and benefits of project activities. As such, they constitute an essential component in the Environmental and Social Assessment of the project.

ESMF Monitoring Indicators

In order to assess the effectiveness of the project activities, the following environmental and social monitoring indicators are proposed for monitoring the implementation of the ESMF. Table 12 presents, as an indication, the indicators to be taken into account in the elaboration and implementation of the monitoring program.

Table 12: Indicators for monitoring CGES measures

Measures	Fields of intervention	Indicators
Technical measures	Carrying out environmental and social studies	<ul style="list-style-type: none"> • Number of ESIA's conducted
Project monitoring and evaluation measures	Environmental and Social Monitoring and Surveillance of the Project	<ul style="list-style-type: none"> • Number and types of indicators monitored
Training	PCGES evaluation (internal, mid-term and final)	<ul style="list-style-type: none"> • Number of follow-up missions
Awareness	Capacity Building Program	<ul style="list-style-type: none"> • Number and nature of modules developed

Indicators for monitoring the implementation of sub-projects

The indicators below are proposed to be monitored during the implementation of the sub-projects. Particular emphasis will be placed on monitoring the following elements: the Niger River and Lake Chad basins, especially spawning areas; soil erosion, deforestation

and silting of rivers during development; land conflicts; health of populations and producers (waterborne diseases, accidents, etc.).

Table 13 : Program of environmental and social monitoring of sub-projects

Elements to follow	Monitoring indicators	Monitoring activities	Collection frequency	Collection method	Actors		Cost (CFA)
					Implementatation	Monitoring	
Waters	Pollution level Bacteriological parameters	Monitoring of water resource use activities; Water quality monitoring (wells, drilling, etc.) Physico-chemical and bacteriological controls at water points	Annual	Analyses Physicochemical and bacteriological	DRH UGP	BNEE	500 000/ site that is 11 500 000
Soil	Salinization level Quality (structure, texture)	Periodically monitor salt concentration levels in irrigation water Monitoring of nuisances and various soil pollution and contaminations (pollutants, oils, greases, etc.)	At the end of each campaign "	AHA Sampling	DGA UGP	BNEE	450 000/ site That is 10 350 000
Flora	Cleared areas; Composition, pressure level	Evaluation of reforestation/planting measures and the regeneration rate Monitoring the level of implementation of the internal regulations on the protection of natural resources	Once a year for 3 years from the end of the works	Sampling in reforestation areas	DEF UGP	BNEE	150 000/ site That is 10 350 000 over 3 years
Fauna	Specific Abundance	Identification of species population	Annual	Population surveys and sampling	DEF UGP	BNEE	150 000/ site That is 10 350 000 over 3 years
Loss of cropland	Loan area surfaces; Rehabilitated areas	Visit of loan sites	twice a year	- Neighborhood surveys - on-site inspections	DGA Municipal ities UGP	BNEE	50,000 /site That is 3,450,000 over 3 years
Measures for the prevention of hazards, risks and accidents	Number of awareness sessions for workers and the general public on safety and health risks Number of accidents; Presence of regulations and instructions	Strict application of the rules of procedure on health, hygiene and safety measures Checking compliance with the provisions for the prevention of risks, hazards and accidents on construction sites Monitoring of compliance with the implementation of labor legislation: provision and wearing of adequate protective equipment for site personnel Checking the installation of safety and hygiene measures on the building site	4 times a year	- Neighborhood surveys - on-site inspections	DHPES Municipal ities UGP	BNEE	50,000 /site That is 3,450,000 over 3 years
Total monitoring costs							49 450 000

7.4. Institutional arrangements

The main institutions involved in the implementation of the CGES are as follows.

- **The Project Management Unit (PMU):** It will coordinate the implementation of the CGES and act as an interface with other stakeholders. It will coordinate capacity building and training of agricultural agents and producers and other technical structures involved in the implementation of the CGES. The PMU will recruit two Experts in Environmental and Social Safeguards (ESES/GRN and ESS/G) who will ensure the coordination of local monitoring of environmental and social aspects for the work and interface with other actors. These experts will coordinate the preparation and local monitoring of the implementation, in relation with the municipalities and the technical services concerned (environment, agriculture, forestry, hydraulics, etc.). These experts do not have any autonomy in environmental and social terms. They will have to work in close collaboration with the BNEE.
- **The BNEE:** It will ensure the environmental and social monitoring (compliance control of works and environmental and social protection standards) and implementation of the CGES and support capacity building of agents in the field. At the local level, the BNEE will be supported by the DEESE housed in the DREDD. The monitoring carried out by the BNEE will in fact be a contradictory verification based on the monitoring and follow-up reports. The project will provide institutional support to the NEEB in this monitoring under the framework of a Memorandum of Understanding. The BNEE will forward a copy of its reports to WADB for action.
- **Technical services in charge of project implementation:** The technical services in charge of implementation (DGA, DGGR, DGEF, ONAHA, etc.) will have to designate Focal Points who will support the Communes and Producers and participate in the monitoring of the implementation of the works.
- **Private service providers:** Works companies and Control Mission: The project activities, including environmental and social measures, will be implemented by private service providers who must have a Health, Safety and Environment Manager. The proximity supervision of the works will be ensured by Control Missions recruited by the PMU for this purpose. These offices will have to have an environmental and social expert who will mainly have to ensure the permanent control of the implementation of environmental and social measures.
- **Producers' Organizations:** They must apply procedures and good environmental and social practices in the implementation and management of the hydro-agricultural works of which they will be beneficiaries.
- **NGOs:** Environmental NGOs may also participate in informing, educating and raising awareness of agricultural producers and populations on the environmental and social aspects related to the implementation of sub-projects, but also in the follow-up of implementation and environmental monitoring.

7.5. Synoptic Table

All the mitigation measures, the actors involved in the implementation of the ESMF Plan, the monitoring indicators as well as the costs and the different periods of implementation of the recommended measures are presented in the synoptic table below.

Table 14: Synoptic table of the ESMF Plan

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
PHASE OF CONSTRUCTION									
Assessment and management of environmental and social risks and impacts	Compliance with FVC performance standards and national legislation		Conduct sub-project ESIA's Ensuring proper implementation of the ESMP's, the PGIPP and the GAP	BNEE, ONAHA, beneficiaries, DRE, DRGR, UGP works contractors, NGOs	PMU, Beneficiaries, contractors, NGOs	RDGR, EARB, DRE, Control Office	-Follow-up reports, -Visit of the sites	Throughout the project	8000000/EIES That is 184 000000
Workforce and working conditions		Discrimination against certain marginalized groups, including women and young people	-Establish criteria for fair competition in hiring, -Respect the provisions of the Labor Code	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies, NGOs	DRGR, BNEE, DRE, Control Office	-Percentage of women as a percentage of all employees;	Throughout the project	PM
	Gender mainstreaming and the process of integrating equity concepts in the execution of activities		Ensure proper implementation of the Gender Plan of Action	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, Construction companies, NGOs	Ministry responsible for gender, BNEE	-Percentage of young people	Throughout the project	15 000000 all sub-projects
	Job creation and income improvement		-Respect the provisions of the Labor Code and	BNEE, ONAHA, beneficiaries	PMU, construction	BNEE, Ministry in charge of	Follow-up reports,	Throughout the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			the International Labor Conventions; -Adopt the same wage level for men, women and young people for the same level of work.	s, DRE, DRGR, construction companies, NGOs	companies, NGOs	Gender Employment Inspectorate	-Payroll and Employee Survey		
Rational use of resources and pollution prevention		Modification of soil structure	Avoid overrunning the routes of construction machinery on the surrounding fields by marking out the work rights-of-way and access roads to the borrow sites and make truck and machinery drivers aware of this.	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies, NGOs	BNEE, DRGR, ONAHA	-Follow-up reports, - Number of awareness sessions -Total length of marked site -Number of people sensitized	Construction phase	1,000000/ site, i.e. 23,000000
		Loss of arable land	Rehabilitate borrow material sites as soon as they are no longer in operation	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, works companies; site owners	BNEE, DRGR, ONAHA	-Percentage of borrow sites rehabilitated -Types of rehabilitation (new assignment)	Throughout the project	PM
		Surface and groundwater pollution	-Sensitize the staff and workers of companies on the risks of chemical pollution of surface water, -To ensure a rigorous control of the liquid wastes of the building site as well at the base of the building site as at the	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Report and number of awareness sessions, -Quantity of waste treated -Existence of a toilet on the building site	Construction phase	2 000000/site that is 46000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			level of the perimeters in development, -Equip the construction site baseboards with a toilet facility for the personnel, -Collecting and tightly packing materials and rags soiled with chemical products and handing them over to specialized institutions for treatment and disposal						
		Poor siting of boreholes	On each site, carry out several pumping tests in the water tables present and only retain the borehole (s) with sufficient flow rates that can meet the water requirements of the project at all times.	BNEE, ONAHA, DRE, DRGR, PMU, advisory support services,	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Number of drilling tests carried out on each site Percentage of productive boreholes	Construction phase	PM
		Air Pollution	-Do not leave the engines of trucks and machinery running when stationary, -Educating truck drivers on the regular maintenance of their vehicles, -Cover loads of powdery materials with tarpaulins,	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Engine noise, -Percentage of drivers aware, -Number of loads covered with tarpaulin, -State of humidity of the tracks	Construction phase	1000000/site that is 23 000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			-Watering the tracks under rehabilitation/construction in dry periods.						
Community Health, Safety and Security		Potential risks of sexual exploitation, abuse and harassment	-Sensitize all project stakeholders and beneficiaries to issues of violence against women -Establish a mechanism for reporting and resolving cases of sexual exploitation, abuse and harassment	PMU, ONAHA, DGGR,	PMU, ONAHA	The gender mainstreaming expert	-Effective implementation of the reporting mechanism -Number of awareness sessions -Number of cases observed	Construction and operation phases	FTR
		Damage to the health and safety of workers and the population	-Sensitize workers to the risks of accidents related to their activities and to the non-observance of safety instructions, -Equipping all workers with personal protective equipment (boots, gloves, nose mask, helmet, etc.), -Equipping the construction site bases with a first aid unit equipped with basic pharmaceutical products, -Sensitize staff, workers in enterprises and the population on the risks of contamination by sexually transmitted	BNEE, ONAHA, beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, Contractors	BNEE, DRGR, ONAHA	-Effective wearing of EPI -Presence of a first-aid unit equipped with essential pharmaceutical products -Number of awareness sessions, -Number of condoms distributed	Construction phase	2 000000/site that is 46000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			infections (STIs) and HIV-AIDS and make condoms available to them, -Sensitize the population and drivers of lorries and other vehicles to the risks of accidents when driving through built-up areas.						
		Traffic disruption	Avoid total blockage of traffic by providing temporary diversions if necessary.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Contractors, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	Work in half-roadway	Construction phase	PM
Biodiversity conservation and sustainable management of living natural resources		Loss of vegetation and grazing cover	-Limit tree felling to the strictly necessary spaces -Pay the slaughter tax in accordance with national regulations. -Redistribute the wood from the clearing of the land to the populations of the villages concerned. -Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of developed perimeter in the commune). -compensate for losses of cash crops and trees with	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	-Reforested area in the commune -Number of trees of economic value felled -Area of forage crops	Construction phase	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			economic value (teak, doum palm, shea, date palm, néré...) -develop forage crops in the project area						
		Changing the landscape	Carry out selective tree cutting.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, construction companies, NGOs	PMU, construction companies	BNEE, DRGR, ONAHA	Number of saved trees	Construction phase	PM
		Disturbance, destruction of wildlife habitat and poaching	Mark out work rights-of-way and avoid any unnecessary overflow, especially when opening new access roads to the sites.	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Works companies, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	-Length of marked site -Consumption of wild meat on the construction site	Construction phase	PM
Indigenous Peoples		Reduction of grazing areas nationally	Carry out compensatory reforestation in the project area (1 ha of reforestation per ha of perimeter developed in the municipality)	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Works companies, NGOs	PMU, Construction companies	BNEE, DRGR, ONAHA	Reforested area in the municipality -	Construction phase	PM
Cultural Heritage		Unintentional destruction of	-Stop work and put in place devices to secure the remains discovered and inform the competent authorities of	BNEE, ONAHA, Beneficiaries, DRE, DRGR,	PMU, Contractors	BNEE, DRGR, ONAHA	-Number and location of incidental findings	During all phases of the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
		archaeological remains	the appropriate measures to be taken. -Comply with the provisions of Articles 51 to 53 of Ordinance No. 97-002 of 30 June 1997 on the protection, conservation and presentation of the national cultural heritage.	Contractors , NGOs					
OPERATING PHASE									
Assessment and management of environmental and social risks and impacts	Compliance with FVC performance standards and national legislation		Ensuring proper implementation of the ESMPs, the PGIPP and the GAP	BNEE, ONAHA, Recipients, DRE, RDGR, PMU, Advisory Support Services, NGOs	PMU, Beneficiaries, Contractors, NGOs	DRGR, BNEE, DRE, Audit Office	-Follow-up reports, -Visit of the sites	Throughout the project	PM
Workforce and working conditions	Gender mainstreaming and the process of integrating equity concepts in the execution of activities		-Ensure the proper implementation of the Gender Action Plan. -Ensure an equitable distribution of plots between men, women and young people.	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, construction companies, NGOs	Ministry in charge of Gender, BNEE	-Percentage of women as a percentage of all employees -percentage of plot respectively exploited by men, women and young people	Throughout the project	

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
Rational use of resources and pollution prevention		Soil Salinization	-Periodically monitor salt concentration levels in irrigation water. -Ensure that drainage systems are in good condition and working order. - Soil leaching (remediation) after harvesting	NEB, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	-Periodic report of salt level control -Condition of drainage devices	During the entire operating phase	100,000/ha/year, i.e. 150,000,000/year for the entire project.
	Reduced energy bills		Periodic maintenance of solar panels and electrical installations	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	Cleanliness of the solar panels	Operation phase	69 000000
		Disruption of ecosystem services	-Ensure effective implementation of the Integrated Pest Management Plan (IPMP) -Use only registered pesticides Use non-chemical fertilizers -Raise awareness among project beneficiaries about the risks of soil, air and water pollution due to the massive and uncontrolled use of agrochemicals	BNEE, ONAHA, beneficiaries, DRE, DRGR, consulting support services, NGO	PMU, consulting support services, , NGO	DRGR, BNEE, DRE	- Number of awareness sessions -Brand names of agrochemicals used -Results of soil and water analysis	Operation Phase	FTR

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
	Improvement and/or maintenance of soil quality		Ensure that all farmers master techniques to improve soil quality.	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Support and Advisory Services, NGOs	DRGR, BNEE, DRE, Control Office	Number of people trained	During the entire operating phase	95 000 000
	Reduced consumption of fossil fuels		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	State of operation of the solar equipment and the evolution of the budget allocated to their maintenance.	Operation phase	PM
	Reduction of GHG emissions		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Operating status of solar equipment and the evolution of the budget allocated to their maintenance	Operation phase	PM
	Sustainable management of groundwater resources	Lack of effective water management	Further reduce water losses by ensuring proper operation and maintenance of drip and California drip irrigation systems	BNEE, ONAHA, beneficiaries, DRE, DRGR, PMU,	PMU, Advisory Support Services, NGOs	RDGR, EARB, ERD, Control Office	Evolution of the quantity of water pumped Evolution of the budget	Operation phase	90 000000

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
		mechanisms	Establish, on each site, a periodic maintenance system for water collection and distribution installations and equipment Replace, as soon as possible, defective, damaged or dilapidated installations and equipment Locally train, among the beneficiaries of the project, young technicians capable of urgently carrying out certain small jobs such as closing a valve and replacing a broken pipe letting water flow, etc.	advisory support services, NGOs			allocated to the maintenance of irrigation systems		
		Pollution and degradation of surface and groundwater quality	-Lagooning of drainage water before discharge to the wild, -Privileging biological pest control and limiting the use of registered pesticides	BNEE, ONAHA, beneficiaries, DRE, DRGR, PMU, DPV, NGOs	PMU, Advisory Support Services, Beneficiaries, NGOs	DRGR, BNEE, DRE, DPV	Evolution of drainage water quality	Operation phase	20 000/site that is 460 000
Community Health, Safety and Security		Impacts on the health of populations	-Training and raising awareness among farmers on the optimal use of agrochemicals (nitrogen fertilizers), on the harmful effects of phytosanitary treatments.	BNEE, ONAHA, Recipients, DRE, DRGR, PMU, DPV, NGOs	PMU, Advisory Support Services, Beneficiaries, NGOs	DRGR, BNEE, DRE, DPV	Number of awareness-raising sessions for farmers and plant protection officers	Operation phase	23 000000/year

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			-Sensitize plant protection officers to wear protective equipment (nasal masks) when applying pesticides. -Inform and sensitize project beneficiaries on water-related diseases (malaria, typhoid fever, amoebic dysentery, etc.); -Develop and implement the IFMP. -Include the project communes in the intervention program of the epidemiological surveillance system.				-effective wearing of EPI -Change in the number of people affected by waterborne diseases		
	Improved access to energy for irrigation		Ensuring the proper operation and maintenance of solar equipment	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	State of operation of the solar equipment and the evolution of the budget allocated to their maintenance.	Operation phase	PM
	Improving food security		-Ensure the proper implementation of the recommendations of the ESMPs, PGIPs and PAGs in order to achieve the project's objectives.	BNEE, ONAHA, beneficiaries, DRE, DRGR, advisory support	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control Office	-Evolution of agricultural yields during the different campaigns, -Number of farmers with a	Throughout the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
			-Ensure the achievability of the project through capitalization and sharing of lessons learned.	services, NGOs			good command of irrigation techniques, soil quality improvement, biological control,		
Biodiversity conservation and sustainable management of living natural resources		Proliferation of invasive plants and pests	<ul style="list-style-type: none"> - Proceed with regular weeding of the fields, - cutting and uprooting unwanted seedlings - Ensure proper implementation of the integrated pest and pesticide management plan - Use chemical or biological control in consultation with the specialized services of the Ministry of Agriculture (plant protection). 	BNEE, ONAHA, Beneficiaries, DRE, DRGR, Advisory Support Services, NGOs	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, control office	-Type of invasive plant and percentage of colonized area -Methods of control adopted -Types of pests	Operation phase	PM
	Wildlife Habitat Restoration		<ul style="list-style-type: none"> -Planting hedges and compensatory reforestation, -Utilize endogenous species for reforestation 	BNEE, ONAHA, Recipients, DRE, DRGR, Advisory Support	PMU, Advisory Support Services, NGOs	DRGR, BNEE, DRE, Control office	-Rate of recolonization of sites by endogenous species -Reforested area	During the period of operation of the project	PM

Triggered Performance Standards	Positive impacts	Negative impacts / risks	Mitigation/avoidance and enhancement measures	Actors	Responsible		Monitoring indicators	Implementation period	Costs (CFA)
					Implementation	Monitoring			
				Services, NGOs					
Indigenous Peoples		Lack of water points for watering livestock	Install, outside the irrigated perimeters, water points intended for the watering of the livestock of local herders and nomadic herders during their seasonal transhumance	BNEE, ONAHA, DRE, DRGR, Works companies, ONG	UGP, Works companies,	BNEE, DRGR, ONAHA	Number of water points installed around the perimeters -	Construction Phase	PM
Cultural Heritage		Unintentional destruction of archaeological remains	Stop the work and put in place devices to secure the remains discovered and inform the competent authorities of the appropriate measures to be taken.	BNEE, ONAHA, Beneficiaries, DRE, DRGR	PMU Ministry of Culture	BNEE	Number, nature and location of remains	All phases of the project	PM

7.6. Cost of implementing the ESMP

The cost of implementing measures to mitigate the negative impacts of the project amounts to CFA 1,456,460,000 over 5 years. To this amount must be added the cost of implementing the Environmental and Social Monitoring Plan worth CFA 49,450,000. The overall cost of implementing the project's ESMP thus amounts to CFA 1 505 910 000.

CHAPTER VIII: ANALYSIS OF PROJECT OPTIONS AND VARIANTS

8.1. "No project" option

The "no project" option means "doing nothing" in the face of the challenges facing Nigerien agriculture today, such as:

- Its vulnerability to the effects of climate change,
- Food insecurity, poverty and malnutrition in rural areas,
- The weak capacity of the technical services of the State and NGOs/associations to ensure better management of hydro-agricultural developments in a context of climate change,
- The low capacity of farmers' organizations, cooperatives and groups to implement climate-resilient actions,
- The degradation of existing hydro-agricultural developments (silting of perimeters, obsolescence of structures and technical equipment, etc.),
- The degradation and loss of agricultural land through erosion,
- Its heavy dependence on fossil fuels for the mobilization of water resources for irrigation.
- Difficulties of access to agricultural inputs and equipment in rural areas, etc.

This option also means the absence of development of the agro-sylvo-pastoral potential of the targeted communes and villages, the absence of new investments in rural areas, the absence of development and management of natural resources, the absence of activities for the preservation and development of production basins, this status quo causing the continuous degradation of the living conditions of the populations with, as main foreseeable consequences, social conflicts and the accentuation of migration phenomena.

Such an option is inadmissible because it would run counter to the major efforts being made by the Government of Niger through ambitious policies, plans and programs in various areas and sectors such as the fight against land and water resource degradation, food insecurity and poverty in rural areas.

8.2. Project " option »

The project will allow the country's agricultural activities to be integrated into an approach that will reduce their vulnerability to climate change. The comparative advantages of this option over the "no project" option are severalfold.

In environmental terms, the project will result in: a significant reduction in greenhouse gas emissions, particularly CO₂, by replacing the use of fossil fuels with solar energy, better land development using climate-resilient methods and technologies, a greater capacity to mobilize water by installing solar pumps and water reservoirs on the sites, preservation of community nature reserves and areas under serious threat (land and water degradation), etc.

At the social level, the implementation of the project will allow a better supervision of the beneficiary populations both at the level of land development and the use of fertilizers and pesticides, which could result in improved income and marketing conditions for

agricultural production, a strengthening of the skills of the various actors involved in the sector. The implementation of the project will have a multifaceted positive impact on the beneficiary populations. In particular, it will contribute, through the creation of new jobs, the enhancement of agricultural employment and gender mainstreaming, especially for women and young people, to the reduction of poverty and food insecurity and the strengthening of social cohesion.

The implementation of the project will, however, have a number of negative impacts that can be avoided or greatly reduced by implementing appropriate mitigation measures.

On the basis of this comparative assessment, the "with project" situation should be favored in view of the economic, environmental and social benefits it offers.

8.3. Project variants

❖ Water dewatering variant

A choice was made between the current practice of using generators and replacing them with solar pumping kits. This choice is justified not only by the preponderant weight of the energy bill in the current operating costs (60%) but also and above all by the emissions of greenhouse gases such as CO₂. The use of this technology will make it possible to reduce emissions by around 160,650 t CO₂e over 30 years, i.e. 5,355 t CO₂e per year.¹

❖ Variant for solar panel types

The choice was made between 3 main types of panel: monocrystalline, polycrystalline and amorphous (Table 7 below). The monocrystalline (thick film) silicon type panel was chosen. Its advantages (better yield, reduced surface area, great worldwide reputation) far outweigh its defects (high manufacturing cost, low yield under low illumination) thus offering a good quality/price ratio.

Table 7 : Characteristics of the different types of solar panels

	Monocristallin	Polycristallin	Amorphe
Technology	Very good yield : 14 à 20 %	Good yield: 11-15%.	Low yield: at 9%.
	Lifespan: important (30 years)	Life span: significant (30 years)	Service life: fairly long (20 years).
	Manufacturing cost: high.	Manufacturing cost: cheaper than monocrystalline panels	Cost of manufacturing: inexpensive compared to other technologies
	Power : 100 to 150 Wc/m ² . 7 m ² /kWc	Power :100 Wc/m ² . 8 m ² /kWc.	Power :0 Wc/m ² . 16 m ² /kWc.
	Low efficiency under low lighting conditions.	Low efficiency under low lighting conditions.	Correct operation with low illumination.

¹<http://www.moteurnature.com/actu/consommation-emission-CO2.php>

Characteristics	Loss of efficiency with rising temperature.	Loss of efficiency with rising temperature.	Not very sensitive to high temperatures.
	Manufacture: made from a block of molten silicon that has solidified to form a single crystal. Uniform blue color.	Manufacture: made from electronic grade silicon which, when cooled, forms several crystals. Its cells are blue, but not uniform: we can distinguish patterns created by the different crystals.	Can be used in flexible panels. Larger panel surface area than for other silicon panels. Low efficiency in direct sunlight.
			Performance decreasing with time.
			Manufacture: very thin layers of silicon that are applied to glass, flexible plastic or metal using a vacuum evaporation process.
International market share	43 %	47 %	10 %

❖ Irrigation technology variant

In order to reduce water losses to a strict minimum, two irrigation techniques, the most water-efficient, have been selected: the taste-to-taste and the Californian. The pipes will be made of buried PCV pipes, a sustainable variant that requires less maintenance than the current open canals of the AHAs.

8.4. Justification of the choice of solar energy for the project

On an environmental level

Solar energy is an environmentally efficient alternative to thermal energy (produced by means of a generator), which is a source of serious pollution and produces GHGs with harmful effects on the climate. The choice of solar energy is a contribution of the project to the reduction of the quantities of CO₂ produced by the irrigation systems currently practiced in Niger for the development of hydro-agricultural perimeters, which consist in the use of thermal energy for water dewatering. Solar energy provides a reliable supply of energy over the long term without any emissions. The use of solar energy preserves the environment and has no impact on human health.

On an economic level

The choice of a solar pumping system is also a factor in improving the efficiency of perimeter operations. Indeed, solar water pumping does not require fuel, which

eliminates the energy bill and the time associated with fuel deliveries. Because the sun is a reliable source of energy, there are no concerns about fuel supply, fuel transportation or increased operating costs. Solar pump systems have few moving parts, which makes maintenance less expensive and gives them a long service life - 20 years on average. This gives the solution a good return on investment and a better price/performance ratio compared to conventional pumping systems.

A consistent downward trend in the price of solar energy in markets favorable to the energy transition to clean energies

In 15 years, the costs of solar energy have fallen sharply worldwide, making its exploitation economically very profitable. In 2004, solar energy was available at prices of 4.5 to 5 euros per Wp (+1.5 euros for cabling and module supports). Today, these costs have fallen significantly. The strongest downward trends have been observed over the last 7 years where solar energy has recorded a fall of 85% according to a study by the world financial advisory group, the Lazard bank. The improvement of production processes and the reduction in the cost of materials are the main explanations that justify these falls according to the 2018 report of the International Renewable Energy Agency (IRENA) which also confirms the 26% fall in the 150 states belonging to Irena of the average cost of electricity produced from solar energy. And, it is projected, an equivalent drop over the next 7 years (2018-2025).

CHAPTER IX: PUBLIC CONSULTATIONS

9.1. Public consultation process

Public consultation refers to any process that seeks public input to inform a decision. Generally speaking, public consultation refers rather to formal processes framed by a defined procedure and often subject to a regulatory or legal obligation. Indeed, the CVF and the BOAD make public information and consultation a requirement through their respective policies, starting at the project design stage. Similarly, Niger's environmental assessment regulations require all project proponents to put in place a publicity mechanism in order to bring information to the attention of stakeholders and take into account their opinions, concerns and expectations regarding the project so that they can be integrated into the design of the project. It is with a view to complying with these various requirements that public consultations and stakeholder meetings were conducted with various categories of stakeholders in the regions of Agadez, Diffa, Maradi, Tahoua and Zinder. (Cf. list of people met in the appendix).

From a methodological point of view, the meetings with stakeholders took place in the form of individual interviews for the technical services and in the form of focus groups for certain groups of stakeholders such as cooperatives and other FOs.

9.2. Objectives

The objectives of these meetings were to:

- inform the actors concerned by the project;
- respond to concerns about the project, its components and impacts;
- evaluate the general reception that the community might give to the project;
- gather additional information and take into account the concerns, expectations and suggestions of the parties concerned;
- Assess the needs for capacity building of stakeholders in environmental management.

9.3. Points Discussed

The main topics discussed during these meetings revolved around the following points.

- land tenure and land appropriation issues;
- environmental and social constraints facing irrigated agriculture;
- gender mainstreaming in the use of irrigated perimeters;
- major environmental impacts related to irrigation in general and specifically to the two (2) types of irrigation financed by the project.

9.4. Technical Services Consultations

These meetings concerned the following categories of actors: regional and departmental technical services for the environment, agriculture, animal husbandry, rural engineering, ONAHA, the Permanent Secretariat of the Rural Code, agricultural producers' organizations, representatives of municipalities, etc.

9.5. Local Community Consultations

Local communities were consulted in the villages of the proposed sub-project sites. The attendance lists for these meetings are presented in Appendix 2. The main concerns expressed by the local communities as well as the suggestions and recommendations retained at the end of the discussions are presented in the following table.

Table 16: Summary of concerns expressed by local project stakeholders

Concerns expressed	Main suggestions and recommendations
Fear of a minority takeover of the project haunts some producers	To avoid frustration, the involvement of traditional and municipal authorities is key to sensitize the various stakeholders. As the work is a regional development action, it must be approved by the regional council; the authorities must be involved in launching the work. This will help mobilize the region's contributions to the regional development plan.
Land transfer method	Setting up of a site management committee with legislative texts that define the conditions of access to the site, the roles and responsibilities of the actors, the rights and duties of the members. These texts must be the object of a consensus between the operators.
Criteria for the provision of developed land and plots	When distributing the developed plots, those responsible for conducting the process must ensure that they are available to all citizens of the village and that they are representatives of youth and women.
Soil degradation and alarming decline in agricultural yields	Soil quality and agricultural yields will be improved through new cultivation techniques and the promotion of organic agriculture through the use of manure on irrigated areas (activity 2.2.4).
Water supply challenges for small-scale irrigation development	The project addresses this problem by setting up a solar pumping system to reduce the cost of access to the resource. The beneficiaries of the project must be sensitized on the need for an individual and collective good management of the set up installations. They must have access to this resource without any discrimination based on gender or social class
Lack of financial means to afford agricultural inputs (fertilizers, improved and resistant seeds, phytosanitary products)	The project will support the acquisition of agricultural inputs (fertilizers, improved and drought-resistant seeds) (Activity 2.2.3). It will also contribute to the improvement of the financial means of the beneficiaries by supporting the development of income generating activities (IGA) through the conservation and processing of agricultural products (Activity 2.4.2).
Repetitive pest attack with production losses	An Integrated Pest Management Plan (IPPMP) for the project is developed for this purpose.
Silting of the areas.	One of the expected results of the project is the protection of productive capital against threats related to the effects of climate change such as siltation and flooding (Activity 1.1.1).
Flooding of areas by heavy rains over a relatively short period of time	

Implication of technical services	<p>They will provide technical advice. This activity will involve the management committee, which will not only provide the structure with texts, but also organize the production.</p> <p>At the producer level, the services will be responsible for training volunteers in technical production.</p> <p>When ordering inputs, the technical services will be asked to select seeds that are suitable for the soil but also likely to resist pest attacks.</p> <p>Upon receipt of the seeds, the technical services will be responsible for testing the quality, which will help avoid frustration and discouragement.</p> <p>When preparing the files, the technical services agents will support the management of the committee.</p> <p>In the area of production evaluation, the technical services will train the members of the management committee in the production of reliable statistical data and their archiving. They will train producers in the evaluation and transmission of data to management committee members.</p> <p>To facilitate mentoring, technical services staff should receive logistical support for site trips.</p> <p>In the area of by-product conservation, it is the responsibility of technical services to support producers through training sessions and to initiate study tours or experiments as needed.</p>
Damage to animals	Landscaped areas will be fenced off with wire mesh to prevent damage to animals.

CONCLUSION

This Environmental and Social Management Framework has identified the positive impacts, negative impacts and potential risks associated with the project. Generic measures have been proposed to guide the preparation of ESIAs with Environmental and Social Management Plans (ESMPs) for each of the sites to be finalized under the sub-projects. The overall cost of implementing the project's ESMP is CFA 1,505,910,000. These plans will have to contain realistic and appropriate measures to ensure that the entire project is resilient to the adverse effects of climate change. The monitoring indicators will have to be monitored by competent structures in order to evaluate the effectiveness of the proposed measures and to propose, if necessary, the necessary adaptations.

APPENDIX

APPENDIX 1 : Typical Terms of Reference (TOR) for a subproject's ESIA

Typical Terms of Reference (TOR) for a subproject ESIA

I. Introduction and background

This part will be completed at the appropriate time and should provide the necessary information relating to the sub-project to be carried out, its context, the objectives and activities of the planned sub-project, and will indicate the activities that may have environmental and social impacts and that require appropriate mitigation measures.

II. Subproject execution area

The work will take place in the following area (describe site).

III. Objectives of the study

This TdR covers the conduct of an ESIA for the (sub-project site) sub-project on hydro-agricultural developments with climate-resilient smart agriculture practices. The objective of the study is to allow a good consideration of the environmental and social dimensions associated with the sub-project. The study will be carried out in accordance with FVC's environmental and social safeguard policy and the regulatory provisions in force in Niger, in particular:

- Law 2018-28 of 14 May 2018 determining the fundamental principles of environmental assessment in Niger;
- Decree No. 2000-397/PRN/ME/LCD of 20 October 2000 on the administrative procedure for environmental impact assessment and review.

IV : Mission of the consultant

The mission will consist of:

- Conduct a description of the biophysical, socio-economic and cultural characteristics of the sub-project's environment and highlight the major constraints that need to be taken into account in the implementation of the sub-project,
- Assess the potential environmental and social impacts associated with the sub-project activities and recommend appropriate mitigation measures including cost estimates.
- Assess the conditions for the collection, storage, transportation and treatment of solid and liquid waste and recommend appropriate management measures,
- Conduct a review of the respective national environmental policies, legislation, and administrative and institutional frameworks against the 08 CVF Performance Standards, indicate which ones are triggered, identify any gaps that may exist, and make recommendations to address them in the context of project activities.
- Review the conventions and protocols to which Niger is a signatory in relation to the activities of the sub-project.,
- Identify responsibilities and actors to implement the proposed mitigation measures,

- Assess the available capacity to implement the proposed mitigation actions, and make appropriate recommendations, including training and capacity-building needs and their costs.
- Prepare an Environmental and Social Management Plan (ESMP) for the sub-project. The ESMP shall show (a) the potential environmental and social impacts resulting from the sub-project activities that take into account the mitigation measures contained in the ESMC mitigation checklist; (b) the proposed mitigation measures; (c) institutional responsibilities for the implementation of the mitigation measures; (d) monitoring indicators; (e) institutional responsibilities for monitoring the implementation of the mitigation measures; (f) cost estimates for all these activities; and (g) the schedule for the implementation of the ESMP.
- Stakeholders' engagement plan
Before the beginning of the subprojects Environmental and Social Impact Assessment, it will be prepared the stakeholders engagement plan to be approved by the Project Management Unit.
- Public Consultations
The results of the environmental impact assessment as well as the proposed mitigation measures will be shared with the population, NGOs, local government and the private sectors operating in the area where the activity will be located. The minutes of this consultation will be an integral part of the report.
- Grievance Redress Framework
BOAD has its own grievance management policy and procedure. However, to make this system operational and accessible at the local, municipal, regional, national and international level, to all project stakeholders, the consultant will prepare an indicative Grievance Redress Framework.

V. Report and documents to be provided

A. The stakeholder engagement plan

The stakeholder engagement plan to be approved before the beginning of the subprojects Environmental and Social Impact Assessment. The contains of the stakeholder engagement plan is:

- 1 Introduction/description of the sub-project
 - 1.1 Summary of Previous Stakeholder Engagement Activities
 - 1.1.1 Observations
 - 1.1.2 Recommendations
- 2 Stakeholder Identification and Analysis
 - 2.1 Affected Parties
 - 2.1.1 Institutional Stakeholders
 - 2.1.2 National / Regional / Communal Directorates
 - 2.1.3 Local administrations
 - 2.1.4 Households
 - 2.1.5 Agricultural groups and cooperatives

- 2.1.6 Community infrastructure
- 2.1.7 Other stakeholders
- 2.2 Disadvantaged or vulnerable individuals or groups
- 2.3. Indigenous People protection (if there are any Indigenous People present in the project area an Indigenous Peoples Plan will be developed and their Free Prior Informed Consent will be sort before any sub-project is approved in accordance with the requirements of the GCF Indigenous Peoples Plan)
- 3 Stakeholder engagement
 - 3.1 Objectives
 - 3.2 Methods of Direct Engagement with Stakeholders
 - 3.3 Proposed Disclosure Strategy
 - 3.3.1 Key messages
 - 3.3.2 Information Format and Dissemination Methods
 - 3.3.3 Written and Visual Communication
 - 3.3.4 The Media
 - 3.3.5 Other Means of Communication
 - 3.4 Proposed Consultation Strategy
 - 3.5 Proposed Strategy for Incorporating the Voices and Views of Vulnerable Groups
 - 3.5.1 Engagement of women, girls and women's civil society organizations
 - 3.6 Timeline
 - 3.7 Future phases of the sub-project
- 4 Resources and Responsibilities for Carrying Out Stakeholder Engagement Activities
 - 4.1 Resources
 - 4.2 Management functions and responsibilities
- 5 Complaint Management Mechanism
 - 1.1 Step 1 - Receipt and registration of the complaint
 - 1.2 Step 2 - Complaint Processing (Assessment and Referral)
 - 1.3 Step 3 - Development of the proposed response
 - 1.4 Step 4 - Communication of the outcome of the complaint
 - 5.1 Step 5: Implementing the response to resolve the complaint
 - 1.5 Step 6 - Reviewing the response if it fails
 - 1.6 Step 7 - Closing or Referring the Complaint
- 6 Monitoring and Reporting
 - 6.1 Stakeholder Involvement in Monitoring Activities
 - 6.2 Reporting to Stakeholders
- Annexes

B. Grievance Redress Framework contains

- 1. Introduction
- 2. Methodology
- 3. Objectives of the complaint's mechanism
- 4. Complaint management procedure
 - 4.1. Access to information
 - 4.2. Receipt and registration of the complaint

- 4.3. Categorization and review of admissibility of complaints
- 4.4. Internal assessment, investigation, and resolution
- 4.5. Out-of-court handling of complaints
 - 4.5.1. The level of the sub-project
 - 4.5.2. The village level
 - 4.5.3. The municipal level
 - 4.5.4. The regional level
 - 4.5.5. The national level
 - 4.5.5.1. The Project Management Unit
 - 4.5.5.1. BOAD's resident mission
 - 4.5.6. BOAD, accredited entity
5. Implementation and monitoring of agreed measures
6. Closure of the complaint and archiving
7. Grievance tracking and reporting
8. Complaint's mechanism effectiveness monitoring
9. Capacity building measures for a better efficiency of the complaint's management mechanism
10. Conclusion
11. Appendices
 - 11.1. Annex 1: Model registration form contained in the complaints register
 - 11.2. Appendix 2: Minutes of the establishment of complaints management committees
 - 11.3. Annex 3: Quarterly evaluation sheet of the complaint's management committee
 - 11.4. Annex 4: Conciliation report
 - 11.5. Annex 5: Complaint's follow-up sheet
 - 11.6. Annex 6: Complaints closure sheet

C. The study should lead to the drafting of an ESIA report consisting of :

- a) An appreciative or non-technical summary of the information provided in the points below, including the main findings and recommendations of the EIA. This summary is a succinct summary that can be separated from the REIES and must be translated into English.
- b) An introduction outlining the main points of the report
- c) A full description of the subproject: justification of the subproject; objectives and expected results; determination of the geographical boundaries of the project area; methods, facilities, products and other means used,
- d) An analysis of the initial state of the site and its environment: collection of basic data on water, soil, flora, fauna, air, physico-biological, socio-economic and cultural conditions,
- e) An outline of the legal framework of the study (a brief review of the relevant legislation)
- f) An assessment of the likely changes (positive or negative: direct, indirect or cumulative in the short, medium and long term) that the sub-project is likely to generate during and at the end of the operations on the various components of the environment.

- g) A description of the possible alternatives to the sub-project concerning the site(s), the technology to be used, the implementation and the evaluation of their costs,
- h) An identification and description of measures to prevent, control, remove, mitigate and compensate for the negative impacts of the sub-project.
- i) An environmental monitoring and follow-up plan taking into account the knowledge gaps and uncertainties encountered in the implementation of the project,
- j) An overall conclusion that focuses on the main measures to be taken to limit and/or eliminate the most significant negative impacts and indicates shortcomings that may reduce the validity of the results obtained,
- k) Appendices including: terms of reference, bibliographical references, maps, drawings, laboratory results and any other documents considered important for the understanding of the study.

The Environmental Impact Assessment Report (EIS) and other annexed documents must be written entirely in French (the summary must be translated into English) and submitted in six (6) copies (paper version) of which one (1) copy to the Minister in charge of the Environment, two (2) copies to the BNEE, one (1) to the region concerned by the sub-project, one (1) to the CNEDD and one (1) to the Ministry in charge of the sub-project and an electronic version to the BOAD.

VI. Consultant Profile

The Consultant must have a BAC + 5 level with specialization in environmental management with at least five (5) years of experience in conducting environmental impact studies and have conducted at least five (5) sub-project ESIAs similar to the sub-project.

VII. Duration of the mission

The duration of the study will be determined according to the type of sub-project.

VIII. Production of the final report

The consultant will produce the final report two weeks after receiving comments from the BOAD and the BNEE. The final report shall take into account all recommendations, comments and suggestions.

VIII. Supervision of the study

The work of the consultant will be supervised by the PMU Environmental Specialist. The PMU Environmental Specialist will provide the Consultant with all the documentation necessary to complete the Study.

APPENDIX 2 : Public consultations

**Projet de développement et de mise à l'échelle
d'aménagements hydro agricoles avec des pratiques
d'agriculture intelligente résilientes au changement
climatique**

CONSULTATION PUBLIQUE
TERMES DE REFERENCE

Région de *Tchad*

Site de *Tsoulou*

Superficie du site.....

Date.....

I. Liste de présence

REGION : Takoua		DEPARTEMENT : Abalak		
COMMUNE : Tabalak		VILLAGE : Tsouna		
		Nom du site : Tsouna		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Abbo Halid	chef de village	97684562	
2	Ewal Habou	" " "	97126407	13
3	Saba Abou	agriculteur		
4	Abdoulaye Mahaman	agriculteur	89747288	0
5	Abdoulaye Hamadouha	agriculteur	96847777	12
6	Alhady Abdoulaye Ila	agriculteur	96053185	12
7	Abacar Mahamadou	agriculteur		1
8	Salifou Ila	agriculteur	96089423	
9	Alhou Aboubacar	agriculteur	96355205	16
10	Abdouhamane Abdoulaye	agriculteur	9973754	11
11	Moutali Wessoulemane	agriculteur	96403781	14
12	Moussa Amadou	agriculteur	96624671	14
13	Djibril Djaman	"	96004329	15
14	Rousseini Mamane	"		
15	Abdoussahmane Ali	"	88302867	16
16	Agali Adicoufa	"	96169963	14
17	Agali Adamou	"	99742801	14
18	Serhalou Serahima	"	97591718	
19	Mani Akadima	"	98983168	18
20	Takana Alfausseini	ménagère	96234628	2
21	Ami Beula	"	97300810	0
22	Mariamou Galouy	"		2
23	Fatimataou Agaka	"	96626728	12
24	Mariamou Ibrahim	"		7
25	Hadi Adou	"	9782930	1
26	Zeinabou Abbo	"		1

61. Souda Saidou
62. Harouna Atto
63. Yacine Hamadi

Environnement 96550065
Généraliste 96878126
Ménagère

66 Zairi Hani Hani
67 Hani Hani

*

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
27	Hana Abachi	ménagère		+
28	Mariam Aboubar		+	
29	Zara Ouhamoudou		-	+
30	Gaicheton Mouhamadou			*
31	Hadijaton Hamadacha		96333366	+
32	Rabi Ali			0
33	Ichih Agalère		98898697	-
34	Gaicheton Hamadamoussa		-	3
35	Finaha Ibrahim		-	
36	Gaicheton Assa			x
37	Mariam Smolan		-	-
38	Mama Aliou		-	-
39	Anni Sadi		-	-
40	Amma Chafi		-	+
41	Mariam Mahamadou		-	0
42	Maimama Babou		-	5
43	Abarka Salah		-	+
44	Alhousseini Akkili	agriculteur	83796218	+
45	Alhadi Mahamadou		89796218	x
46	Galien Ibaou		98252196	u
47	Mohamadi Mohamed		97473793	+
48	Ibaou Ahmoudou		96626444	+
49	Chafizou Ismael		96918416	+
50	Bachara Mamoudou	ménagère	-	+
51	Ramatou Chafi		-	+
52	Tahj Hamadamoussa	agriculteur	38336703	+
53	Iba Mahamadou	Ménagère	-	x
54	Alahé Magori	Ménagère	-	
55	Sabira Ambouka		-	+
56	Rajikou Ilo	chef. Village	96308168	+
57	Nayoussa Ilo	Agriculteur	9664699	+
58	Hati Nayoussa	Ménagère	-	+
59	Fati Kadu		-	+
60	Hati Sahadi		-	+

REPUBLIQUE DU NIGER REGION D'AGADEZ	Projet de développement et de mise à l'échelle d'aménagements hydro agricoles avec des pratiques d'agriculture intelligente résilientes au changement climatique
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Localités de : Aggor, Téchillé, Mararaba Elméki et Tchintaborack

SYNTHESE DE RAPPORTS D'AUDIENCES PUBLIQUES

Audience publiques

Conformément au mécanisme de publicité des études d'impact sur l'environnement (EIE), énoncé à la loi n°2018-28 du 14 mai 2018 déterminant les principes fondamentaux de l'Evaluation Environnementale au Niger, ces audiences doivent permettre d'atteindre les résultats suivants :

- les populations sont imprégnées des différents contours du projet ;
- les impacts et les mesures d'atténuation et de renforcement préconisées sont connus par les populations ;
- un cadre démocratique de débats entre les acteurs du projet est créé ;
- les opinions et les attentes des populations sont recueillies ;
- les populations ont adhéré aux objectifs du projet.

Après la présentation succincte du contenu du rapport, la parole fut donnée à la population pour poser des questions d'éclaircissement, faire des observations et exprimer ses vœux/avis relatifs au projet. Les intervenants ont tous manifesté leur joie par rapport à un tel projet et attendent impatiemment sa mise en œuvre.

Enfin, les préoccupations soulevées par les populations lors des consultations publiques se résument comme suit :

Préoccupation/Attentes communes

- La clôture grillagée des sites pour pallier aux éventuels dégâts des animaux,
- La mise en place des fonds de roulement pour face à la précarité ambiante
- La mise en place des boutiques d'intrants et magasins de stockage
- Formation professionnelle au profit des femmes et jeunes
- ✓ **Sites de Mararaba et Tchintaborak**

Les activités d'irrigation en cours, la population dispose d'une grande expérience dans le domaine. Ces sites sont confrontés aux problèmes d'inondation et des contraintes posées par la prolifération d'une espèce envahissante : *Prosopis juliflora*. L'aménagement des nouveaux sites risque d'exacerber la situation, d'où la nécessité d'un traitement préalable de la question. Remplacer le système gravitaire d'irrigation par le réseau californien.

✓ Sites de Aggok et Techillé

A Aggok, les activités d'irrigation ont été interrompues depuis 2015 à cause du tarissement précoce des puits. On note une tentative de reprise de cette activité comme illustrée par la photo ci-dessous. A Techilé, il n'existe pas des périmètres irrigués. La population de ces deux sites a exprimé son besoin en renforcement de capacité.



Quelques photos des audiences publiques

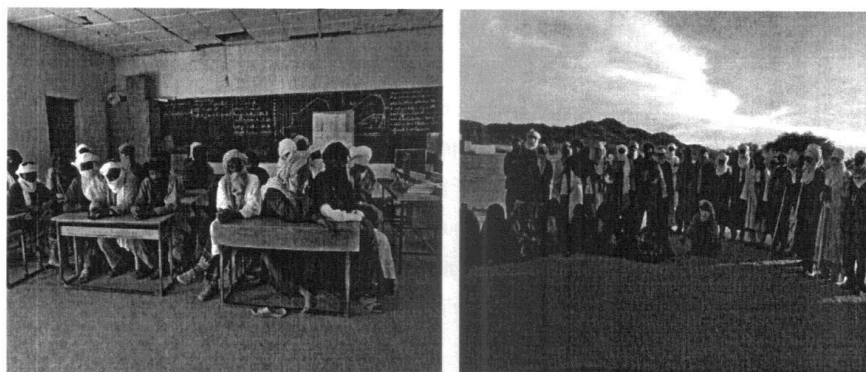
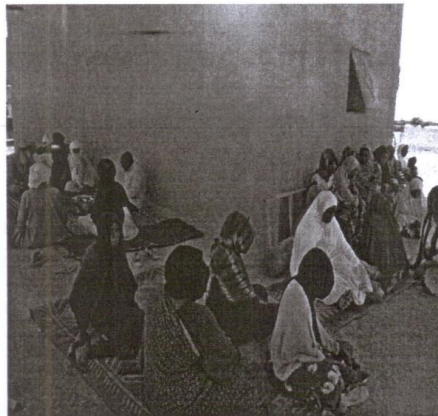


Photo 4,5 : Tenue des audiences publiques à Mararaba



Photos 6,5 : Tenue des audiences publiques à Aggok et Techilé

CONCLUSION/RECOMMANDATIONS

La mission d'audiences publiques, effectuée dans la zone concernée par le projet Fonds vert, a permis de constater les réalités terrain.

Il ressort des entretiens avec les populations de la zone du projet :

- La participation massive des populations aux consultations publiques témoigne de leur adhésion au projet. La participation des jeunes et surtout les femmes a été remarquable sur l'ensemble des sites. L'implication des femmes et des jeunes à l'exploitation des sites qui seront aménagés se fera de manière équitable, inclusive et sans aucune discrimination tel est l'engagement pris par les chefs de villages.
- les participants ont été suffisamment informés des différents impacts aussi bien positifs que négatifs, ainsi que les mesures d'atténuations proposées ,
- les populations des quatre (4) sites attendent impatiemment la mise en œuvre de ce projet.

Aux termes de cette mission, les recommandations suivantes sont formulées :

- réaliser les travaux dans les règles de l'art en tenant compte des spécificités.
- solutionner toute contrainte de nature à annihiler ou minimiser l'efficacité du projet

REPUBLIQUE DU NIGER REGION D'AGADEZ	Projet de développement et de mise à l'échelle d'aménagements hydro agricoles avec des pratiques d'agriculture intelligente résilientes au changement climatique
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Commune de Dabaga
Localité : Tchintaborack

PROCES VERBAL D'AUDIENCES PUBLIQUES

L'an deux mille dix-neuf et le vendredi 6 décembre, s'est tenue une réunion de consultation publique à Tchintaborack conduite par une équipe régionale d'agadez. La réunion a regroupé autour du chef de village les couches socio-professionnelles du village. Après la fatiha dite par un participant, les participants ont été informés sur les tenants et aboutissants du projet. Ils ont par la suite posé des questions d'éclaircissement auxquelles des réponses satisfaisantes ont été apportées par l'équipe de la mission.

Les participants ont enfin soulevé des préoccupations et émis des avis et attente pour la mise en œuvre du projet :

- La clôture grillagée des sites pour pallier aux éventuels dégâts des animaux,
- La mise en place des fonds de roulement pour face à la précarité ambiante
- La mise en place des boutiques d'intrants et magasins de stockage
- Formation professionnelle au profit des femmes et jeunes
- Les activités d'irrigation en cours, la population dispose d'une grande expérience dans le domaine. Ces sites sont confrontés aux problèmes d'inondation et des contraintes posées par la prolifération d'une espèce envahissante : *Prosopis juliflora*. L'aménagement des nouveaux sites risques d'exacerber la situation, d'où la nécessité d'un traitement préalable de la question. Remplacer le système gravitaire d'irrigation par le réseau californien.



I. Liste de présence

REGION: AGADES		DEPARTEMENT: TCHIROZERINE		
COMMUNE: TCHIROZERINE		VILLAGE: TCHINTABOREK Nom du site: Tchintaborek		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Alhousseini Hamoudan	Jardinier	83865491	
2	Ahmed Konjou	Jardinier	=	
3	Ichiba Gama	Jardinier	=	
4	Hattan S. Pigmane	Jardinier		- //
5	Bitti Goumouan	Jardinier	-	
6	Nakayo Salsiri	Jardinier	-	- //A
7	Gehrit Kourou	Jardinier	-	
8	Alhousseini Ahmada	Jardinier	-	
9	Mohamad Ahanna	Jardinier	96494184	
10	Mohamed Kariso	Jardinier	1A	1A
11	Atto Makha	Jardinier	91845840	
12	Choua Tahmodi	Jardinier	-	D
13	Amachi Illo	Jardinier	-	
14	Sidi Mordofa	Jardinier	-	
15	Bahy Adam	Jardinier	-	
16	Nouhamel Rhika	Jardinier		
17	Aghali Akafas	Jardinier	-	
18	Houmad Sadeck	Jardinier		110
19	Hamadan Goumane	Jardinier	-	11-
20	Tafka Amou ABBi	Jardinier	-	
21	Tchida Sidi	Jardinier	F-	- A
22	Maghni Amoumoune	Jardinier	F-	=
23	Fatimata Alhousseini	Jardinier	F-	
24	Hajja Goumane	Jardinier	F-	7.
25	Adidi ABBi	Jardinier	F	
26	ghanna Issighid	Jardinier	F-	↑

REPUBLIQUE DU NIGER REGION D'AGADEZ	Projet de développement et de mise à l'échelle d'aménagements hydro agricoles avec des pratiques d'agriculture intelligente résilientes au changement climatique
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Commune de Dannel

Localité : Téchillé

PROCES VERBAL D'AUDIENCES PUBLIQUES

L'an deux mille dix-neuf et le dimanche 8 décembre, s'est tenue une réunion de consultation publique à Techilé conduite par une équipe régionale d'agadez. La réunion a regroupé autour du chef de village les couches socio-professionnelles du village. Après la fatchia dite par un participant, les participants ont été informés sur les tenants et aboutissants du projet. Ils ont par la suite posé des questions d'éclaircissement auxquelles des réponses satisfaisantes ont été apportées par l'équipe de de la mission.





















Les participants ont enfin soulevé des préoccupations et émis des avis et attente pour la mise en œuvre du projet :

- La clôture grillagée des sites pour pallier aux éventuels dégâts des animaux,
- La mise en place des fonds de roulement pour face à la précarité ambiante
- La mise en place des boutiques d'intrants et magasins de stockage
- Formation professionnelle au profit des femmes et jeunes

A Techilé, il n'existe pas des périmètres irrigués. La population a donc exprimé un besoin en renforcement de capacité.



I. Liste de présence

REGION : AGADEZ		DEPARTEMENT : ARLIT		
COMMUNE : DANNET		VILLAGE : TECHILÉ		
		Nom du site : Techilé		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Alhassane Djéni Alhassane	maire Danet	91632131	
2	Agdaud la melle	chef de village	91624466	
3	Abdoul Aziz Zadi	villagier		
4	Adam emaud	Manœuvre		
5	Ghaoussman eji	commerçant		
6	Ahmad Atakou	Bijoutier		
7	mamadou aghali	elever		
8	Alstini emaud	Eleveur		
9	steban ebakwoz	Commerçant		
10	Hamata Amadou	Ménagère		
11	Halima Saliman	Ménagère		
12	ghaichata emaud	Ménagère		
13	Ahhamouda Aghali	Eleveur		
14	tamagort Bilal	Ménagère		
15	takalafa ghaliga	Ménagère		
16	Bakou Kawouan	Ménagère		
17	damaoui Abouzane	Ménagère		
18	Amouini ghaoudah	Ménagère		
19	A Rahmat ebakwoz	Eleveuse		
20	Rhissa Bila	Eleveur		

REPUBLIQUE DU NIGER REGION D'AGADEZ	Projet de développement et de mise à l'échelle d'aménagements hydro agricoles avec des pratiques d'agriculture intelligente résilientes au changement climatique
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Commune d'Ingall

Localité : Aggor

PROCCES VERBAL D'AUDIENCES PUBLIQUES

L'an deux mille dix-neuf et le dimanche 7 décembre, s'est tenue une réunion de consultation publique à Aggor conduite par une équipe régionale d'agadez. La réunion a regroupé autour du chef de village les couches socio-professionnelles du village. Après la fatchia dite par un participant, les participants ont été informés sur les tenants et aboutissants du projet. Ils ont par la suite posé des questions d'éclaircissement auxquelles des réponses satisfaisantes ont été apportées par l'équipe de la mission.

Les participants ont enfin soulevé des préoccupations et émis des avis et attente pour la mise en œuvre du projet :










- La clôture grillagée des sites pour pallier aux éventuels dégâts des animaux,
- La mise en place des fonds de roulement pour face à la précarité ambiante
- La mise en place des boutiques d'intrants et magasins de stockage
- Formation professionnelle au profit des femmes et jeunes

A Aggor, les activités d'irrigation ont été interrompues depuis 2015 à cause du tarissement précoce des puits. On note une tentative de reprise de cette activité comme illustrée par la photo ci-dessous.

CHEF DE VILLAGE D
ALBANEY SON
TEL. 91 00 5

I. Liste de présence

REGION : Agadez		DEPARTEMENT : Ingall		
COMMUNE : Ingall		VILLAGE : Aghogh		
		Nom du site : Aghogh		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Albakay Sidi Ali	chef du village	91602307	
2	Youssef Alwa	jardinier	91133124	
3	Hamad Boutou	jardinier	90327821	
4	Boutaly Ahmed	jardinier	92640153	
5	Ahmadou In'takouby	jardinier	91358111	
6	Moussa Moussatan	jardinier	92793835	
7	Sanad wani	jardinier	91000460	
8	Abajer chefo	jardinier	92735882	
9	Alkate Alitine	jardinier		
10	Ilguimise Al'ihmade	jardinier	91402600	
11	Ali Sanad	jardinier	91300418	
12	Souleymane Boutaly	jardinier	92294253	
13	Talimide Balli	jardinière		
14	Alaya Seyni	jardinière		
15	Aicha Aboungaze	jardinière		
16	Takoteyte Igdi	jardinière		
17	Sana Ali	jardinière		
18	Chinfa Baba	jardinière		
19	Rokiatou Sidi Ali	jardinière		
20	Zouheira Ali	jardinière	90007020	
21	Inaya Mahamade	jardinière		
22	Zeinalou Mohamed	jardinier	91268105	
23	Fatma Aboulwakman	jardinier		
24	Aminatou Aboutaly	jardinier		
25	Rokia wani	"		
26	Moussa Mahamane	"		

	Mohamed Gousseini	jardinier	92925509	
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
27	Bika Al'ikrade	jardinier		11
28	Beyni Alkade	élèveur		00
29	Pajime Alweina	élèveur		55
30	Ibrahim Alweina	élèveur		
31	Bay Salime	élèveur		20
32	Golzi Boutou	jardinier		21
33	Mohamade Salime	jardinier		
34	Mohamade Galidine	"		22
35	Galidine Zinakarbaye	"		11.7.2
36	Boutalo Galidine	"		10
37	Agoli Galidine	"		
38	Agoli Mallamade	"		11.7
39	Mohamade Alhadji	"		2
40	Alhadji Moussatane	"		
41	Mohamade Moussatan	"		11
42	Ahmed Boubacar	"		11
43	Ibrahik Boubacar	"		11
44	Sidi Mohamed S Ali	"	30.67.1615	
45	Ibrahim Babati	"		
46	Halifa Hamdi	"		2
47	Hamadi Kofime	"		11
48	Lahsan Ibrahim	"		11
49	Lahsan Ahmed	"		11
50	Habou Saley	"		11
51	Ibrahim S Ali	"		2
52	Moussa ISSA	"		2
53	Gusmane Babati	"		11
54	Lamine Hamdi	"		
55	Hasson Mohamed Lamine	"		11
56	Bayabé Agozar	"	80735523	
57	Hamdi Ahmed	"	81137587	

**Projet de développement et de mise à l'échelle
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d'agriculture intelligente résilientes au changement
climatique**

CONSULTATION PUBLIQUE
TERMES DE REFERENCE

Région de

Site de

Superficie du site.....









Date.....

I. Liste de présence

REGION : Tahana		DEPARTEMENT : Bronze		
COMMUNE : Kausane		VILLAGE :		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Mahamane Nassim Oumaraou	CDA	99968749	[Signature]
2	Allassane Alio	ouvrier	99212695	[Signature]
3	Nomane Hama Saly	cultivateur		[Signature]
4	Touko Alimi	cultivateur		[Signature]
5	Abimbale Moutao	cultivateur		[Signature]
6	Abou Feidi M Habibou	DRH / TA	90376707	[Signature]
7	Adada Haya	cultivateur		[Signature]
8	Halelou Karon	cultivateur		[Signature]
9	Ibrahim Oumam	cultivateur		[Signature]
10	Nomane Fakel	cultivateur		[Signature]
11	Mouamini Kaka	cultivateur		[Signature]
12	Koumoune Amadou	cultivateur		[Signature]
13	Oumam Iko	cultivateur		[Signature]
14	MAHAMANE ABDOU ADAMANE	DRH / TA	96239800	[Signature]
15	Abdo Arro	cultivateur	86216385	[Signature]
16	Djibril Bouda	cultivateur	96939890	[Signature]
17	Abdou Alka	cultivateur	96591437	[Signature]
18	Abou Bouda	cultivateur		[Signature]
19	Isaoua Nomane	cultivateur	98471166	[Signature]
20	Moussa Amara	cultivateur		[Signature]
21	Fati Chabou	Rep. féminin	97666663	[Signature]
22	Djibril Alio	ménagère		[Signature]
23	Houama Alka	ménagère		[Signature]
24	Bakoua Mahamane	ménagère		[Signature]
25	Saouda Alhadini	ménagère		[Signature]
26	Zahara Camara	ménagère		[Signature]

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
29	Hadiza Habibou	menagere		
30	Zenabou Ismael	menagere		
31	Yaha Ila	menagere		
32	Charifa Daoui	menagere		
33	Fakhria Ila	menagere		
34	Wassila Ibrahim	menagere		
35	Dia Awapka	menagere		
36	Badira Hamane	menagere		
37	Diamba Dimer	menagere		
38	Zenabou Cameroun	menagere		
39	Diamba Hano	menagere		
40	Saladatu Idi	menagere		
41	Allassane Issoufou		9747559	
42	Soumaila Saley	STD/Environnement	9692882	
43	Namata Soumaila	STD/Environnement	9692882	
44	Hassane Y. Hamadou	DRE Taharou	9609508	
45	ABDoulaye Kimba	Représentant DRA	97501074	
46	Mainassara Reua	DDGR/Bauza	96290212	
47	Allassane Rahamadou	DR R-R	96094370	
48	Ime Ibrahim Hagu Amada	DR ONAHATA	96267105	
49	Makman Abdou	SG/Maie	99803902	
50	Hediza Zakari	menagere		
51	Rakiya Hamma	menagere		
52	Hassane Nayana	menagere		
53	Hagu Wadou	menagere		
54	Tselha Boube'	cultivateur		
55	Salaton Sala	Maie	96058736	

Liste des participants

Structures	Cadres	Emargement
Ministère de l'Agriculture et de l'Elevage	Direction Générale de l'Agriculture	 13/12/19
	Direction Générale de la production et des Industries Animales	13/12/19 
	Direction Générale de l'ONAHA	 13/12/19
	Secrétaire permanent du code rural	13/12/19 
Haut Commissariat I3N		13/12/19 
CNEDD		13/12/19 
Ministère du plan		13/12/19 
Ministère des finances		 13-12-19

REPUBLIQUE DU NIGER REGION D'AGADEZ	Projet de développement et de mise à l'échelle d'aménagements hydro agricoles avec des pratiques d'agriculture intelligente résilientes au changement climatique
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Commune de Dabaga
Localité : Mararaba Elméki

PROCCES VERBAL D'AUDIENCES PUBLIQUES

L'an deux mille dix-neuf et le jeudi 5 décembre, s'est tenue une réunion de consultation publique à Mararaba Elméki conduite par une équipe régionale d'agadez. La réunion a regroupé autour du chef de village les couches socio-professionnelles du village. Après la fatiha dite par un participant, les participants ont été informés sur les tenants et aboutissants du projet. Ils ont par la suite posé des questions d'éclaircissement auxquelles des réponses satisfaisantes ont été apportées par l'équipe de la mission.

Les participants ont enfin soulevé des préoccupations et émis des avis et attente pour la mise en œuvre du projet :

- La clôture grillagée des sites pour pallier aux éventuels dégâts des animaux,
- La mise en place des fonds de roulement pour face à la précarité ambiante
- La mise en place des boutiques d'intrants et magasins de stockage
- Formation professionnelle au profit des femmes et jeunes
- Les activités d'irrigation en cours, la population dispose d'une grande expérience dans le domaine. Ces sites sont confrontés aux problèmes d'inondation et des contraintes posées par la prolifération d'une espèce envahissante : Prosopis juliflora. L'aménagement des nouveaux sites risques d'exacerber la situation, d'où la nécessité d'un traitement préalable de la question. Remplacer le système gravitaire d'irrigation par le réseau californien.



I. Liste de présence

REGION : AGADEZ		DEPARTEMENT : TCHIROZERINE		
COMMUNE : DABAGA		VILLAGE : MARARABA. AOUDEAS		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Ousmane Namo	Jardinier		
2	Abdrahamane Tchissa	Jardinier	92253692	
3	Ghissa Katakira	Jardinier		
4	Sidi Katakira	Jardinier		
5	Silimane Gouma	Jardinier		
6	Ismael Namo	Jardinier		
7	Thya Hamid	Jardinier		
8	Moussana Gouma	Jardinier	91483892	
9	Moussa Hamid	Jardinier		
10	Harwad Thya	Jardinier		-A
11	Assaleh Mohamed	Jardinier	92422808	
12	Aboubacar Tchissa	Jardinier		-A
13	Adam Alhassane	Jardinier	91303869	
14	Ghoumar Ghissa	Jardinier		
15	Salah Moussa	Jardinier		X
16	Hamad Islo	Jardinier		-
17	Hamidan Mohamed	Jardinier		
18	Hammondou Dialla	Jardinier		-a
19	Almed Bonbazar	Jardinier		
20	Silimane Almantapka	Jardinier		F
21	Hamid Alhassane	Jardinier	90988310	
22	Mohamed Wanalher	Jardinier		X -
23	Hammondou Tchaguina	Jardinier		
24	Amoumoune Lalo	Jardinier		
25	Atouma Lalo	menagere		
26	Tal Hassan Hamid	menagere		

**Projet de développement et de mise à l'échelle
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d'agriculture intelligente résilientes au changement
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CONSULTATION PUBLIQUE

TERMES DE REFERENCE

Région de

Site de

Superficie du site.....

Date.....

I. Liste de présence

REGION :		DEPARTEMENT :		
COMMUNE:		VILLAGE :		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Abdourahamane Mahamane	Chef du village	97240377	T
2	Abdourahamane Harouna	Imam	99069057	Y
3	Abdou Karamane	Enseignant	96094193	Y
4	Aboubakar Alhousseini	Enseignant	96707299	Y
5	Mahamadou Traouga		96654615	-M
6	Aboubakar Habibou		85419054	-A.H.
7	Elh. Alhassane Mahamane		88350847	-Y
8	Elh. Hamadamou Aboubakar			Y
9	Moussa Mamane			-Ma
10	Abdoul. Malik Hamidoune		96605722	-A
11	Aboubakar Noman	Adm		C.B.
12	Malam Hamani Abdoulhi			2
13	Aminou Aboubakar		8835737	A.
14	Alio Harouna		88620341	3
15	Oumarou Hamidou		98336388	Y
16	Amadou Idriss	Conseiller municipal	97255353	Y
17	Ibrahim Alhassane		96409406	Y
18	Moussa Souleymane			A
19	Rachideu Hamidoune		96312852	Y
20	Abou Abdoulaye			T
21	Hamma Abdoulaye		96401625	-H.A.
22	Mahamadou Aboubakar		89612060	-M
23	Ssa Traouga			Y
24	Bassirou Atti Kou			B.
25	Ahmed Moussa		98874146	Y
26	Haya Adamou		91323429	-D

27	Mohamane			
28	Mahamadou Abdoukaki (Keni)			
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
29	Yacoubou Salah			
30	Namaka Haya			
31	Amadou Karimoune			
32	Chouibou Ibrahim			
33	Moussa Mahamadou			
34	Mahamadou Abdouhamane		96391933	
35	Idrissa Abdelou			
36	Djibo Mahamadou			
37	Sani Aboubakar			
38	Salami Harouna	M		
39	Maman Idriss Idrissa			
40	Goumarou Ali		98130907	
41	Aboubakar Mahamane			
42	Aboubakar Aboubakar			
43	Goumarou Hamani (Bala)			
44	Amadou Abdoul Aziz		96707987	
45	Mahamane Nomaou			
46	Alio Mahamadou		97635295	
47	Kamaye Abdouhamine		97465490	
48	Chouibou Goumarou			
49	Aboubakar Hamza			
50	Mahamadou Maman			
51	Mahamadou Moussa	Imam I	97987399	
52	Amadou Aboubakar		91588348	
53	Idrissa Djibrina			
54	Mahamadou Aboubakar			
55	Amadou Moussa		97642772	
56	Samanta Amadou		99261966	
57	Assoumane Goumarou		99699848	
58	Ibrahim Goulymane			
59	Mahamadou Ali		99592991	

I. Liste de présence

REGION :		DEPARTEMENT :		
COMMUNE:		VILLAGE :		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Aïcha Tombali		97987332	
2	Inna Moukaila			
3	Adama Attaher			
4	Rabi Amadou		98712689	
5	Tambara Souleymane			
6	Sahara Hamadoussa			
7	Hamira Saïdou			
8	Koulouwa Amadou			
9	Ouma Kallé			
10	Zinaba Moussa			
11	Ije - Souleymane			
	Aïchaton Aboubar			
	Amine Aboukhalil			
	Fatima Almonctar			
	Harana Harana			
	Ramatu Hamani			
	Amana Bille			
	Hadjaton Touré			
	Moumouna Awi			
	Hajir Raba Abdoulaye			
	Rabi Idissa			
	Adama Nourou			
	Halimaton Amane			
	Hawa Samiré			
	Zaharaton Abdoulaye			
	Louba Djibo			

	Fatima	Biibo			
	Chaoudi	Tanku			
N°	NOM ET PRENOMS		PROFESSION	CONTACT	SIGNATURE
	Gaichaton	Oumaru			m
	Bele	Adamou			m
	Habbé	Oumaru			m
	Moukama	Hamma			m
	Oumale	Aboubakar			m
	Rabi	Sadi			m
	Rahamtu	Adama			m
	Zina	Altkou			m
	Amina	Amadou			m
	Aichaton	Lawa			m
	Amira	Mahamadou			m
	Aichaton	Amane			m
	Hadiza	Moussa			m
	Hassira	Sidi			m
	Zineb	Aboubakar			m
	Aichaton	Naanton			m
	Mariama	Aboubakar			m
	Aichaton	Mahamadou			m
	Aria	Abou			m
	Assama	Abou			m
	Halissa	Amane			m
	Fatchima	Adou			m
	Ayema	Sidi			m
	Rakia	Almou			m
	Naria	Hager			m
	Ta Weina	Soussou			m
	Hadja Fatchima	Hamidou			m
	Machaton	Assoumana			m
	Binta	Mahamadou			m
	Mariama	Kore			m
	Hadiza	Naanton			m

	Hajia Sata.			
	Hawa Hahmadou			
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
	Rabi Chaïbou.			
	Mariam Rahmadou			
	Nourweira Siïdoun			
	Nafima Elhamou			
	Ramatou Alhousseini			
	Aissamane Issa			
	Fatimabou Salifou			
	Zouabou Hamza			
	Sahoua Ibrahim			
	Fati Kidnaye			
	Fatchima Tanimoune			
	Halimatin Ikhama			
	Hawa Adamou			
	Halima Soli			
	Balki Saïdou			
	Rachida Abdoulaye			
	Ladi Boubou			
	Guinabou Ahmadou			
	Aïchaton Siïdoun			
	Touweira Nourou			
	Abou Slla			
	Saliba Almadas			
	Mariamane Loulou			
	Yaine Moussa			
	Fatchima Hahmadou			
	Aïcha Sedine			
	Rabi Kasseum			
	Lantou Ayenba			
	Hawa Gyamba			
	Mariam Djimilou			
	Amra Hahmadou			

Moustapha Bameled	Ameha Ayuba	Issam Issam	Issam Issam
Mallon	Idrissa	Adel -	Illi
Rabi	Aboubacar	Kouba	Illi
Habbi	Oumabr.	Harpa	Iddou
Fatchima	Iddou	Rabou	Assoumana
Agama	Abou -	Fati	Issam
Ijamila	Iddou	Ama	Alasane
Rabi	Abdul-Kader -	Hadjama	Iddou
Assoumana	Aboubacar	Hasso	Habiba
Mariama	Haroun	Horara	Iddou
Rabi	Assoumana	Kimar	Selma
Ama	Ouhan	Kalamata	Chita
Rabi	Issa	Stan	Bigo
Sandata	Mahamedou	Rabi	Assoumana
Siaka	Alasane	Mine	Boula
Assa	Mamidi	Aichata	Hachim
Binta	Assoumana	Habiba	chefa
Fatchima	Naman	Ouma	chifa
Mariama	Mahamedou	Kedje	Hachim
Ouma	Naman	Habiba	Anja
Bénabou	Illi	Yehé	Hachim
Habbi	Selma	Wara	Sani
Adia	Habiba	Sakira	Mahamedou
Ama	Aboulaye	Fatchima	Yahou
Fatchima	Amana	Hadja	Ala
Eno	Haroun	Iddou	Habiba
Hawa	Amone	Mariam	Illi
Kemba	Agita	Habiba	Aboubacar
Pamator	Issa	Hadja	Assoumana
Mariama	Issa	Habiba	Aboulaye
Aicha	Yahou	Binta	Solo
Amame	Abdoulamene	Aichata	Mahamedou
Aicha	Solo	Salamata	Hachim
Acha	Sambouka	Mine	Alasane
Habesata	Amame	Sandata	Mahamedou
Aicha	Lana	Mariam	Alasane
Fatchima	Souly	Assa	Kalamata
Illi	Braddere	Fatchima	Atta
		Fatchima	Mahamedou

I. Liste de présence

REGION :		DEPARTEMENT :		
COMMUNE :		VILLAGE :		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
	Seraï Moura			
	Aïno Amara			
	Acha Haya			
	Saadou Adaman			
	Balki Oumra			
	Hadiza Mohamedou			
	Binta Mohamedou			
	Bahija Abou			
	Kali Mohamedou			
	Aicha Mohamedou			
	Aicha Ili			
	Hassina Sokina			
	Fatchina Moura			
	Rehematon Mahaman			
	Hawa Abouba			
	Kali Adou			
	Hama Haya			
	Martina Bakou			
	Zaliha Baba			
	Hadjaton Adou			
	Acha Hama			
	Binta Yacoubou			
	Madikan Katta			
	Rakia Bourou			
	Bebi Cheffou			
	Hadjaton Saadou			
	Mohamedou Maffanidou			

Binta Abu		Hassan	Abdu	
Hadjara Issa		Amber	Abdu	
Bora Issa		Abu	Abdu	
Mariam Aldo		Sahar	Abdu	
Jubela Amma		Hatira	Amadu	
Sahia Nouba		Mariam	Maham	
Amira Taminou		Hawa	Maham	
Sadia Fekissa		Hindata	Abubakar	
Sadia Illo		Fatchima	Maham	
Sarata Abdurage		Maham	Illo	
Mariam Sahia		Siabata	Maham	
Sabata Ouhumadu		Noua	Maham	
Sadia Assouma		Assa	Maham	
Basata Guma		Sarata	Maham	
Fati Halibu		Fekira	Cherba	
Sahia Cherba		Belki	Guma	
Mariam Sahia		Rah	Maham	
Rakia Guma		Amirata	Illo	
Koumege Kachidu		Abubakar	Maham	
Sarata Maham		Mamad	Maham	
Alkama Maham		Abubakar	Habib	
Maria Illo		Abubakar	Halibu	
Aldo Issa		Abubakar	Illo	
Basata Guma		Sahia	Abubakar	
Sarata Guma		Abubakar	Maham	
Mariam Cherba		Amir	Maham	
Adamah Kachidu		Yakou	Maham	
Yakou Ibrahim		Issa	Cherba	
Guma Kachidu		Maham	Illo	
Soussa Taminou		Ateli	Cherba	
Tanka Hassana		Abubakar	Amir	
Taminou Abdurage		Yakou	Illo	
Binta Sahia		Amir	Abubakar	
Assouma Amadu		Mariam	Maham	
Hawli Belki		Amir	Maham	
Basata Amadu		Amir	Maham	
Hadjara Issa		Amir	Maham	
Fatchima Issa		Amir	Maham	
Illo Issa		Amir	Maham	
Amir Issa		Amir	Maham	

I. Liste de présence

REGION : <u>Naradi</u>		DEPARTEMENT : <u>Dakoro</u>		
COMMUNE : <u>Korahane</u>		VILLAGE : <u>Korahane</u>		
		Nom du site : <u>ben dabo qui</u>		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Idi Ibrahim (Tilo)	cultivateur	37898071	
2	Laouali Salifou	Representant du chef	37857221	
3	Agada Karam		96640112	
4	Tambani Nabe	chef de Travaux	96269014	
5	Namane Salifou	Representant du chef		
6	Idi Salifou	cultivateur	88272210	
7	Gaba Ibrahim	Vie Naine	96617170	
8	Dahmane Issa	delegue du chef	1140715	
9	Souley Chaibou	cultivateur		
10	Abdou Souley	cultivateur	96842175	
11	Namane Souley	cultivateur	96028174	
12	Namane Souley	cultivateur		
13	Namane Souley	cultivateur	96043326	
14	Namane Souley	cultivateur	96201194	
15	Namane Souley	cultivateur	38584430	
16	Namane Souley	cultivateur	99491501	
17	Namane Souley	cultivateur		
18	Namane Souley	cultivateur	89052458	
19	Namane Souley	cultivateur	33580858	
20	Namane Souley	cultivateur	97342542	
21	Namane Souley	cultivateur		
22	Namane Souley	cultivateur		
23	Namane Souley	cultivateur		
24	Namane Souley	cultivateur		
25	Namane Souley	cultivateur		
26	Namane Souley	cultivateur		
27	Namane Souley	cultivateur		
28	Namane Souley	cultivateur	90609674	
29	Namane Souley	cultivateur	28854843	

Korahone (suite)

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
30	Gauche Bayard	cultiv	83777244	GP
31	Sami Noussou	cultiv	71377366	Z
32	Sami Noussou	cultiv	92575501	W
33	Sami Noussou	cultiv	8058454	T
34	Thabir I. S. S.	cultiv	37868516	
35	Thabir I. S. S.	cultiv	81201398	80
36	Souley I. S. S.	cultiv		
37	Nawata Andiga	cultiv	4196158	4/4
38	Nawata Andiga	cultiv	8853387	12
39	Nawata Andiga	cultiv	814535	Q R
40	Rabou Noma	cultiv	9837134	8
41	Sami I. S. S.	cultiv	92849281	12
42	Amadou Nankao	cultiv	88957282	12
43	Bella Amadou	cultiv		u
44	Abdou Salam Nankao	cultiv		u
45	Abdou Rachid Nankao	cultiv	90661144	u
46	Nawata Souley	cultiv		T
47	Amadou Nankao	cultiv		u
48	Choude Roulle	manager	9286666	12
49	Malima Ibrahim	manager		u
50	Heurine Sahbi	manager	96541127	u
51	Thabir Rakia Thabir	Bouche		u
52	Nawata Haroun/Tassala	manager		u
53	Talata T. S. S.	manager		u
54	Abdou Soudougui	cultiv	42635152	u
55	Rabou R. S. S.	manager		u
56	Rabou R. S. S.	manager		u
57	Rabou R. S. S.	manager		u
58	Abdou Chai	manager		u
59	Tilago Andiga	manager		u
60	Ai Bi So	manager		u
61	Abdou Adamou	cultiv	97655937	u
62	Balki Adamou	cultiv manager	98436301	u
63	Safia Alhou	manager		u




























I. Liste de présence Korohane (Suite)

REGION :		DEPARTEMENT :		
COMMUNE :		VILLAGE :		
		Nom du site :		
N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
59	Ibrahim Amma	Culteur		X
60	Alinda Anbo	menage		u
61	Adamou Ada	Culteur		X
62	Elia Salao	Culteur		u
63	Koufouma Salip	menage		X
64	Sabily I. B.	menage		u
65	Fathima Roumouli	menage		u
66	Chagouli Dan Baki	menage		u
67	Saadi Soufara	menage		V
68	Amou Sal	menage		u
69	Abou Kiro	menage		u
70	Halima Koko	menage		X
71	Habou Adama	menage		u
72	Hanna Sam	menage		X
73	Danadi Nani	menage		u
74	Tabachi Nana	menage		X
75	Yadama Sal	menage		u
76	Amou Amou	menage		u
77	Tagouma Dan Baki	menage		u
78	Bloua Yacoubou	menage		u
79	Houma Gidou	menage		X
80	Amou Koro	Culteur		X
81	Danki Koro	Culteur		X
82	Souma Houdou	Culteur		X
83	Badi Nana	Culteur		X
84	Eloua Nana	Culteur		X

Liste de présence aux consultations publiques à Djirataoua

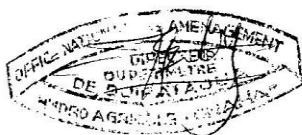
Djirataoua le 10/11/2019
 Projet de Réhabilitation SDR HA 201
 Liste de présence des participants de la Réunion
 de la Mission de Global Leads SA avec
 ONAHA ET DGGR/MINISTÈRE AGRIC.

Nom & Prénoms	structure	fonction	Contact	Signature
Sani Amadou	Coop CPR	SG plot	95032257	
Ilia Harouna	Publ-coop CPR	Publ coop	94599740	Ilia
Sani Bayrou	Coop CPR	SG plot	97677603	SP
Abou Naboune	Coop CPR	Publ plot	80716361	
Jeli Mahaman	S.G. CPR	S.G. CPR	97534831	Jeli
Saoudou Harouna	S.G.	Coop GN	97245907	Saoudou
Haty Ousseini	Président	Coop-GN	90421056	Haty
Abdoul Hadi Ali	Tre'sorier	Coop. CPR	80902062	Abdoul
Ali Saïdou	Membre Plot	Coop. RA	9997001	Ali
Rabé Jno	Membre Plot	Coop. GN	96288737	Rabé
Suley Zado	Membre Plot	Coop GS	98642442	Suley
Kabinou Moukta	Membre Plot	Coop. CPR	84695397	Kabinou
Salissou Ibrahim	Membre Plot	Coop GS	84.883721	Salissou
Oummarou Haïdo	Membre Plot	Coop GS		Oummarou
Elh Sanoussi Ibrahim	Conseiller	Coop GS	97576880	Elh
Jno Kane	Membre Plot	Coop GS		Jno
Oummarou Salissou	Membre Plot	Coop GS	99312702	Oummarou
Sani Gado	Conseiller	Coop GS	84180420	Sani
Saïdou Harouna	S.G.	Coop. RA	99252864	Saïdou
Ihoussa Suley	Tre'sorier	Coop. RA	97655030	Ihoussa
Nathamou Sangou	Tre'sorier	Coop. KTI	96397780	Nathamou

Nom Prenoms	Structure	Fonction	Contact	Signature
Nouhou Kalla	Coop CPR	SG plot	88 30 22 90	
Zabawou Sani	Coop KM	prod plot	96 60 73 10	
Yaoou Idi	Coop KM	SG plot		
Hamidou Idi			97 61 90 73	
Abdoul Aziz Yahaya	Coop KM	SG plot	99 40 95 28	
Bachir Yahaya	Coop KM	SG plot	99 47 88 66	
Rabé Hareu	Coop KM	SG plot	38 27 68 71	
Hareu Eusmane	Coop KM	President	88 56 35 54	
Abou Maman	Coop GS	T G	91 63 66 72	
Bessirou Gamba	Coop GS	presid plot		
Abdou Rahaman	Coop GS	SG	99 51 22 33	
Moukokoar Hareu	Coop	presid plot	99 55 57 39	
Salissou Maki	Coop	presid plot	96 48 85 08	
Moussa Laco	Coop	Tresorier	96 47 52 22	
Souley Laco	Coop	PR	98 66 24 42	
Laoual Kane	Coop	presid		
Laouali Maki	Coop KM	amptable	88 20 00 95	
Ehitou ZRO	Coop KM	Memb	92 71 76 91	
Issoufou Hahamane KM		membre	96 48 13 85	
Yahouza Issoufou KM		membre plot	94 82 72 55	
Moussirou Kadi	GS	SG	90 07 16 93	
Abdou Adouma KM		Membre PR	93 31 12 72	
Salissou Hissoufou KM		PR duplet	96 42 63 98	
Adamou Kouni KM		PR duplet	93 47 55 94	
Mallam Hamza	CPR	PR duplet	97 41 89 55	
Achirou Sakam	RA	PR duplet		
Ybrahim Abdou	RA	PR	94 19 17 06	
Ybira hani Boura	KM	SG	89 90 70 63	

Nom PRENOM	Fonction	Structure	Contact	Signature
Subman Baraou	PR du plot KM		98630348	<i>[Signature]</i>
Salissou Mali	SG	RA	98213270	<i>[Signature]</i>
Sani Harou	coop GS	SG	98237038	<i>[Signature]</i>
Salissou Issa	GS		99339339	<i>[Signature]</i>
Abdoul Yésima	GS		99930418	<i>[Signature]</i>
Halarou Gamba	Coop RA	Président	74-379320	<i>[Signature]</i>
Mamouda Bakaye	Coop RM	S.G	80-96-1144	<i>[Signature]</i>
Harou Gondou	membre	KM		
Saguirou Nani	Président GS	GS	96-80-88-78	<i>[Signature]</i>
Moussa Gouji	GS	S.G	99-90-9026	<i>[Signature]</i>
Sadi Bayni	Président	GS	89-01-63-78	<i>[Signature]</i>
Sani Ali	S.G	GS	96-52-4590	<i>[Signature]</i>
ANEAGASSE Haroune Kula	Analyste	Global head	+22897228919	<i>[Signature]</i>
ELH SAMINOU	ONAHA	DRV/AE	96876968	<i>[Signature]</i>
Abdoul Razak NA	ONAHA	DR / coord	96299469	<i>[Signature]</i>
Ballo, Naminou	DRGR	DRGR	96273501	<i>[Signature]</i>
Oumarou Ibrahim	ONAHA	DP	99455131	<i>[Signature]</i>

Le Directeur



Some partial views of participants in Djirataoua



**Appendix 3 : Environmental and Social Characterization and Classification Form
for Sub-Projects**

This form has been designed to assist in the environmental and social characterization and classification of sub-projects to be implemented in the field. The selection form contains information that will enable the implementing structures to identify characteristic aspects of the local biophysical and social environment for the purpose of assessing the potential socio-economic impacts of the activities. It consists of three parts:

- - Part A : Site Sensitivity Assessment
- - Part B: Social and Environmental Impacts of the Sub-Project
- - Part C: Project Classification and Environmental Work

I. SUB-PROJECT PRESENTATION.

I.1 Title of the sub-project: _____

I.2 Location : Region: _____ Department : _____ Commune: _____ Village: _____ Village: _____

I.3 Estimated cost of the sub-project: _____ FCFA

I.4. Duration of execution: _____ months (from _____ to _____)

II. PRELIMINARY SCREENING OF SUB-PROJECTS.

Part A: Site Sensitivity Assessment

Is the sub-project located, in whole or in part, in or near a risk or environmentally sensitive area?

1. Ecological habitat of endangered species. Yes _____ No _____
2. Protected area Yes _____ No _____

Instructions.

If the answer is "yes" to any of the questions in Part 1, no further review is required. Proceed to the end of the form to indicate that the sub-project is Category A.

If the answer is "no" to all of the questions in Part 1, proceed to Part B.

Part B: Social and Environmental Impacts of the Sub-Project

Social and environmental impacts of the sub-project			
Q1	Can the sub-project lead to land conflicts?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q2	Is the sub-project likely to result in involuntary displacement of people, hamper the free movement of local goods and people, access to goods or loss of assets (crops, agricultural land, built-up land, etc.)?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q3	Will the sub-project contribute to the generation of a significant amount of discharges? or waste?	in the ground	<input type="checkbox"/> yes <input type="checkbox"/> no
		in the air	<input type="checkbox"/> yes <input type="checkbox"/> no
		in water	<input type="checkbox"/> yes <input type="checkbox"/> no
Q4	Does the sub-project, for its implementation, require or reinforce the use of chemicals (pesticides, other products)?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q5	Does the sub-project pose a threat to sensitive areas of the environment?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q6	Does the sub-project present threats to the biodiversity of the environment?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q7	Can the sub-project pose a threat to the cultural, archaeological or historical heritage of the area, if any?		<input type="checkbox"/> yes <input type="checkbox"/> no
Q8	Will the sub-project result in risks to the health and/or human safety of personnel or local populations during and/or after construction?		<input type="checkbox"/> yes <input type="checkbox"/> no

Q9	Could the sub-project lead to conflicts between the various users themselves or between them and the local inhabitants?	<input type="checkbox"/> yes	<input type="checkbox"/> no
Q10	Does the sub-project, for its implementation, require the massive use of natural resources (water, wood...) of the environment?	<input type="checkbox"/> yes	<input type="checkbox"/> no
Q11	Will the sub-project cause the temporary or permanent loss of crops, fruit trees or domestic infrastructure (such as granaries, toilets etc.)?	<input type="checkbox"/> yes	<input type="checkbox"/> no
Q12	Can the sub-project lead to an increase in disease vectors?	<input type="checkbox"/> yes	<input type="checkbox"/> no
Q13	Is the sub-project likely to result in wildlife disturbance (habitat loss, poaching, stress, migration, etc.)?	<input type="checkbox"/> yes	<input type="checkbox"/> no
Q14	Does the sub-project have the potential to result in disturbance to grazing activities? (impeded livestock movement, degradation of pastures)?	<input type="checkbox"/> yes	<input type="checkbox"/> no

Suggestions

If the answer is "yes" to at least one of the questions between Q1 and Q9, no further testing is required. Proceed to the end of the form to indicate that the sub-project is Category B1. Sign and retain the form for control purposes.

If the answer is "no" to all of the questions in Q1 to Q9 and "yes" to at least one of the questions in Q9 to Q14, skip to the end of the form to indicate that the sub-project is Category B2. Sign and retain the form for control purposes.

If the answer is "no" to all questions (Q1 to Q14), skip to the end of the form to indicate that the sub-project is Category C. Sign and retain the form for control purposes.

Part C: Project Classification and Environmental Work (to be completed by BNEE/DEESE)

Project type: A ☐ B1 ☐ B2 ☐ C ☐

Environmental work required:

No environmental work (C) ☐

Simple Mitigation Measures (B2) ☐

Simplified Environmental Impact Assessment (B1) ☐

Ineligible sub-project (A) ☐

APPENDIX 4: Land securing for AHAS development in Niger

Land management by ONAHA

Legal framework for AHA land tenure by ONAHA

As part of the new reforms, ONAHA is in charge of conducting the registration process for irrigated land. In addition, the Office will play a more prominent role in the allocation of plots. In addition to the texts mentioned above, which set up the State structures for land tenure security, the implementation of land tenure-related missions by ONAHA is governed by several texts, in particular:

- Law n° 60-28 fixing the methods for the development and management of agricultural developments carried out by the public authorities.
- Law N°2017-27 of 28th April 2017 on emphyteutic leases;
- Decree No. 2015-354/PRN/MAG of 10 July amending and supplementing Decree No. 2015-218/PRN/MAG of 18 April 2015 approving the statutes of the National Office for Hydro-Agricultural Developments (ONAHA);
- Articles: 19, 45, 46, 47, of the management agreement N°002 of August 08, 2016 modifying and supplementing the agreement N° 0524/MAG of July 06, 2015 signed between the State and ONAHA, mandating ONAHA with the prerogatives of administration and management of hydro-agricultural developments carried out by the public authorities;
- Order n° 009 of January 21, 2016 approving the standard contract for the occupation of plots of land within the agricultural perimeters developed by the State or local authorities.

On AHAs, the management rules and sanctions are clarified in the internal rules of the AUEi and the cooperative. The various ONAHA/AUEi and ONAHA/Cooperative Society (Scoop) also set out the management rules, including land management.

In the ONAHA/Scoop Contract Article 3: provides for the Commitments and obligations of ONAHA, namely". To secure the physical integrity of the hydro-agricultural development through registration and in application of the principles governing the legal regime of the State's public domain ».

Article 6 which deals with the protection of the integrity of the public heritage of the AHA stipulates that: "To avoid deterioration or detrimental use of the AHA, the Association undertakes to take all necessary measures to prevent unauthorized encroachment on the AHA (land and tracks within the perimeter, canals and drains, ...)".

ONAHA's role in land management

ONAHA has powers to protect AHA areas and secure their land through their registration as well as the conclusion of any exploitation title decided by the State on one of its perimeters in compensation for a lost right or for the needs of development. It also has the powers to represent the State before the administrative authorities and technical and financial partners in any case related to hydro-agricultural developments under construction or planned, the

right to go to court, to plead as plaintiff or defendant, if necessary, alongside the other administrative bodies of the State, in any lawsuit involving the interests of an AHA.

According to Article 19 of ONAHA's Statutes relating to the steering of the public hydro-agricultural development, the tasks of general interest carried out by ONAHA within the support mission for the steering of investment operations for public hydro-agricultural developments are specified in a contract binding ONAHA to the State, in particular, the activities of recomposition of irrigated land in compliance with the fair, transparent and equitable rules in force. Article 7 of the ONAHA/MAG/EL Management Agreement gives ONAHA the prerogatives for "land management of the developed areas, and this in relation to a joint committee set up by a ministerial order.... "» . Thus, according to the Plan Contract between the State and ONAHA, the major results expected from ONAHA are, among others, significant progress in terms of securing irrigated land and environmental monitoring. The levels of results set for ONAHA in the Plan Contract for securing land tenure on AHAs are as follows:

- The areas to be secured for 2000 ha per year of new land and 17 310 ha of existing developed land;
- The lands of former AHAs are registered and Land Title are established for all new AHAs;
- The rights of the operators are recorded on the Land Title.

ONAHA's Land Management Unit responsible for new AHA's land tenure security

To meet its obligations in terms of land tenure security, ONAHA's Unit responsible for land management will be in charge to:

- conduct the procedure hereinbefore (point 2.3) for the establishment on behalf of the Land Titles Office for AHAs;
- participate in the resettlement operations of populations concerning all hydro-agricultural development projects;
- legally protect the rights of the producers exploiting the plots,
- monitor the execution of the plot occupation or emphyteutic lease contracts that bind ONAHA to the aha farmers;
- periodically renew the documents of these contracts (contract of occupation);
- monitor and inform management about land claims and disputes on the perimeter;
- mediate between ONAHA and representative entities or between farmers on the strictly land level;
- mobilize in case of need for legal advice to document all disputes on the perimeters throughout the country;
- manage, in relation with regional directors, heads of offices and perimeter managers, the databases relating to aha plots.
- ensure the proper conservation (archiving) of the land security deeds drawn up;
- write the final report of all aha securing operations.

New AHAs registration process for the AHA-AIC project and its replication

In the framework of the AHA-AIC project, all the land will be secured before the development of the AHAs. The process below will be undertaken by the ONAHA's land management Unit to secure the perimeters of the project and all the new land for the project replication.

New AHAs Pre-registration operations

In Niger, any owner of immovable property (private or public person) may apply to the Registrar of Landed Property for its registration (Art. 790, CGI); but only built or undeveloped land may be registered in the land register (Art. 772, CGI).

Before registration can be applied for AHAs development, several preconditions must be met. Firstly, if the lands proposed for AHA development is not fenced, the owners must determine their boundaries by means of stone, masonry or cement concrete markers planted at each of the vertices of the polygon formed by the land.

In the case of areas to be developed, this delimitation must be preceded by an awareness campaign aimed at farmers and local populations, which will be conducted by ONAHA, in conjunction with customary authorities, municipal officials and the cooperatives concerned. The aim is to explain to the various stakeholders the purpose of registration and the procedures for its implementation, and above all to reassure everyone that it will be carried out with respect for everyone's rights.

In addition to the delimitation, the relevant documents and information on each perimeter should be collected. It emerged from the survey that there are no legal and/or administrative documents drawn up when the perimeters were drawn up (titles of allocation or ownership of the areas, judicial decisions or minutes attesting to the compensation of customary rights, administrative expropriation decisions, etc.). Nevertheless, it is necessary to present evidence of the existence and status of the said perimeters; and in this sense, maps and plans for the creation of the perimeters, reports on socio-land surveys establishing the criteria on which the plots were initially distributed, the results of the work of the commissions created for this distribution (list of customary owners, list of plot distribution, list of beneficiary villages by perimeter, list of farmers for each perimeter etc.) may be useful.

Registration

The common law of registration in Niger is the Decree of 26 July 1932, reorganizing land ownership in French West Africa (AOF). However, it should be noted that the provisions of this decree relating to land ownership are integrated into Law N° 2012-37 of 20 June 2012 on the General Tax Code (CGI) in its articles 737 to 854.

Request for registration

The Director General of ONAHA by virtue of the powers conferred on him by the management agreement signed with the State, have the power to file a request with the Registrar of Land Ownership and Land Rights to request the registration of AHAs made by the public authority under ONAHA management.

He must submit, in accordance with the provisions of article 774 of the CGI, a file including:

- i. the identity of the applicant together with the documents establishing his or her status;
- ii. a certificate of election of domicile in the jurisdiction of the district court of the locality where the area or areas concerned are located;
- iii. a description of the land therein with an indication of its location, capacity and limits; and an estimate of its market value;

- iv. a perimeter plan, dated and signed, drawn up to a scale of 1/1000, 1/2000, 1/5000 or 1/10000;
- v. an application to register the perimeter.

An application must be drawn up for each perimeter. The application, once registered at the Land Registry Office, becomes a requisition. At the same time as the requisition, the claimant must deposit an advance equal to the presumed amount of the costs of the proceedings arbitrated by the Registrar of Landed Property and Land Rights (Art. 776, CGI).

The law specifies that the Registrar must ensure the formal validity of the securities produced and the reliability of the information transmitted. Paragraph 3 of Article 91 of the Decree of 26 July 1932 specifies that "if the requisition emanates from an administrative authority and the Registrar has objections to make regarding the regularity of the documents produced or invoked, he shall inform the requesting authority. The requesting authority may overrule the requisition but, in this case, it must confirm the requisition in writing and thus substitute its own responsibility for that of the Registrar as to the consequences of the registration".

Lands registration

Prior to the establishment of the Land Titles, the registration procedure is subject to publication, in order to allow any right holder or successor in title to intervene and safeguard their interests, especially to reinforce the rights that will be established at the end of this procedure. Article 785 of the law stipulates that "the land title is final and unassailable" and according to Article 786 "any action tending to claim a real right not revealed during the procedure and having the effect of calling into question the very right of ownership of a registered land is inadmissible".

According to article 777 "as soon as possible after the requisition is filed, an extract is inserted at the request of the Registrar of Land and Property Rights, in the official gazette or legal notices". The land registration lasts three (3) months during which the requisition must be posted at the seat of the court in whose jurisdiction the land is located, at the seat of the Town Hall. During these three months, any interested person may intervene in the proceedings, either by opposing the registration, or by requesting the registration of a real right on the TF. Beyond this period, claims are no longer allowed except when the demarcation could not be carried out within this period.

Demarcation operation

During the period provided for land registration (3 months), the boundaries of the area to be registered must be marked out. According to Article 781 "the date set for this operation must be brought to the attention of the public at least twenty (20) days in advance by means of:

- i. an insertion in the Official Journal or in a newspaper empowered to publish legal notices ;
- i. a notice sent for posting to the person in charge of the Territorial Community where the land is located;
- ii. an invitation addressed, through the intermediary of the Administration, to the customary chief, in whose jurisdiction the land is located, to attend the demarcation;
- iii. personal summons, transmitted through administrative channels: a) to the applicant; b) to the non-applicant owner; c) to each of the adjacent owners named in the requisition, in order to be present there as well or to be represented by a regular representative...".

It should be noted that the demarcation is carried out by a surveyor, either chosen by the applicant or appointed by the Registrar. It is carried out, according to article 782, on the date fixed, by the surveyor designated for this purpose, in the presence of the applicant or his representative, the owner or his representative, if it is not him who requested the registration, the representative of the Administration, the customary chief, and as far as possible the riparian owners duly summoned. This operation expressly includes the recognition of the boundaries, by markers or fences, indicated on the plan attached to the requisition. At the same time, or as soon as the demarcation is completed, the surveyor checks the accuracy of the survey, rectifies, if the errors are of minor importance, the plan attached to the requisition and carries out the necessary measurements. Immediately after the demarcation, the surveyor draws up a report on the spot, which is signed by the surveyor who drew up the report and all the persons mentioned above who took part in the operation.

Establishment of Land Titles

After receipt of the acts of demarcation (the report and the corrected plan in particular), in the absence of any opposition or application for registration, or after these are withdrawn by their authors or declared unfounded by the competent court, Article 784 provides that:

- i. He records all the documents produced in connection with the registration in the register of deposits;
- ii. In the light of the requisition elements, the oppositions and applications for registration accepted by the claimant and the court decisions on these claims, he draws up an analytical list of the acts and documents;
- iii. He shall draw up the title deed on the land register of the Commune in which the property is located, with the following indications:
 - ✓ the description of the land, with indication of its consistency, capacity, location and boundaries;
 - ✓ a summary mention of the rights in rem existing on the land and the charges on it;
 - ✓ the designation of the owner.
- iv. It cancels and attaches to its archives the titles of ownership in support of the application for registration;
- v. He shall draw up for the owner an exact and complete copy of the land title, duplicates of the analytical slips and a copy of the plan; where there are holders of the charges or rights in rem mentioned, a certificate of registration shall be drawn up for them.

Indicative chronogram of land tenure security activities in the perimeters

ACTIVITIES	1 st month			2 nd month			3 rd month			4 th month		
1. Information by official mail from the various competent ministries												
2. Inventory of existing and available documents, first interviews with local authorities to begin to complete the available information.												
3. Information and awareness-raising for the various authorities												
4. Information and awareness-raising for the populations concerned												
5. Delimitation of irrigated perimeters in the field												
6. Land advertising and boundary marking												
7. Census of farmers and codification of plots of land												

- the explanation and signature of the contractual documents by ONAHA and the operator;
- the authentication and signature of the Mayor.

Land tenure conflict management on AHAs: Litigation and dispute resolution by the ONAHA land management unit

ONAHA's Land Management Unit is in charge to:

- receive and examine complaints;
- carry out missions on AHA;
- make observations;
- meet with those concerned and the elected representatives of cooperatives or anyone who can help in an amicable settlement (administrative and customary authorities);
- if necessary, mobilize legal counsel to document all disputes on the perimeters throughout the country; this to prepare a defense file for the Secretary General of the government, who is the only structure authorized to represent the state in court and defend its interests there;

To solve land tenure problems depending on whether one is dealing undeveloped land or AHA, the approach and the actors are different.

On undeveloped land, the Basic Land Commissions, if they are seized, proceed to the conciliation of the protagonists. Otherwise, they prepare a file to be sent to the customary affairs judge at the departmental level (as in Niger customary law is recognized) if the communal land commission proves to be incompetent.

On developed land exempted from any land claim as AHA is in the public domain of the State, in case of land dispute, the Director General of ONAHA is the sole authorizing officer in land matters in collaboration with the authorities and the producers' organization. In fact, if a producer commits a serious fault requiring his eviction, the AHA producer organization traces the facts in a Minutes and proposes the sanction in the PV which is transmitted to the Director General of ONAHA. The concerned AHA Producers' Organization amplifies the Minutes to the Joint Land Management Committee which decides on the matter and the Director General of ONAHA approves the decision. In case of unsatisfactory results, the offender can apply to the judge in charge of customary affairs who gives a ruling that will be applied by the organization.

While some AHAs like Sébéri, N'Dounga 1, 2, and 3, Liboré and Saga had their TF from the colonial period. The AHAs already achieved such as those of Djambali, Tégueléguel, Guidans Magagi and the PADA/ITA Project have their land title with registration of the land rights of the farmers, within the framework of the reforms and the process presented above.

The ONAHA unit that conducted the registration process recorded cases of disputes between farmers or between a farmer and his organization for withdrawal due to serious misconduct or for the delimitation of land parcels. Disputes are settled through field missions and meetings with the authorities and interested parties. The said missions also deal with cases of possible disputes. Moreover, it is planned to print contracts and implement them at the regional level in order to register the individual land rights of the farmers on the land title of the development, thus ensuring them a renewable ten-year security.

Land documents archiving

The documents resulting from land security operations are archived at the level of the regional divisions or branches and at the level of the General Management. At the level of the Regional Directorates, the

documents (occupancy contracts or leases, plans, perimeter maps, lists of assignees, survey reports and a copy of the regional land title) are archived in a secure location in the Regional Director's office. The original land title documents are sent to the Directorate General for archiving (electronic and paper).

Each land title is recorded in a separate folder along with the related documents and attachments. The land title number and location are legibly marked on the folder. A register is created for each region where the chronologically numbered land titles are recorded.

Two types of archiving are used: electronic storage (digitization, etc.) and paper storage (libraries, etc.....).

Favorable conditions to be adopted with the AHA-AIC project approach in communes that are currently excluded from it because of "land problems"

Within the framework of the project and in localities where land commissions are not established, the project will support their establishment, their human and material capacity building that would allow in the security of land to be developed. The basic land commissions will be set up by the communes, the department.

To contribute to measures for the extension of AHA in districts with specific land tenure problems, ONAHA's Land Management Unit will oversee:

- Disseminating the lessons learnt in the framework of the AHA-AIC project and ongoing land tenure security activities to strengthen all these structures.
- Raising awareness of the population on the advantages and constraints of AHAs;
- Study tours organizing for opinion leaders from districts with specific land tenure problems;
- Capacity building for influential actors;
- The setting up of local land commissions where they are not present ;
- The activation of existing local land commissions.

Monitoring of land issues by ONAHA's "internal audit and monitoring-evaluation" unit

The job description of the head of ONAHA's "internal audit and monitoring-evaluation" unit in ONAHA's procedures manual indicates the regularity of land management of irrigated plots as far as land monitoring is concerned.

APPENDIX 5: Legal and regulatory framework and general measures taken by the State to resolve "land problems" and disputes concerning expropriated irrigated land

Legal and regulatory framework and general measures taken by the State to resolve "land problems" and disputes concerning expropriated irrigated land.

Establishment of regulatory texts on the organization, attributions and functioning land security structures

In application of the provisions of Ordinance No. 93-015 of 2 March 1993 on the Rural Code guiding principles, texts have been adopted by the State of Niger to ensure land tenure security. These include, among others (i) Decree No. 97-008/PRN/MAG/EL of 10 January 1997 on the organization, powers and functioning of the institutions responsible for applying the guiding principles of the Rural Code, in particular the National Rural Code Committee, the Consultative Committee and the national, departmental, district and commune permanent secretariats; (i) Order N° 013 /MDA/CNCR/SP of 19 April 2006 on the organization, attributions and functioning modalities of the Regional Permanent Secretariats of the Rural Code; (iii) Order N° 098 /MDA/CNCR/SP of 25 November 2005 on the organization, attributions and functioning modalities of the land commissions of communes, villages or tribes.

A.1. Missions of structures involved in land tenure security

The National Committee of the Rural Code instituted by article 122 of the Ordinance N°93-015 of 2 March 1993 includes: (i) an Executive Bureau of the Committee; (ii) a National Permanent Secretary; (iii) an Advisory Committee. The National Rural Code Committee is responsible for the elaboration, dissemination and monitoring of the Guiding Principles application of the Rural Code.

The Consultative Committee is responsible, under the authority of the President of the Rural Code National Committee, for : (i) formulating reasoned opinions on all questions submitted to it; (ii) organizing, in liaison with the National Permanent Secretariat, the establishment of support teams for local structures within the Committee.

The National Permanent Secretariat has the following missions: (i) the preparation of the National Committee meetings and the drafting of its reports; (ii) the coordination of the Departmental, District and Municipal Permanent Secretariats' activities; (iii) the administrative and financial management of the National Permanent Secretariat; (iv) the preparation of the National Committee's budget; (v) the proposal of plans for seeking financing to be submitted to the Minister in charge of Agriculture and Livestock; (vi) the preparation of draft complementary texts to the Rural Code; (vii) the creation of a documentation center and a data bank on rural land tenure; (viii) the monitoring and evaluation of the land tenure commissions' activities and the impact of the Rural Code's application.

The Permanent Regional Secretariat of the Rural Code is the technical service specialized in the implementation of the Rural Code at the regional level. Its mission is: (i) to coordinate and control the application and popularization of the Rural Code in the Region; (ii) to collect, process and conserve the data required to draw up the Land Development Plan at regional level; (iii) drawing up the Land Development Plan; (iv) archiving at regional level the rural land files and records of each department; (v) methodological support, coordination and synthesis of the activities of the departmental and communal Permanent Secretariats and transmission of reports to the National Permanent Secretariat; (vi) supervision, monitoring and coordination of the activities of the departmental land commissions.

The Departmental Permanent Secretariat has the following missions (i) the control, coordination of the application and popularization of the Rural Code in the department; (ii) the carrying out of impact studies for the elaboration of the land development plan; (iii) the elaboration of the land development plan; (iv) the

coordination and synthesis of the activities of the permanent secretariats of the districts and communes and the transmission of their reports to the National Permanent Secretariat; (v) the coordination at the departmental level of the activities of the district and commune land commissions in collaboration with the Permanent Secretary of the district; (vi) the archiving at the departmental level of the rural land files and records of each district and commune.

The communal land commission has jurisdiction over all renewable rural natural resources (land, plant, animal and hydraulic resources) in the commune. It ensures : (i) informing and raising the awareness of the commune's population by diffusion the texts of the Rural Code; (ii) keeping the commune's rural file in conjunction with the departmental land commission; (iii) conducting the process of issuing land titles in conjunction with the departmental land commission; (iv) setting up and supervising village and tribal land commissions; (v) monitoring the development of the commune's rural natural resources; (vi) conducting the process of securing (identification, delimitation, materialization and registration in the rural file) shared resources (corridors, grazing areas, forests, water points, animal resting areas, etc.); (vii) monitoring the development of the commune's rural natural resources; (viii) monitoring the implementation of the Rural Code; (ix) monitoring the development of the commune's natural resources; and (x) monitoring the implementation of the Rural Code. (vii) contributing to the process of drawing up the Regional Land Development Plan; (viii) issuing rural concession contracts for land in the public and private domain; (ix) issuing certificates of priority right of use on the land where pastoralists are based, in conjunction with the departmental land commission. The communal land commission will effectively respond to all requests from the departmental land commission and the Regional Permanent Secretariat in the exercise of their respective missions.

The village or tribal land commission or basic land commission has jurisdiction over all renewable rural natural resources (land, plant, animal and water resources) of the village or tribe. It ensures : (i) informing and raising the awareness of village or tribal populations by diffusion the texts of the Rural Code; (ii) assisting village or tribal chiefs in issuing land transaction deeds; (iii) assisting village or tribal chiefs in filling out conflict conciliation minutes; (iv) monitoring the development of the rural natural resources of the village or tribe; (v) conducting the security process involving the identification, delimitation and materialization of shared resources including corridors, grazing areas, forests, water points, animal resting places, etc. (vi) land advertising. The village or tribal land commission will effectively respond to all requests from the communal and departmental land commissions in the exercise of their respective missions.

A.2. Composition of Commissions at grassroots and decentralized level

In contrast to the national, regional and departmental committees, which are more administrative and mostly composed of state services, the communal and grassroots committees are mostly composed of grassroots structures and local elected officials.

The communal land commission is composed of : (i) the mayor, President; (ii) the Secretary General of the Commune, Permanent Secretary; (iii) the communal councilors, other than the mayor, including one woman at the rate of three councilors (3) for communes with 11 to 20 councilors and four councilors (4) for communes with more than 20 councilors; (iv) the heads of the canton or grouping having jurisdiction over the communal area; (v) a representative of farmers; (vi) two representatives of livestock farmers, including one transhumant where applicable; (vii) two representatives of women; (viii) a representative of rural youth; (ix) a representative of wood farmers; (x) a representative of water point management committees; (xi) the heads of technical services having, on the territory of the commune, competence in the fields of agriculture, livestock, environment, hydraulics, rural engineering, land use planning, community development, town planning, state affairs, literacy, social development and the promotion of women.

The basic land commission is composed of: (i) the village or tribal chief; (ii) the chief's secretary; (iii) a representative of farmers; (iv) two representatives of pastoralists, one of whom is a transhumant where applicable; (v) a representative of other natural resource users, including loggers, hunters, fishermen, etc.; (vi) two representatives of women; (vii) a representative of rural youth. However, in the pastoral zone, the composition of the basic land commission will take into account the effective participation of different groups of herders according to livestock categories. Thus it could include a representative of each of the groups of camel, cattle and small ruminant farmers.

B. Niger State's Public actions to accelerate the securing of rural pastoral and agricultural land tenure

B.1. Establishment of national and local commissions for the rural code implementation

To date, the level of establishment of national and local commissions for the implementation of the rural code in Niger is as follows

Level	Structure	Planned	Achieved	Percentage
Nation	National Rural Code Committee (CNCR)	1	1	100%
	Permanent Secretariat of the CNCR	1	1	100%
Region	Regional Permanent Secretariat	8	8	100%
Department	Departmental Permanent Secretariat	63	60	95,23%
Commune	Municipal Land Commission (COFOCOM)	266	250	94%
Village / tribe	Basic Land Commission (COFOB)	14673	4212	28,70%

As mentioned above, these structures are in charge of strengthening land tenure security for AHAs prior to their implementation. On all the sites where AHAs exist or on which AHAs will be developed, an effort is underway to set up all the local commissions.

B.2. The achievements of the Rural Code

The implementation of the rural code, despite its shortcomings, has made it possible, thanks to the diversity of the texts and structures that it has instituted, to cover most areas of rural development (agricultural and grazing land, water, forests, the environment, hunting, fishing, livestock, land use planning, justice...). Populations are gradually taking ownership of the rules on securing land rights. The status of certain common resources, the conditions of their management and their use have also been established, which is increasingly creating a framework conducive to investment. A few results, however modest, can be appreciated as follows.

Table 1. Status of secure shared resources from 2000 to 2016

Regions	Types of spaces / Resources							
	Passage ways		Pastoral areas / enclaves		Forests classified/protected		Rural concession	
	Number	Km	Number	Surface area (ha)	Number	Area	No.	Area
Maradi	296	6267,96	338	80644,43	18	143,226	5	5
Dosso	576	4364,77	231	49653,67				19908,8
Tahoua	78	211,9	59	27579,5	1	3138,31	17	7551,3
Tillabéri	58	1714,35	26	42454,39				
Zinder	73	2989,3	117	105222,3	10	10583,5	13	66
Total	1081	17454,28	771	305554,2	29	13865,03	32	27531,1

Table 2. Status of private resources secured from 2000 to 2016

Regions	Types of land deeds issued													
	Customary Detention		Donation		Sale		Rental		Loan		Gage		Legal title of property	
	No.	Sup	No.	Sup	No.	Sup	No.	Sup	No.		No.	Sup	No.	Sup
Maradi	12197	21053,88	1738	3912,23	4176	12981,96	181	977,2	205	567,65	634	2026,97	2325	9320,06
Dosso	3551	17271,67	1504	5226,46	3414	1685	254	524	531	2312,9	376	1474,2	1089	7973,40
Tahoua	9950	1238,45	2866	1452,2	9472	1708,2	722	285,28	1475	544,75	44	11,4	404	616,4
Tillabéry	1389	12403,5	282	1467,70	1024	9534,53	202	346,62	66	569,3	15	79,86	219	21537,06
Zinder	1623	-	593	-	2566	-	108	-	597	-	484	-	768	-
Total	28703	39 564	6 983	13058,59	20652	25909,69	1467	2133,1	2277	3994,61	1553	3592,43	4805	39446,93

B.3. The achievement of land's General States

Since 2016, with the support of its leading technical and financial partners, the State of Niger has been strongly committed to accelerating the process of securing land tenure in Niger in order to ensure the success and sustainability of vital investments in the key sectors of agriculture and socio-economic development. A multi-stakeholder technical committee set up in June 2017 has launched a participatory process that should lead to the holding of the Land Tenure General Assembly.

The process is financed by FAO, the world partner in agricultural development and supported by the main international investors and technical partners involved in Niger and interested in the land issue such as: the European Union (EU), GIZ, France, BTC, the World Bank, ECOWAS, ECA and IFAD.

Held in February 2018, the Estates General brought together more than 300 participants from all sectors and regions of the country and was one of the largest platforms for exchange between actors ever mobilized in Niger. After more than 20 years of implementation of the "Rural Code Process", the aim was to take stock, in particular, of the process of securing producers' rights in order to enable the development and profitability of their investments, which has been at the heart of the objectives targeted by this process of the rural code

The key recommendations of the General Land Survey, which reframe the action of the State and its partners in land security are:

About the Nigerien State:

- To increase the state budget allocation with a view to improving the management of land issues in Niger;
- Set up an Inter-Ministerial Committee responsible for revising and harmonising all the texts governing rural land tenure in Niger;
- Make the rural land courts operational;
- Recognise the right of CSOs to take legal action against violations of their members' rights, including abusive occupation or land grabbing;
- Accelerate the process of development and adoption of FAS in all regions of the country. To this end, it is necessary to adopt the draft decree relating to the elaboration and implementation of the SAF.

To the Technical and Financial Partners

- Support technically and financially the process of formulating and implementing Niger's rural land policy;
- Supporting the process of developing and implementing the Land Development Plan and the Land Information System

B.4. Accelerating the process of drawing up and adopting land development plans (SAF)

The aim of the land development schemes (SAF) is, from a land-use planning perspective, to secure land for the socio-economic development of Niger include:

- the mapping of all the areas and resources of the regions;
- the definition of the vocation of these spaces and the rights attached to them.

The implementation of these land development schemes is supported by strong institutional and legal support from the government of Niger and is aimed at intensifying agro-sylvo-pastoral and fisheries production and reducing land conflicts by regulating access to land, land use and the resources it contains, regulating the land market, securing local rights to land and developing rural production bases.

The FAS implementation process is participatory and inclusive and allows:

- Communes and village terroirs as gateways to be targeted to support the implementation of micro-projects for the development of producers' land (collective and individual);
- Strengthening legal capacities for resource governance (members of land commissions, rural paralegals, local opinion leaders, village chiefs, etc.), the gateway to improving legal knowledge focused on land;
- Capacity building in planning/programming, as a gateway to encourage the development and implementation of micro-projects for land development;
- Reinforcement of local capacities for georeferencing and drawing up maps of land and resources at the level of terroirs (Deconcentrated Technical Services, members of land commissions).

Region	Status of the implementation of SAFs	
Tillaberi		Ongoing FAS development process
Dosso	2014-2017 Nov. 2018	Regional FAS document developed Submission of the SAF document to the Nigerien government for adoption Adoption in the Council of Ministers of the draft decree adopting the Dosso Land Development Scheme (SAF) Capitalisation of the FAS process at departmental and communal level: example of Tounga-Goumbi in the Commune of Tanda,/ Department of Gaya See : Erreur ! Source du renvoi introuvable.
Tahoua	2020 (In progress)	Regional FAS document developed Validation workshop for the land development plan of the Tahoua region Validation of the SAF operational roadmap Formal establishment of the region's FAS Coordination and Guidance Committee.
Maradi	February 2020	Regional FAS document developed Submission of the SAF document to the Nigerien government for adoption The development of SAF Maradi required the organisation of 8 national workshops, 12 regional workshops, 82 communal workshops, and the participation of 153 NGOs with 12 different consultations over almost 7 years.
Diffa		Ongoing FAS development process
Zinder	2018	The region has a Steering Committee for the Project to Secure Pastoral Land Systems in Niger by Strengthening Land Governance (PSSFP/RGF). Workshop to share the process of preparation of the Land Development Plan (SAF) of the Maradi region

	2020 (in progress)	Regional FAS document developed
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Ongoing measures at ONAHA to secure land tenure for old AHAs

Within the framework of the AHAs land tenure security, ONAHA has planned for a first step, the land tenure security of 34 AHAs. It is a question of:

- MCC : 2 AHA (konni 1 and Konni2)
- PGRC-DU: 9 AHAs (Tillakaina 1 and 2, Daikaina, Yelewani, Saga, N'dounga 2, Kessa, Sakondji and Tara)
- PRPIP: 10 AHA (Seberi, N'dounga1, liboré Tchaguiriré Upstream and Downstream, Say1 and 2, Lata, Daibéri, Gaya Upstream) ;
- Kandadji programme: 3 AHAs (Kandadji, Gabou and Famalé) ;
- Irhazer Project (PAP ITA) 6 AHA (Tiguirwit 2, Agharouss, Injighrane, Injitane, Tiguirwit 2 and Tiblélikt) ;
- PMERSA : 1 AHA (Djambali) ;
- PIPASA: 3 AHAs (Téguéléguél, Guidan Magagi and Hondey Balati)

The work is being carried out by ONAHA and for the moment, the AHAs of Djambali, Téguéléguél, Guidans Magagi and the 6 of the PADA/ITA project have their land title with registration of the operators land rights. On the other hand, some AHAs such as Sébéri, N'Dounga 1, 2, and 3, Liboré and Saga had their land title from the colonial period.

APPENDIX 6: Summary of current and project-related groundwater use

GROUNDWATER CHARACTERISTICS						ALLOWABLE ABSTRACTION RATE		WATER USE							AHA-IAC- NIGER PROJECT		TOTAL WATER USE				
Aquifer		Basin		Depth to groundw	Groundwater total Storage	Refill rate (m3/year)		Current water use in the project area				AHA-IAC- Project annual water use	Total water use (Current use + Project use)	Current and project related water use as share of allowable abstraction rate	HA-IAC Niger water use as share of ground water annual global Refill rate	Water impact evaluation	Current and project-related water use as share of ground water annual global Refill rate	Water impact evaluation			
#	Name	#	Name	m	m3	m3	Rate indicator (% of refill rate or level of storage drawdown)	Quantity	Irrigation	Household	Others	Subtotal current water use	m3	m3/Year	≤ 100%	%		%			
1	Iullemeden Aquifer System (Niger)	1	Continental Intercalaire	Zinder	35	3 891 000 000 000	750 000 000	70% of refill rate	525 000 000	0	496 333	28 770	525 103	807 231	807 231						
		2		Maradi	40				141 946 714	7 947 292	1 986 823	151 880 829	4 343 980	146 290 694							
		3		Tahoua	60				69 969 333	11 662 591	2 332 518	83 964 442	615 931	70 585 264							
		4		Agadez	70				20 013 333	1 423 850	1 240 333	22 677 516	615 931	20 629 264							
		Total Nappes du Continental intercalaire Hamaden					3 891 000 000 000	750 000 000		525 000 000	231 929 380	21 530 066	5 588 444	259 047 890	6 383 073	238 312 453	45,39%	0,85%	No stress	31,77%	Low
		5	Groundwater of the Continental Terminal	Tahoua	40	1 057 000 000 000	1 300 000 000	70% of refill rate	910 000 000	136 000 000	5 900 000	1 900 008	143 800 008	1 231 862	137 231 862						
		Total Groupe Grès d'Agadez					1 057 000 000 000	1 300 000 000		910 000 000	136 000 000	5 900 000	1 900 008	143 800 008	1 231 862	137 231 862	15,08%	0,09%	No stress	10,56%	No stress
		6	Agadez Sandstone Group (Tléoua)	Agadez	80	1 800 000 000 000	900 000 000	70% of refill rate	630 000 000	44 026 667	1 423 850	1 240 333	46 690 850	2 083 248	46 109 915						
		Total Group Sandstone of Agadez					1 800 000 000 000	900 000 000		630 000 000	44 026 667	1 423 850	1 240 333	46 690 850	2 083 248	46 109 915	7,32%	0,23%	No stress	5,12%	No stress
2	Alluvial Valley of	7	Alluvial valley of KqZinder	20	20 000 000 000	600 000 000	70% of refill rate	420 000 000	189 410 000	2 480 667	418 103	192 308 770	7 674 862	197 084 862	46,92%	1,28%	No stress	32,85%	Low		
		8	Alluvial groundwaMaradi	15	9 000 000 000	280 000 000	70% of refill rate	196 000 000	75 492 063	7 947 292	1 986 823	85 426 178	906 519	76 398 582	38,98%	0,32%	No stress	27,29%	Low		
		9	Alluvial valley of TaTahoua	20	253 000 000	12 650 000	70% of refill rate	8 855 000	3 938 667	1 097 555	432 510	5 468 732	615 931	4 554 598	51,44%	4,87%	No stress	36,00%	Low		
Tot						29 253 000 000	892 650 000		624 855 000	268 840 730	11 525 514	2 837 436	283 203 680	9 197 312	278 038 042						
3	Lake Tchad	10	Manga groundwat	Diffa	43	50 500 000 000	525 000 000	70% of refill rate	367 500 000	69 270 000	3 467 915	693 583	73 431 498	3 230 318	72 500 318						
		11																			
Tot						50 500 000 000	525 000 000		367 500 000	69 270 000	3 467 915	693 583	73 431 498	3 230 318	72 500 318	19,73%	0,62%	No stress	13,81%	No stress	
					6 827 753 000 000	4 367 650 000		3 057 355 000	750 066 777	43 847 345	12 259 804	806 173 926	22 125 813	772 192 590	25,26%	0,51%	No stress	17,68%	No stress		

Methodology

Niger is engaged in a process of improving water governance within the framework of the National Action Plan for Integrated Water Resources Management (PANGIRE) adopted in 2017. This should lead to a better knowledge and the implementation of sustainable preservation standards regarding the use of water resources: (coordinates and registration series of stations, aquifer characteristics, vulnerability, groundwater exploitation, types of water use and land use, as well as the population served etc....).

Consequently, the data currently available from the Niger administration are not very exhaustive for the present groundwater balance test work in relation to the water withdrawals in progress and those planned in the areas where the present hydro-agricultural project is being carried out. However, it should be noted that Niger has a database within its Ministry in charge of Hydraulics of a planning, management and decision support tool for the various stakeholders in the water supply sector. This is the IRH/SIGNER database (IRH "Inventory of hydraulic resources" and SIGNER "Geographic information system of Niger"). This database is evolving to become an integrated system of information on Niger water. The field of investigation of the SIGNER system includes the location of infrastructure of all kinds (health centers, schools, dams, boreholes, wells, etc.); the representation of population by cantons and coupling with road infrastructures; pastoral water points and crossing with fodder potential; classification of soils and their suitability for irrigation.

The present analyzes, apart from the documentation of the Niger Ministries of Hydraulics and Agriculture, were therefore able to rely on the standards, modeling and expertise of the following institutions:

- the Sahara and Sahel Observatory (OSS),
- AQUASTAT - FAO's global water information system (FAO is the Food and Agriculture Organization of the United Nations)
- FAO Incorporating environmental flows into “water stress” indicator 6.4.2 Guidelines for a minimum standard method for global reporting UN: Sustainable Development Goals (SDGs) / Goal 6
- French public institutions of reference in geology and water governance, notably the National Office for Water and Aquatic Environments (ONEMA), converted in 2017 into the French Agency for Biodiversity, the national geological service that is the Bureau de Recherches Géologiques et Minières (Geological and Mining Research Bureau): (BRGM)

Basic assumptions for the analysis of the balances between groundwater resources and total water withdrawals

The analytical hypotheses are developed in accordance with criteria for steering sustainable management of water resources with a view to rational and sustainable use for the benefit of present and future generations in a context of adaptation to the adverse effects of climate change.

Sustainable Development Goals : « Indicator 6.4.2 - Level of water stress: freshwater withdrawal as a proportion of available freshwater resources”

The level of water stress: freshwater withdrawal as a proportion of available freshwater resources is the ratio between total freshwater withdrawn by major economic sectors and total renewable freshwater resources, after taking into account environmental water requirements. This indicator is also known as water withdrawal intensity and will measure progress towards SDG Target 6.4.

Sustainable groundwater balance test / Parameters and criteria

The diagnosis on the quantitative status of the project's groundwater ("good status" or "bad status"), is based on a "Balance" test requiring the calculation of the Withdrawal / Recharge ratio. This test is carried out at the global scale of the water body and allows to evaluate the balance between the available resource and the withdrawals. There are two categories of criteria related to the hydrogeological characteristics of the water tables (free, alluvial, deep and captive water tables)

The analytical method used is based on the available piezometric fluctuation data as well as various statistical data on water use. Free and alluvial aquifers are very sensitive to the external factors of their environment. They are directly impacted by rainfall and overexploitation.

The pressure exercised on the groundwater has been related to the rate or volume of recharge and is characterized by 4 levels of intensity, from low to very high, each level being associated with a withdrawal / recharge ratio, The refilling of captive groundwater is in principle in aquifers with low permeability and are not very sensitive to external factors. Refilling is often low and the process is spread out over the long term. The intensity of the pressures was estimated based on thresholds relative to the annual water level withdrawn.

Sustainable balance test of free groundwater and alluvial aquifers

The indicator is computed as the total freshwater withdrawn (TFWW) divided by the difference between the total renewable freshwater resources (TRWR) and the environmental flow requirements (EFR), multiplied by 100.

$\text{Stress (\%)} = \text{TFWW} / (\text{TRWR} - \text{EFR}) * 100$

Following the experience of the initial five years of application of the indicator, and consistent with the approach taken during the MDG program, the threshold of 25% has been identified as the upper limit for a full and unconditional safety of water stress as assessed by the indicator 6.4.2.

APPENDICE 7: Integrated Pest and Pesticide Management Plan Executive summary

Within the framework of the project on hydro-agricultural development with smart agriculture practices that are resilient to climate change, it is expected through components 1 and 2, among other things, the realization of integrated actions of soil restoration, water mobilization for irrigation purposes, promotion of resilient and off-season plant crops to fight against food insecurity, with the technical support of the State services. Crop development at the selected sites may directly or indirectly require the use of chemicals for pest control.

However, the uncontrolled use of certain chemical products, particularly pesticides in the context of the control of endemic or migratory pests, may, depending on their nature or mode of use, cause socio-economic and environmental damage that may be permanent if precautions are not taken, thus compromising the achievement of the project's objectives. It is from this standpoint that this Integrated Pest and Pesticide Management Plan (IPPMP) has been developed to mitigate the impacts associated with pesticide use.

The development of this IPPMP meets the requirements of BOAD operational policy dealing specifically with pest management; as well as Niger's texts on environmental and human health protection. This IPPMP has been prepared to allow a rational use of chemical products (fertilizers, pesticides, ...) within the framework of the implementation of the said project and specially to encourage integrated management with less dangerous consequences on the environment and human and animal health.

The methodological approach adopted in the preparation of the IPPMP is based on data collection, field work, assessment of the impacts and risks associated with pesticide use practices and the proposal of measures. Data or information was collected in two (2) ways, namely: literature review and interviews with the various stakeholders who are used to using pesticides in pest management in order to have a deeper understanding of certain aspects.

This phase made it possible to describe and analyze the current conditions of pesticide use in the different areas of intervention of the project, both within public health and agriculture framework, and finally to describe and analyze the current state of the agricultural environment and the hydro-agricultural development areas.

The development of good practice measures was based on: (i) identification of pests and predators in the project area; (ii) identification of current methods and strategies for controlling pests; (iii) choice of alternative methods to chemical control; (iv) measures to protect water, soil, fauna and flora; (v) environmental education of producers and populations living in the project area; (vi) community and participatory management by local residents, communal authorities, etc.

The study highlighted the National Plant Protection Policy and BOAD's policy on pest control.

The regulation of pesticide production, distribution and use has evolved significantly and great efforts have been made by the various Ministries and actors involved in pesticide management to ensure the implementation of an appropriate legal framework. However, there is a real problem regarding the extension and especially the application of these texts at the national level. Niger has ratified and/or signed several conventions at the international, regional and sub-regional levels, whose recommendations remain relevant and are applicable to the implementation of this project.

At the institutional level, the existing system makes it possible to disseminate and enforce all the measures adopted by the State for the effective management of pests and pesticides without

threatening human health and the environment. However, this mechanism lacks actions that are undertaken in a synergistic manner, human resources and appropriate material means. This situation results in poor control of crop pests, circulation of illegal products with, sometimes, unspecified active ingredients and failure to comply with standards for transporting and storing pesticides.

► Difficulties in the control and monitor of products used in the country

It is difficult to verify whether pesticides imported by a trader comply with those registered by the CILSS. Another constraint relates to the lack of a uniform framework for registering the main groups of pesticides. Such an instrument would be common to all statistical, customs, trade, control and monitoring, public health, environmental and pollution control services. It would facilitate the monitoring of products and the control and exploitation of data on these products.

► Insufficient collaboration between institutions

Collaborative initiatives between the Ministry of Agriculture and the Ministry of Environment and Health do not yet seem to be effective in several areas (management of expired products and empty packaging, monitoring of workers handling pesticides; etc.). At the present time, there is no evidence of joint or concerted action between these ministries with regard to the control of pesticides for agricultural or domestic use. With the revitalization and support for the operation of the NPMC, the existence of such collaboration would have motivated, for example, the need for training medical personnel who could intervene in cases of pesticide poisoning. It could also give rise to the need to raise the awareness of populations on the appropriate use of pesticides for domestic use as is done for agricultural producers.

► Pesticides commonly used in the project localities/areas

In the different localities of the project, several methods are used to control the main above-mentioned pests. According to the different actors met during the field mission (technical services and local communities), chemical control is the most widely used against pests. Indeed, it is considered more effective and above all it gives immediate results.

► The safety measures recommended by WHO and FAO are not followed by pesticide users. They ignore or neglect the negative effects of pesticides, lack of Personal Protective Equipment (PPE), lack of knowledge of the routes of entry of toxins into the body, lack of hygiene, use of empty packaging in the food chain and failure to take into account the influence of weather conditions during treatment.

► Shortcomings in the different stages of current pesticide management:

- the inadequacy of the control system;
- the presence of unauthorized and expired products on the market;
- the concentration of active ingredient sometimes unspecified;
- the lack of training, information and awareness of good practices;
- the lack of standardized stores;
- the presence of shops selling pesticides in the markets of large urban centers;
- Empty containers found in shops of decentralized agricultural services;
- Non-compliance with the instructions of the Ministry in charge of agriculture for the return of small containers of pesticides.

The various shortcomings listed above in the current pesticide management process are sources of major impacts and risks to the biophysical and human environment:

- air pollution;
- chemical water pollution;

- soil and crop contamination.

The burial of empty packaging increases groundwater pollution. Their incineration causes air, water and soil pollution and constitutes a risk to human and animal health.

Integrated pest and pesticide management approach under the project

- A careful combination of cultural, biological, mechanical and bio-pesticide control methods can provide a satisfactory level of control without the need of pesticides.
- In the context of the present project, a community-based monitoring and early warning system will be set up.

Priority issues identified in the integrated management of pests and pesticides

- *Insufficient application of good practices in pesticide management*
- *Insufficient means in the promotion of alternative (non-chemical) pest management*
- *Weak capacity for intervention, control and monitoring of actors*
- *Failure of the control, analysis and environmental and social monitoring system*

Action Plan for the Integrated Management of Pests and Pesticides

The objective of the action plan is to drive a process and contribute to the national pest control and pesticide management effort through simple, realistic and relevant measures, mainly in the project area. It does not have the ambition to address all the problems related to pest and pesticide management in Niger. It includes:

- Principles of Intervention;
- Strengthening the legislative framework for pesticide management;
- Establishment of an institutional framework adapted to the management of the project's IPPMP;
- Capacity building of stakeholders through training/awareness raising;
- Applicable technical measures;
- Promotion of the use of alternative control strategies;
- Good practices to be adopted during the pesticide management cycle;
- Actions to take in case of poisoning/intoxication; and
- Monitoring and evaluation plan.

Organizational mechanisms for implementing and monitoring the IPPMP

- PMU: it will coordinate the implementation of the IPPMP and act as an interface with other relevant actors.
- DGPV, CNLA and their local services: will supervise the "agricultural" component of the implementation of the IFMPP and support capacity building of field agents.
- the NCEA: will ensure the regulatory control of the implementation of the IFMPP and will support the capacity building of agents in the field.
- Producers' Organizations: They must have and apply procedures and good environmental practices for the ecological and safe use and management of pesticides.

Monitoring will be carried out at the national, regional, departmental and communal levels.

At the national level:

- PMU (strategic oversight) ;
- the NPMC, notably the DGPV and the CNLA;
- the NCEA (for regulatory oversight); and.

At regional, departmental and communal

The personnel of the Plant Protection Services, of CNLA, of the Environment in the Regional and Departmental Directorates and in the concerned municipalities.

Monitoring will be organized through periodic field visits and will consist in assessing the implementation of the level of IPPMP action plan activities, the cost of which amounts to CFAF 80 000 000.