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MINISTRY OF HEALTH

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Final report

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Environmental and Social Impact Assessment (ESIA)
of the construction project
of the Fada N'Gourma Regional Hospital
University Centre (CHRU)

Environmental and Social Impact Assessment (ESIA)

Construction Project of Fada N'Gourma Regional Hospital University Centre (CHRU)

Final version

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Team:

Moussa Ouedraogo, Environmentalist

Servanne Sawadogo, Sociologist

Bruno Nebié, HSQE expert

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- Name: Ministry of Health
- Address: Avenue du Burkina, Koulouba, Ouagadougou, Burkina Faso
- Referent: Mr. Aboubacar Sanou, Construction and Equipment Project Coordinator of 3 CHR

■ Insuco

- Unit / Coordination Office: Insuco Burkina Faso
- Participants and function fulfilled in the project:
 - Project Director: Moussa Ouedraogo, Mission Head, Environmentalist
 - Expert Servanne Sawadogo, Sociologist
Bruno Nebié, HSQE expert
 - GIS Analyst: Romain Ronceray, Cartographer

■ Quality

Role	Name	Position	Date
Editor 1	Moussa Ouedraogo	Moussa Ouedraogo, Mission Head, Environmentalist	26/06/2019
Reviewer	Laure Prin	Technical Director Insuco Burkina Faso	26/06/2019
Validator	Hélène Chéron-Kientéga	Director of Insuco BF	02/07/2019
Editor 1	Moussa Ouedraogo	Mission Head, Environmentalist	11/07/2019
Validator	Laure Prin	Technical Director Insuco Burkina Faso	12/07/2019
Translator	Nomadlingo	Translation Firm	12/09/2019
Validator	Hélène Chéron-Kientéga	Director of Insuco BF	16/09/2019

This report has been reviewed, validated and submitted on 12/07/2019, by:

Last name, first name, position

Hélène Chéron - Kientéga, Country Director

Signature



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Tables of acronyms

IGA	Income-Generating Activities
ARV	Antiretrovirals
BUNEE	National Office for Environmental Assessments
CEB	Basic Education Districts
CEEP	Early Education Centres
Cf	Confer
CHR	Regional Hospital
CHRU	Regional Hospital University Centre
CMA	Medical Centre with a Surgical Unit
MC	Medical Centre
CNIB	Burkina National Identity Card
CONEDD	National Board for the Environment and Sustainable Development
CORUS	Operations and Health Emergency Response Centre
COTEVE	Environmental Assessments Technical Committee
CSES	Environmental and Social Monitoring Committee
CSPS	Social Promotion and Health Centre
CVD	Village Development Board
DBM	Bio-Medical Waste
DGESS	General Studies Office and Sectoral Statistics
DR	Regional Directorate
DRENA	Regional Directorate of National Education
DPC	Deterioration Expired and Broken
DRS	Regional Health Office
EES	Strategic Environmental Assessment
ESIA	Environmental and Social Impact Assessment

ff	Fixed fee
FAFPA	Support Fund for Vocational Training and Apprenticeship
FAIJ	Support Fund for Youth Initiatives
FAPE	Support Fund for Small Companies
FASI	Support Fund for the Informal Sector
FBDES	Burkina Fund for Social and Economic Development
FS	Health Training
GIRE	Integrated Water Resources Management
GPS	Global Positioning System
ha	Hectare
STI	Sexually Transmitted Infection
INSD	National Institute of Statistics and Demographics
kg	Kilogramme
m	Metre
m ²	Square metre
MAP I	Post-Injection Allergic Reaction
MDC	Control Mission
MEEVCC	Ministry of Environment, Green Economy and Climate Change
lm	Linear metre
ESIS	Environmental and Social Impact Statement
SDG	Sustainable Development Goals
WHO	World Health Organisation
ONEA	National Office of Water and Sanitation
NGO	Non-Governmental Organisation
CSO	Civil Society Organisation
NAPA	National Adaptation Programme of Action for Climate Variability and Change

PAP	Person Affected by the Project
RAP	Resettlement Action Plan
PCD	Communal Development Plan
PEDD	Environment Plan for Sustainable Development
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
KP	Kilometre point
PMH	Human Powered Pump
PNAT	National Land Development Policy of the Territory
NSDP	National Sustainable Development Policy
PNDES	National Economic and Social Development Policy
PNDS	National Plan for Health Development
PNE	National Environmental Plan
PNF	National Forest Policy
PNG	National Gender Policy
PNHP	National Public Hygiene Policy
PNP	National Population Policy
PNS	National Health Policy
PNSFMR	National Land Tenure Security Policy in Rural Areas
PO	Operational Policy
PRMS	Plan for the Restoration of Livelihood
PTF	Technical and Financial Partner
RAF	Agrarian and Land Reform
RAMT	Theoretical Medium Action Radius
DR	Departmental Road
NR	National Road

RGPH	General Census of Population and Housing
SCADD	National Strategy for Accelerated Growth and Sustainable Development
SDAU	Development and Urban Planning Master Plan
SEMAFO	Société d'Exploitation Minière d'Afrique de l'Ouest [West African Mining Corporation]
SINEAU	National Water Information System
SMIG	Interprofessional Guaranteed Minimum Wage
SOCOMA	Société Cotonnière du Gourma [Gourma Cotton Company]
SONABEL	Société Nationale Burkinabé d'Electricité [Burkina Faso National Electricity Company]
TOR	Terms of Reference
TNB	Télévision Nationale Burkinabè [Burkina Faso National Television]
u	Unit
HIV / AIDS	Human Immuno Virus / Acquired Immuno Deficiency Syndrome
VRD	Roads and Miscellaneous Networks

Non-technical summary

The Government of Burkina Faso has found that health infrastructure coverage is characterised by its inadequacy and inequality in the distribution of health trainings by region in relation to the standards set by the World Health Organisation (WHO). For example, a National Plan for Health Development (PNDS) for 2011-2020 taking into consideration the Government's ongoing and major health concerns, has been developed. The PNDS takes into consideration the sectoral policy of decentralisation of the health system.

The project to build the new Fada N'Gourma Regional Hospital University Centre (CHRU) is part of the objectives set by the Government of Burkina Faso. The project aims to contribute to improving health care access for people in the Eastern Region and to reduce the poverty of the population. The project is backed by the Burkina Faso Ministry of Health.

According to Decree no. 2015-1187 / PRES-TRANS / PM / MERH / MATD / MME / MS / MARHASA / MRA / MICA / MHU / MIDT / MCT of 22 October 2015 containing the conditions and procedures for the implementation and validation of the strategic environmental assessment, of the study and of the environmental and social impact statement, the construction project of a CHR falls under category A (Sector of Activity 12 - Health). As a consequence, it is subject to the performance of an Environmental and Social Impact Assessment (ESIA).

The Fada N'Gourma Regional Hospital University Centre (CHRU) construction project infrastructures can be grouped into 6 large complexes, namely:

- **Technical platform:** includes medical and surgical emergency services, resuscitation, intensive care, operating theatre, endoscopy, medical imaging, laboratory and blood bank, sterilisation station and pharmacy;
- **Mother-child section:** consists of a maternity ward, gynaecology ward, maternity ward and delivery areas, neonatology, paediatric and gynaecological obstetric emergencies services, the paediatric service and the nutrition service and the vaccination service;
- **Hospitalisation Platform:** this consists of hospitalisation for the following services:
 - Internal medicine / gastroenteritis / neuro / geriatrics services;
 - Cardiovascular / diabetes / metabolism / nephrology services;
 - Infectious illnesses / dermato / haemato services;
 - Mental health service;
 - General surgery/ digestive / urological services;
 - Orthopaedic surgery / trauma and rehabilitation services;
 - ORL / ophtalmo / maxillo-facial stomato services.
- **Consultations and administration area:** includes admission services, cafeteria, administration, the haemodialysis unit, day hospital surgery, outpatient consultations, functional explorations, physiotherapy, orthoprosthesis, and the interface structure;
- **Logistics / technical and mortuary area:** includes the kitchen, laundry room, maintenance workshop and storage area, fluids station, waste and mortuary area;
- **Family building.**

The guiding principles of this programme organisation are the following:

- Separation between the movements of the sick and the movements of visitors;
- Allow for an easy and consistent extension of the different platforms;
- Ensure the smooth flow of pedestrian and vehicle traffic within the CHRU;
- Ensure a privileged connection between the technical platform and emergency services.

The CHRU has a capacity of approximately 280 beds.

Description of the initial state of the environment

■ Geographic location

The city of Fada N'Gourma enjoys the status of the capital of the Eastern Region, of the province of Gourma and of an urban municipality. It is a centre of concentration with several administrative authorities. The CHR site, which occupies a 201,278 square metres area (just over 20 hectares), is located 5.5 km north of the city, accessible by the NR 18 connecting Fada N'Gourma to Bilanga.

■ Biophysical environment

The topography of the municipality of Fada N'Gourma is, on the whole, relatively flat. There are, however, a few hills around the villages of Nalambou in the North and Namoungou. The city is located in an area where soils are mainly found on clay material coming from migmatitic granites or various basic rocks, soils on sandy clay material from granites and soils on various rocks. These last two types are the most dominant. They occupy almost half of the departmental space, stretching from the centre to the west. However, these soils are subject to continuous degradation due to the phenomenon of erosion.

The soils of the municipality are generally fertile, conducive to agricultural activity and are divided into three types:

- more or less deep bleached, tropical ferruginous soils hardened like armour plate and tropical ferruginous soils bleached with gravel in spots or concretions. They are unsuitable for agriculture.
- pseudo-gley hydromorphic soils;
- low-evolved soils from alluvial to pseudo-gley.

The territory of the municipality of Fada N'Gourma is part of the Niger watershed to the north and that of the Oti to the south. Thus, in terms of water, the municipality is crevassed by four rivers that are the Tanwalbougou, Natiaboani, Natiari and Oupenchyambangou. One finds also on these rivers natural (mares) and artificial (dams or buli) reservoirs. Also, the major rivers are fed by numerous runoff drains that accelerate upstream land degradation, and silting downstream of the river. The importance of the drains in the various villages of the municipality, gives the latter the desire to develop water reservoirs for agricultural and / or pastoral purposes.

The project's area of influence is characterised as a whole by tree and shrub formations with an herbaceous mat in the shallows. In agricultural operations, vegetation is constituted by essentially a savannah park with a high concentration of useful species such as *Vitellaria paradoxa* (shea). The shrub-covered savannah is dominated by the Combretaceae and is located on the hard plate area located in the plateau areas. In addition to the dominant Combretaceae, there are also species such as *Piliostigma reticulatum*, *Balanites aegyptiaca*, *Guiera senegalensis*, *Ziziphus Mauritiana*, *Sclerocarya birrea* and *Pterocarpus erinaceus*.

The tree-covered savannah, on the other hand, is dominated mainly by *Vitellaria paradoxa*, *Parkia biglobosa*, and *Lannea microp carpa*.

The vegetation along the rivers, often characterised as gallery forest, consists of *Mitragina inermis*, *Daniela oliveri*, *Ficus capensis*, *Khaya senegalensis*, *Diospyros mespiliformis* and *Ficus iteophylla*.

■ Human environment

According to the 2006 General Population and Housing Census (RGPH), the population of the Eastern Region was 1,209,399, of whom 615,627 were women. At the provincial level, Gnagna had a population of 407,739 compared to 304,169 for Gourma, 80,047 for Komondjari, 75,662 for Kompienga and 341,782 for Tapoa.

As for the regional capital, Fada N'Gourma, its population was estimated in 2006 at 124,577 inhabitants, including 62,193 men and 62,384 women, in 21,022 households. By 2020, the population of Fada N'Gourma will reach 201,652 including 100,981 women.

The restricted study area has no Social Promotion and Health Centre (CSPS) or Medical Centre with a Surgical Unit (CMA). The nearest CSPSs are more than 3 kilometres away: the CSPS in sector 7 in Fada and the CSPS in Boudangou. The CSPS is a care unit comprising at least one clinic, a maternity ward, common services and annexes.

The people at the project site benefit from the services of the sector 7 CSPS. In fact, 100% of the household heads surveyed say they use the sector 7 CSPS in terms of "health services". This centre provides essential

on-site care (curative, preventive and promotional care as well as deliveries) and refers cases of complications to the Fada CHR.

In general, according to health officials, there is a shortage of human resources, health infrastructures and medical equipment for better care of patients. In fact, the buildings, equipment and logistics date back several years and are only rarely renovated.

In the project's area of influence, household heads are characterised by a low level of education. In fact, we find that among the household heads surveyed, 65% have no education while 20% have a primary and 15% a secondary school educational level.

According to the socio-economic survey data in Figure 9, it can be seen that 85% of the surveyed households have access to drinking water through human powered pumps (PMH), 10% through a simplified conveyance system for drinking water, and 5% use lined wells.

At the site of this project, we note no water points, much less potable water. On the other hand, within a radius of about 4 km, there are 3 boreholes including that of the University of Fada, a drilled well in sector 7 and a drilled well in the village of Boudangou. Depending on the season, the inhabitants of the farming hamlets adjacent to the CHR site and the occupants of the temporary habitats around there supply themselves at these boreholes.

From the socio-economic survey, it appears that sanitation or collective hygiene is very limited as the majority of households (85%) have no toilets while 10% have traditional toilets and 5% have improved toilets.

The sampled socio-economic survey shows that agriculture (exercised by 65% of the households surveyed) is by far the main activity of household heads, followed by livestock breeding (20%), wage work (10%) and construction trades (5%).

Summary of the impacts connected with the project

Table 1: Non-technical summary - summary of impacts connected with the project

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Preparatory and construction phase				
Impact 1	Traffic densification	Traffic	Major	Temporary traffic disruption due to increased traffic
Impact 2	Traffic densification	Health and safety	Average	Increased risks of accidents
Impact 3	Expropriation and release of right-of-way of the CHRU	Farm land	Average	Destruction and / or displacement of farm land
Impact 4	Expropriation and release of right-of-way of the CHRU	Employment	Average	Restriction of access to the site for operation of the quarries
Impact 5	Expropriation and release of right-of-way of the CHRU	Tourist cultural heritage	Average	Restriction of graves and blast furnaces
Impact 6	Expropriation and release of the right-of-way of the CHRU	Land	Average	Loss of rights to land
Impact 7	Expropriation and release of right-of-way of the CHRU	Economic activities	Average	Loss of pasture land
Impact 8	Expropriation and release of right-of-way of the CHRU	Women's economic activities	Average	Loss of access to NWFPs
Impact 9	Expropriation and release of right-of-way of the CHRU	Quality of life and well-being	Average	Weakening of the livelihoods of residents due to restriction of access

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Impact 10	Installation of base camp living and construction site facilities	Air	Average	Air pollution due to the gases of motorised machinery
Impact 11	Installation of basic living and construction site facilities	Surface water	Average	Surface water pollution due to waste discharges
Impact 12	Installation of base camp living and construction site facilities	Groundwater	Average	Groundwater pollution due to waste discharges
Impact 13	Installation of base camp living and construction site facilities	Soil	Average	Breaking down the nature of the soil following compaction
Impact 14	Installation of base camp living and construction site facilities	Vegetation	Average	The anthropogenic pressure of workers on local vegetation
Impact 15	Installation of base camp living and construction site facilities	Landscape	Average	Proliferation of plastic bags and other waste
Impact 16	Installation of base camp living and construction site facilities	Health and safety	Average	Risks of miscellaneous accidents
Impact 17	Installation of base camp living and construction site facilities	Employment	Average	Improved income for residents by IGAs due to the installation of the site
Impact 18	Deforestation and stripping of plant soil	Air	Average	Air pollution due to the gases of motorised machinery
Impact 19	Deforestation and stripping of plant soil	Sound environment	Average	Deterioration of the sound environment by the sound of heavy machinery
Impact 20	Deforestation and stripping of plant soil	Surface waters	Average	Surface water pollution due to oil discharges from machinery
Impact 21	Deforestation and stripping of plant soil	Groundwater	Average	Groundwater pollution due to oil discharges by machinery
Impact 22	Deforestation and stripping of plant soil	Soil	Average	Breaking down the nature of the soil following compaction
Impact 23	Deforestation and stripping of plant soil	Vegetation	Average	Total destruction of vegetation on the site
Impact 24	Deforestation and stripping of plant soil	Landscape	Average	Destruction of the forest landscape on the site
Impact 25	Recruitment of personnel for construction work	Employment	Average	Employment creation for residents
Impact 26	Recruitment of personnel for construction work	Women's economic activities	Average	Employment creation for women
Impact 27	Recruitment of personnel for construction work	Quality of life and well-being	Average	Increase of the purchasing power of residents
Impact 28	Workforce presence	Health and safety	Average	Risks of STI and HIV / AIDS from risky sexual behaviours of

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
				construction workers and the female population
Impact 29	Workforce presence	Women's Activities / Conditions	Average	Risks of violence against women and vulnerable people
Impact 30	Excavating the foundations	Health and safety	Average	Risks of respiratory illnesses and accidents
Impact 31	Excavating the foundations	Employment	Average	Employment creation in the area of influence of the site
Impact 32	Excavating the foundations	Surface waters	Average	Surface water pollution due to oil discharges from machinery
Impact 33	Excavating the foundations	Groundwater	Average	Groundwater pollution due to oil discharges by machinery
Impact 34	Excavating the foundations	Soil	Average	Breaking down the nature of the soil following compaction
Impact 35	Waste deposits from all comers and other waste	Landscape	Average	Degradation of the living standard in the base camp
Impact 36	Waste deposits from all comers and other waste	Health and safety	Average	Waste pollution
Impact 37	Movement of machinery	Health and safety	Average	Health and safety risks to personnel and residents
Impact 38	Movement of machinery	Air	Average	Air pollution (SEM)
Impact 39	Movement of machinery	Health and safety	Average	Risks of miscellaneous accidents
Impact 40	Movement of machinery	Sound environment	Minor	Deterioration of the sound environment by the sound of heavy machinery
Impact 41	Welding and thermal cutting	Air	Average	Air pollution
Impact 42	Welding and thermal cutting	Health and safety	Average	Deterioration of workers' health
Impact 43	Welding and thermal cutting	Sound environment	Minor	Deterioration of the sound environment
Impact 44	Implementation of VRD and installation of equipment	Air	Average	Air pollution (SEM)
Impact 45	Implementation of VRD and installation of equipment	Sound environment	Average	Deterioration of the sound environment by the noise of heavy machinery
Impact 46	Implementation of VRD and installation of equipment	Soil	Average	Modification of and deterioration of the structure and texture of the soil
Impact 47	Implementation of VRD and installation of equipment	Surface water	Average	Disruption of the natural water drainage system
Impact 48	Implementation of VRD and installation of equipment	Landscape	Average	Modification of appearance of the landscape
Impact 49	Implementation of VRD and installation of equipment	Groundwater	Average	Disruption of hydrological and hydrogeological dynamics
Impact 50	Operation of borrow pits	Vegetation	Average	Loss of trees in quarrying areas

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Impact 51	Operation of borrow pit sites	Soil	Average	
Impact 52	Operation of borrow pit sites	Land	Average	Exacerbation of land conflicts
Impact 53	Operation of borrow pit sites	Surface waters	Average	Disruption of hydrological and hydrogeological dynamics
	Operation and rehabilitation phase			
Impact 54	Operation of the CHRU	Water	Major	Water pollution from waste coming from daily activities
Impact 55	Operation of the CHRU	Air	Average	Air pollution connected with the incineration of biomedical waste
Impact 56	Operation of the CHRU	Soil	Major	Soil pollution from waste coming from daily activities
Impact 57	Operation of the CHRU	Health and safety	Major	Improvement of the provision of care
Impact 58	Operation of the CHRU	Economy	Major	Optimizing business activities within the CHRU perimeter
Impact 59	Operation of the CHRU	Quality of life and well-being	Major	Improving the quality of life of people in the CHRU's area of influence
Impact 60	Operation of the CHRU	Economic activities	Major	Improvement of the incomes of residents
Impact 61	Operation of the CHRU	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 62	Operation of the CHRU	Women's economic activities	Major	Improving women's incomes
Impact 63	Operation of the CHRU	Employment	Major	Employment creation in area of influence of the site
Impact 64	Daily production of biomedical waste	Health and safety	Major	Pollution from biomedical waste
Impact 65	Daily production of biomedical waste	Air	Average	Pollution related to incineration (SEM)
Impact 66	Daily production of biomedical waste	Water	Major	Solid pollution (waste) and liquids (wastewater with detergent residue)
Impact 67	Daily production of biomedical waste	Soil	Major	Solid pollution (waste) and liquids (wastewater with detergent residue)
Impact 68	Management of DPC	Air	Average	Pollution related to incineration (SEM)
Impact 69	Management of DPC	Landscape	Major	DPC pollution
Impact 70	Supply (transport) of material and of consumables	Employment	Major	Employment creation
Impact 71	Operation of the relay electrical generating set and incinerator	Air	Average	Pollution (SEM)
Impact 72	Operation of the relay electrical generating set and incinerator	Sound environment	Major	Noise

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Impact 73	Operation of the relay electrical generating set and incinerator	Health and safety	Major	Risk of accidents
Impact 74	Maintenance of the equipment Maintenance of the premises	Water	Major	Various pollution
Impact 75	Maintenance of the equipment Maintenance of the premises	Soil	Major	Various pollution
Impact 76	Maintenance of the equipment Maintenance of the premises	Employment	Major	Employment creation
Impact 77	Supply (transport) of material and of consumables	Employment	Major	Employment creation
Impact 78	Oil leaks from vehicles in car parks	Water	Average	Pollution of water resources
Impact 79	Oil leaks from vehicles in car parks	Soil	Average	Soil pollution
Impact 80	Oil leaks from vehicles in car parks	Landscape	Average	Landscape pollution
Impact 81	Oil leaks from vehicles in car parks	Health and safety	Average	Various pollution
Impact 82	Heating and air conditioning	Electricity	Average	Pressure on electrical resources / fire risk
Impact 83	Heating and air conditioning	Groundwater	Average	Pressure on water resources
Impact 84	Heating and air conditioning	Surface waters	Average	Pressure on water resources
Impact 85	Heating and air conditioning	Health and safety	Average	Exacerbation of the risk of technological accidents
Impact 86	Heating and air conditioning	Air	Average	Air pollution
Impact 87	Heating and air conditioning	Employment	Average	Employment creation
Impact 88	Cleaning up green spaces and premises	Water	Average	Water pollution
Impact 89	Cleaning up green spaces and premises	Health and safety	Average	Chemical poisoning / skin irritation
Impact 90	Cleaning up green spaces and premises	Soil	Average	Soil pollution
Impact 91	Cleaning up green spaces and premises	Vegetation	Major	CO deprivation
Impact 92	Cleaning up green spaces and premises	Landscape	Major	Improved living standard
Impact 93	Cleaning up green spaces and premises	Employment	Major	Employment creation
Impact 94	Cleaning up green spaces and premises	Economic activities	Major	Improvement of the incomes of residents
Impact 95	Cleaning up green spaces and premises	Educational and scientific activities	Major	Improved living standard

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Impact 96	Cleaning up green spaces and premises	Women's Activities / Conditions	Major	Improving women's incomes
Impact 97	Cleaning up green spaces and premises	Quality of life and well-being	Major	Increased purchasing power for residents
Impact 98	Work in high locations for cleaning	Health and safety	Average	Exacerbation of the risks of accidents
Impact 99	Cleaning work in high areas	Employment	Major	Employment creation
Impact 100	Exercise of educational and research activities	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 101	Conducting educational and research work	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 102	Treatment of sewage and sludge	Air	Average	Air pollution / olfactory nuisance
Impact 103	Treatment of sewage and sludge	Soil	Average	Soil pollution
Impact 104	Treatment of sewage and sludge	Landscape	Average	Landscape pollution
Impact 105	Treatment of sewage and sludge	Health and safety	Average	Various pollution
Impact 106	Treatment of sewage and sludge	Educational and scientific activities	Major	Improved scientific and educational knowledge (Management of sludge and drainage)
Impact 107	Treatment of biological fluids and LBP	Surface waters	Major	Water pollution
Impact 108	Treatment of biological fluids and LBP	Groundwater	Major	Groundwater pollution
Impact 109	Treatment of biological fluids and LBP	Health and safety	Major	Pollution by biological fluids and LBP
Impact 110	Treatment of biological fluids and LBP	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 111	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Air	Average	Visual and olfactory disturbances
Impact 112	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Groundwater	Major	Water pollution
Impact 113	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Surface waters	Major	Water pollution
Impact 114	Treatment of household waste, infectious waste,	Landscape	Major	Visual and olfactory disturbances

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
Impact 115	radioactive waste, biopsies and remains Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Health and safety	Major	Visual and olfactory disturbances
Impact 116	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 117	Transport / movement of patients, transport of medicines and technical medical equipment	Sound environment	Average	Deterioration of the sound environment by the sound of heavy machinery
Impact 118	Transport / movement of patients, transport of medicines and technical medical equipment	Traffic	Average	Temporary traffic disruption due to increased traffic
Impact 119	Transport / movement of patients, transport of medicines and technical medical equipment	Health and safety	Average	Exacerbation of the risks of accidents
Impact 120	Transport / movement of patients, transport of medicines and technical medical equipment	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 121	Biological, biochemical and radiological examinations	Groundwater	Average	Various pollution
Impact 122	Biological, biochemical and radiological examinations	Surface waters	Average	Various pollution
Impact 123	Biological, biochemical and radiological examinations	Health and safety	Average	Exacerbation of the risks of accidents
Impact 124	Biological, biochemical and radiological examinations	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 125	Storage and dispensation of medicines and technical medical material	Air	Average	Various pollution
Impact 126	Storage and dispensation of medicines and	Soil	Average	Various pollution

Impact no.	Sources of impacts	Affected component	Importance	Impact Description
	technical medical material			
Impact 127	Storage and dispensation of medicines and technical medical material	Health and safety	Average	Various pollution
Impact 128	Storage and dispensation of medicines and technical medical material	Employment	Major	Employment creation
Impact 129	Storage and dispensation of medicines and technical medical material	Educational and scientific activities	Major	Improved scientific and educational knowledge
Impact 130	Miscellaneous maintenance (material and equipment)	Health and safety	Average	Exacerbation of the risks of accidents
Impact 131	Miscellaneous maintenance (material and equipment)	Employment	Major	Employment creation
Impact 132	Restoration (Cafeteria and kitchen)	Air	Average	Various pollution
Impact 133	Restoration (Cafeteria and kitchen)	Groundwater	Average	Various pollution
Impact 134	Restoration (Cafeteria and kitchen)	Surface waters	Average	Various pollution
Impact 135	Restoration (Cafeteria and kitchen)	Soil	Average	Various pollution
Impact 136	Restoration (Cafeteria and kitchen)	Employment	Major	Employment creation
Impact 137	Restoration (Cafeteria and kitchen)	Women's activities / conditions	Major	Employment creation
Impact 138	Restoration (Cafeteria and kitchen)	Quality of life and well-being	Major	Employment creation
Impact 139	Patient visits and personnel movement	Traffic	Average	Temporary traffic disruption due to increased traffic
Impact 140	Patient visits and personnel movement	Health and safety	Average	Exacerbation of the risks of accidents
Impact 141	Patient visits and personnel movement	Employment	Major	Employment creation
Impact 142	Patient visits and personnel movement	Economic activities	Major	Improvement of the incomes of residents
Impact 143	Patient visits and personnel movement	Women's activities / conditions	Major	Improving women's incomes
Impact 144	Patient visits and personnel movement	Quality of life and well-being	Major	Increased purchasing power

Distribution of estimated cost of the compensation for social and environmental impacts

The total amount of measures to be put in place to compensate for the social and environmental impacts is estimated at this phase of the study to be about two hundred fourteen million CFA Francs, or just under 0.67% of the total estimated amount for the construction of the CHRU.

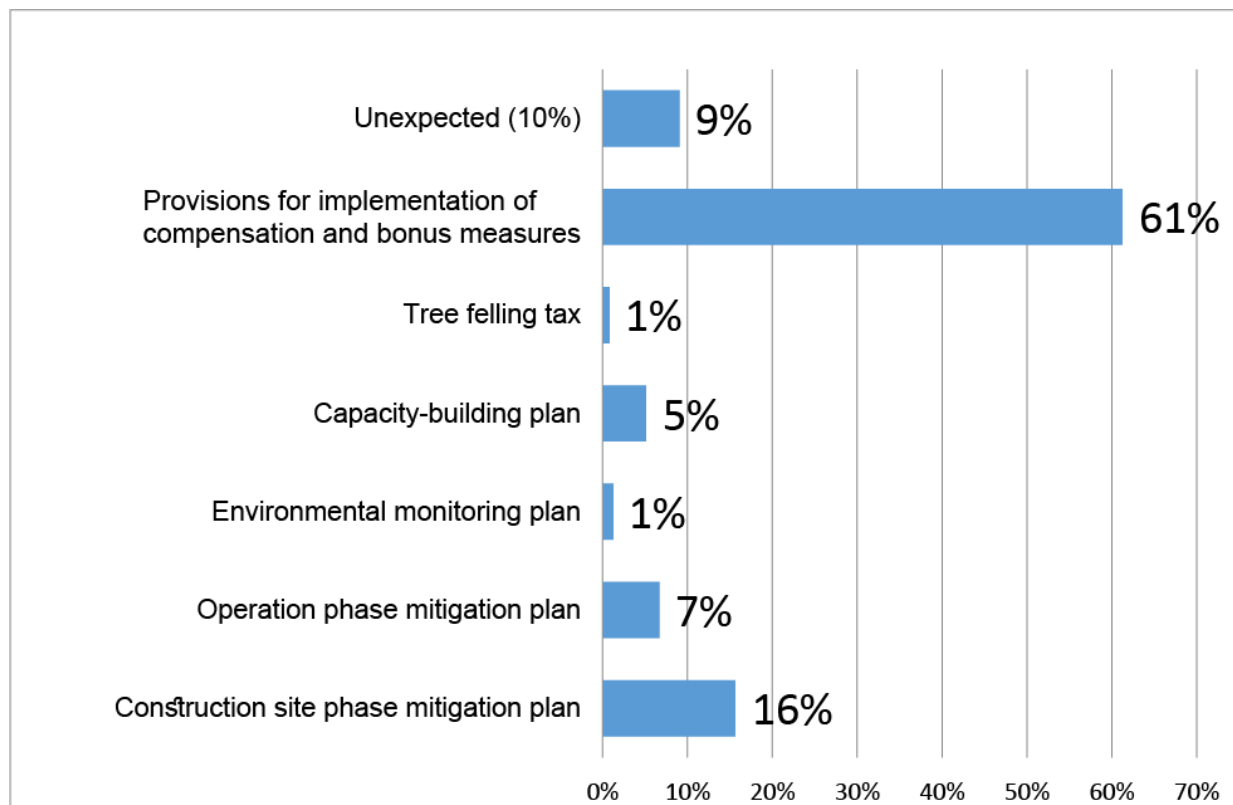


Figure 1: Non-technical summary - distribution of the estimated cost of compensation for social and environmental impacts

1. Introduction

1.1. Background and rationale

In September 2011, the Government of Burkina Faso adopted the second National Plan for Health Development (PNDS) 2011-2020 which was inspired from the strategic directions of the National Health Policy (PNS), in order to indicate the government's commitment to solving in a sustainable manner health problems of the populations. The objectives of this plan fall within those of the Sustainable Development Goals (SDG). The evaluation of the 2001-2010 PNDS showed that the health situation in Burkina Faso, despite a definite improvement, remains characterised by high general and specific mortality rates. The epidemiological profile of the country remains marked by the persistence of a high burden of disease due to endemic epidemics, including HIV infection, and by the progressive increase in the burden of non-communicable illnesses. The floods of 1 September 2009 also put a strain on the organisation of the health system, both in the capacity of the hospitality and in the provision of care.

The city of Fada N'Gourma has a hospital. Like other hospitals, its main missions are to diagnose, treat and monitor patients, the wounded and pregnant women, taking into consideration the psychological and socio-economic aspects of the patients for which it assures accommodation. The Fada Hospital, with a capacity of 152 beds, is a pavilion-type hospital, except for the medical / postpartum care and paediatric / surgical buildings that are in R+1. It is built on a plot of land of about 7 hectares, of which almost half is occupied by administrative housing. The vast majority of the buildings were built in 1972 by the NGO "Brothers of Men" which administered it until 1983. Built 40 years ago, the vast majority of the infrastructures no longer meets the requirement for quality care. Despite the renewal of the equipment, this equipment is insufficient and mostly dilapidated.

Thus, the increase in the population, the evolution of medical techniques and technologies, and the continuous reinforcement of the hospital in number and qualification of personnel demonstrate the need to adapt the premises and equipment to these changes.

The current government, through its National Economic and Social Development Plan (PNDES), has shown its willingness to modernise the health infrastructures and provide quality care for the people of Burkina Faso. Hence the need to build a new hospital for the benefit of the Eastern Region: the CHRU of Fada N'Gourma, the subject of this study.

In fact, in accordance with Decree no. 2015-1187 of 22 October 2015,¹ the construction project of the Fada CHRU falls under Category A. As a consequence, it is subject to the conducting of an Environmental and Social Impact Assessment (ESIA).

An initial study was conducted in 2014 to determine possible social and environmental impacts. As the work could not be done within the initial time frame, it was necessary to update previous studies in order to take into consideration the evolution of the socio-economic situation and the new standards for an ESIA.

1.2. Key players in the project

1.2.1. ESIA Implementation Team

This Environmental and Social Impact Assessment (ESIA) was conducted by Insuco International.

The Insuco team was coordinated by an expert Mission Head in environmental and social impact assessment, Moussa OUEAOGO. Under his supervision he had the following team:

¹ Decree no. 2015-1187/PRES-TRANS/PM/MERH/MATD/MME/MS/MARHASA/MRA/MICA/MHU/MIDT/MCT of 22 October 2015 containing conditions and procedures for the completion and validation of the strategic environmental assessment, of the study and of the environmental and social impact statement.

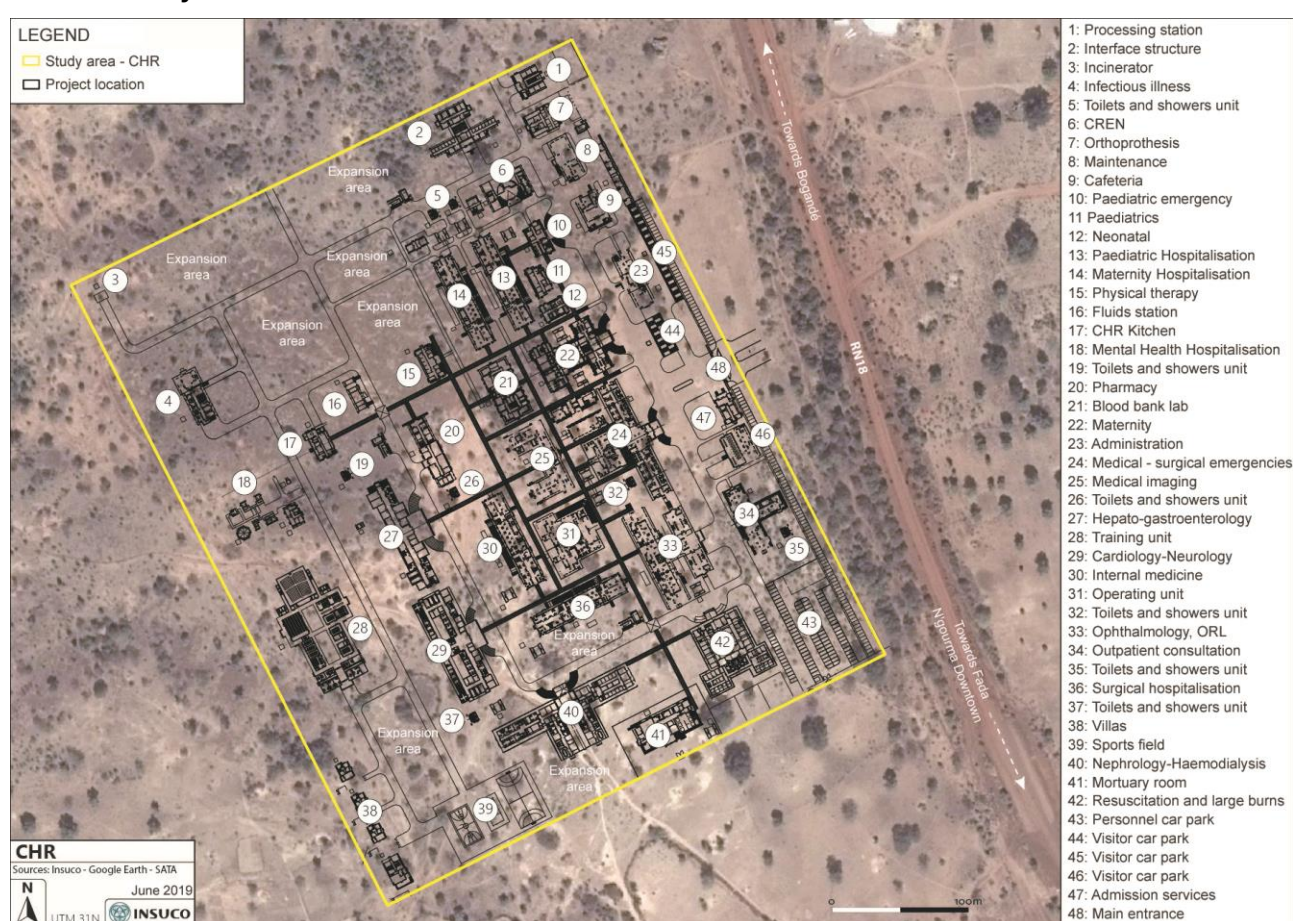
- an expert sociologist in social assessment and resettlement, Servanne OUEROAOGO / SAWADOGO;
- Charles Guissou, a Socio-Economist
- a Hygiene Quality Safety Environment (HSQE) expert, Bruno NEBIE;
- an assistant for the conducting of inventories, Yeri KAMBIRE;
- an assistant for the conducting of socio-economic surveys, Abdel Aziz DIALLO.

1.2.2. Documentary review

As part of the mission, the team collected and consulted a number of documents relating to strategic studies and statistical directories concerning the project area. It also consulted the technical documents relating to the Fada N'Gourma CHRU construction project.

1.2.3. Study area

■ Main study area



Map 1: The main study area of the CHRU

■ Secondary study area



Map 2: Secondary study area

1.2.4. Data collection in the field

1.2.4.1. Conducting environmental investigations

The investigation was developed in two phases:

■ Preparatory phase

Based on the information made available to the team, and the documentary research conducted beforehand, sampling points were chosen taking into consideration the area of influence of the project.

This approach permitted the use of provisional GPS coordinates for the development of the maps of the CHRU construction right-of-way sites. These tools led to the conducting of field trips for the collection of environmental indicators of the initial state.

■ Field phase

This has permitted the confirmation of GPS coordinates identified during the preparatory work and the collection of data. The portrait of the reference situation was based on relevant studies in the public domain on parameters measured in the city of Fada N'Gourma by the SOCREGE and WSP offices in 2018 as part of the ESIA "North Dorsal Interconnection 330 kV - Nigeria - Niger - Burkina Faso - Benin/Togo WSP West African Electrical Energy Exchange System (EEEEOA No 141-24307-00EIES - Burkina Faso, May 2018). "

- Air quality: Equipment to measure physical and chemical air quality has been continuously placed at the identified sites. Noise pollution was also evaluated during this phase. The data was analysed from similar studies carried out in the area with similarities in terms of environmental issues.

- Soils: Field observations crossed with analysis of secondary data allowed experts to describe the environment of the profile (surface condition such as crusting, degree of denudation, vegetation cover, slope of the terrain, topographical position, etc.) and within the profile, the following key morphological characteristics were determined: the thickness and transition of horizons, soil depth, colour, structure, texture, the gravel load of the soil and drainage.
- Hydrology: The exploitation of secondary data allowed the description of the water network in the context of the sub-basin to better assess drainages, interactions and predict the impacts that would result.

1.2.4.2. Conducting social surveys

■ Inventories of property and people

As a prelude to the investigations, initial zoning was carried out with the landowners to delineate the land under their responsibility and define the lists of the operators. The inventory combined GPS surveys with administration of Electronic Data Capture (EDC) questionnaires. Inventory surveys produced information on the identity of affected household heads, homes and their residents, permanent crops (fruit and forest trees), annual crops and fallows, and parcels for non-agricultural and residential use.

The inventory was conducted by a team of investigators, under the responsibility of the team's expert in social and resettlement issues.

■ Conducting the sampled socio-economic survey

A socio-economic survey to provide a monograph of the project area was carried out as part of the ESIA.

Thus, the socio-economic survey was conducted on a sample of households potentially affected by the project and of households not affected. A questionnaire developed for this purpose was administered to all heads of households in the sample. The collected data, which was uploaded to the ONA.io platform, was checked daily, before being exported for cleaning and processing.

1.2.5. Data processing

1.2.5.1. Processing environmental data

This processing was carried out based on analysis of the data by components, the use of adapted software and the comparison with the standards in force in Burkina Faso.

For example, Order no. 2001-185/PRES/PM/MEE, setting standards for discharges of pollutants into air, water and soil in Burkina Faso and WHO guidelines on environmental quality, were considered for analysis of the initial state of air quality.

The standards of the International Finance Corporation (IFC), those of the World Health Organisation (WHO) and of Burkina Faso contained in Decree no. 2011-928/PRES/PM/MFPTSS/MS/MATDS setting general hygiene measures in the workplace have served as a reference for the development of the initial state concerning noise pollution and chemical pollution of the environment.

For educational information, the morphological and analytical data were analysed according to the standards recorded in the land assessment manual "Technical Documentation no. 6" (BUNASOLS, 1990).

Hydrological and water quality data were analysed from Order no. 0019/MAHRH/MS of 05 April 2005 setting water potability standards.

1.2.5.2. Processing of social data

As with the collection of data in the field, the method of data processing was specific to each activity carried out: conducting inventories, conducting the sampled socio-economic survey and conducting the qualitative survey on transport / access.

The inventory data collected, loaded and verified on the ONA.io platform was extracted from Excel databases. The Excel databases were then reviewed to produce geo-localising inventory maps for each item inventoried in the study area.

The analysis of the socio-economic survey data was based on the vulnerability of the households, evaluated through the calculation of the synthetic vulnerability index. This synthetic index is based on seven indicators of living conditions (the evolution of which is verifiable over time): socio-demographic, socio-professional, socio-agricultural, socio-health, quality of housing, possession of animals, possession of property. These indices were integrated in a weighting algorithm specific to the study area, to obtain a synthetic index of vulnerability.

The analysis of the different impacts was inspired by the method developed by Martin Fecteau². It consists of a confrontation between the characteristics of the project and the context, to determine the relative impacts and absolute impacts of the project activities according to the perception that stakeholders and experts have.

1.3. Organisation of the report

Data and analyses are presented according to the regulatory plan of the ESIA (Decree no. 2015-1187, Appendix II).

Table 2: ESIA regulatory plan

Chapters		Sections
I.	Non-technical summary	
II.	Political, legal and institutional framework	
III.	Description of the initial state of the environment	a. Air and noise quality b. Flora and fauna c. Earth environment (topography, geology, hydrology) d. Zoning (occupation and use of space) e. Economic and socio-cultural environment
IV.	Analysis of variants as part of the project and description of the project	
V.	Project impacts on different areas of the environment	
VI.	Environmental management plan for the performance and operation of the project	a. Programme to implement mitigation, compensation and impact enhancement measures b. Environmental surveillance and monitoring programme c. Capacity-building programme d. Estimation of the costs of the different programmes
VII.	Methods of consultation and public involvement	

² Martin Fecteau, Comparative Analysis of Rating Methods for Environmental Impact Assessments, research report, University of Quebec, Montreal, 1997.

2. Political, legal and institutional framework

The purpose of this chapter is to define the political, legal and institutional framework that should govern the implementation of the social and environmental component of the project. The main environmental protection policy and strategy documents, as well as the provisions of the legal texts (international and national) and the institutional framework relating to the environmental and social impact assessment, are briefly presented.

2.1. Burkina Faso's political framework

This section highlights the various policies adopted by Burkina Faso in terms of sustainable development, environment, land and land use planning, gender, the fight against poverty, and health and safety.

2.1.1. Sustainable Development Policies

2.1.1.1. National Economic and Social Development Plan (PNDES)

The PNDES, which covers the period 2016-2020 is based on a diagnostic analysis of the social and economic situation that has identified the persistence of social inequalities and the structural inadequacies of the national productive system, which accentuate, among others, its vulnerability to climatic hazards.

Thus, the strategic objective 3. 5 of the PNDES is to reverse the trend of environmental degradation and to ensure sustainable management of natural and environmental resources.

The importance that the PNDES places on the sustainable management of forest and wildlife resources, the protection of ecosystems and the improvement of the living standard, requires the choice of an approach that promotes the consideration of environmental concerns and social issues at all stages of the project.

2.1.1.2. National Sustainable Development Policy (NSDP)

Adopted by Decree no. 2013-1087/PRES/PM/MEDD/MEF of 20 November 2013, the NSDP views sustainable development as a concept, a process and a method to ensure "*development that meets the needs of the present without compromising the capacity of future generations to meet theirs*". The NSDP defines general guidelines for the development and management of sectoral policies, development strategies, plans and programmes, as well as national and decentralised planning and budgeting.

It sets out the principles and responsibilities of the intervention of the central public administration, decentralised communities, civil society organisations, the private sector and other development actors. It determines the necessary means as well as the monitoring-assessment mechanism of indispensable control in achievement of sustainable development.

Thus, the project to build the CHRU in Fada will be implemented according to the principle of social equity and social solidarity, the principle of gender consideration, the principle of internalisation of costs, the precautionary principle, the principle of prevention, the principle of information and of public involvement, the principle of partnership, the principle of environmental protection, the principle of accountability (or responsibility), the principle of national solidarity, the principle of subsidiarity, the principle of sustainable production and consumption.

2.1.1.3. Environment Plan for Sustainable Development (PEDD)

The PEDD is a complementary tool of the National Strategy for Accelerated Growth and Sustainable Development Strategy (SCADD) to promote development. Its objectives are to: (i) raise the level of fertility and productivity of the land; (ii) preserve, improve and maintain soil quality and function; (iii) encourage soil preservation methods; (iv) raise awareness of issues related to this basic element of ecosystem sustainability. The objectives pursued by the PEDD will be taken into consideration in the development and implementation of the project's ESMP.

2.1.2. Environmental policies

2.1.2.1. National Environmental Plan (PNE)

The National Environmental Plan is a referential framework for the management of environmental concerns in Burkina Faso. The PNE provides the following main guidelines: (i) the rational management of natural resources; (ii) the guarantee of a decent living standard in a better quality environment.

It defines many challenges, including the fight against land degradation, the control of water resources, the development of forest products, etc.

The development and implementation of the Environmental and Social Management Plan of the ESIA of this project will be based on the guiding principles of the PNE.

2.1.2.2. National Forest Policy (PNF)

Sustainable management of forests, wildlife and fisheries resources is a duty for all within the meaning of this policy. It aims to take concerted and complementary action by all the institutions and structures concerned. The PNF contributes to the production of environmental goods and services, the preservation of the natural environment, the conservation of biodiversity, adaptation to climate change, greenhouse gas mitigation and the fight against desertification, while ensuring the socio-economic and cultural needs of present and future generations through:

- Significantly reducing the imbalance between the supply and demand for energy wood, service timber, working lumber and products gathered from the wild for food and medicinal usage;
- Rehabilitation of degraded forests;
- Improving the living standard by developing green belts around urban centres and promoting forest entities at the level of village soils.

2.1.2.3. National Adaptation Programme of Action to Climate Variability and Change (NAPA)

This programme is being implemented as part of the implementation of the United Nations Framework Convention on Climate Change and the Kyoto Protocol. NAPA aims to identify Burkina Faso's urgent and immediate needs to adapt to current climate vulnerability threats. Among other objectives, it aims to:

- Reduce extreme poverty and hunger;
- Ensure a sustainable environment;
- Establish a global partnership for development.

2.1.2.4. National Water Resource Management Policy

The development of water resources has two priority aspects: (i) the integrated management of the resource; (ii) mobilizing water to meet the needs of the population and agriculture.

In terms of water resource management (GIRE), Burkina Faso has embarked on an integrated process involving a national water policy and an action plan organised into various areas of intervention, including those relating to: (i) the development of a National Water Information System (SINEAU) to provide all users with the data needed to make decisions; (ii) research and development; (iii) emergency measures to restore the environment.

The main objective of the national water resource management policy, which is based on internationally recognised principles of good management, is to "contribute to the sustainable development of Burkina Faso by providing appropriate solutions to water-related problems, so that it does not become a factor limiting the country's socio-economic and human development." More specifically, its aim is to achieve sustainable water satisfaction by respecting ecosystems and ensuring better protection against natural factors of degradation.

2.1.3. Land and Land Development Policies

2.1.3.1. National Land Development Policy of the Territory (PNAT)

By Decree no. 2006-362/PRES/PM/MEDEV/MATD/MFD/MAHRH/MID/MECV of 20 July 2006, the Government of Burkina Faso adopted a national land-development policy of the territory. It provides a guide to development studies and actors acting in the field, in order to translate at the spatial level, the strategic directions contained in the 2025 national prospective study.

This policy defines three fundamental directions:

- Harmonious and integrated development of economic activities in the territory;
- Social integration;
- Sustainable management of the natural environment based on land security, rehabilitation and restoration of degraded natural resources.

The completion of this project will require acquisition of land currently valued economically and culturally by the local population. From this point of view, it will integrate the rehabilitation of affected natural environment and contribute to the land compensation of the property of persons affected.

2.1.3.2. National Land Tenure Security Policy in rural areas (PNSFMR)

The national land tenure security policy in rural areas was adopted by Decree no. 2007-610/PRES/PM/MAHRH of 4 October 2007. It targets all rural actors, equitable access to land, the guarantee of their investments, and the effective management land disputes, in order to contribute to poverty reduction, social peacebuilding and achievement of sustainable development. The general principles of the PNSFMR include:

- To encourage increased investment in the rural sector;
- Taking into consideration the gender, needs and concerns of vulnerable groups, especially the poor;
- Considering the need for sustainable management of natural resources and the preservation of the rights of future generations.

The specific objectives of the PNSFMR are:

- Ensuring the right of legitimate access for all land-related conflicts in a dynamic of sustainable rural development, the fight against poverty and the promotion of equity and legality;
- Contributing to improving the prevention and resolution of land-related conflicts and management of natural resources;
- Contributing to creating the foundations for the viability and development of local authorities by providing them with their own land resources and effective management tools;
- Increasing the efficiency of state and local government services in providing an appropriate and effective public service for securing land in rural areas;
- Promoting the effective involvement of grassroots actors and civil society in the implementation, monitoring and evaluation of the PNSFMR.

2.1.4. Health-safety and social equity policies

2.1.4.1. Gender and anti-poverty policies

The National Gender Policy (PNG) has been adopted to address gender inequalities and disparities in several areas of social life. Thus, the general objective of this policy is to promote participatory and equitable development of men and women, ensuring equal and equitable access and control to resources and decision-making spheres in accordance with their fundamental rights. As specific objectives, the PNG aims to:

- Reinforce actors' capacities in perception, understanding and gender practice;
- Promote a dynamic partnership for gender and development;

- Develop information and sensitisation mechanisms for all actors for a change in behaviour and mentality in favour of equity and equality in men - women relationships.

Equality and equity issues are also integrated into other policies, including:

- The National Strategy for Accelerated Growth and Sustainable Development (adopted in 2010);
- The National Social Action Policy (adopted in 2008);
- The National Policy for the Advancement of Women (adopted in 2004);
- The policy and plan of action and guidance for the promotion and protection of human rights (adopted in 2001).

Thus, gender issues will be integrated into all phases of project implementation.

2.1.4.2. National Population Policy (PNP)

Burkina Faso adopted a National Population Policy by Decree no. 2012-253/PRES/PM/MEF/MS/MESS/MASSN of 28 March 2012. It pursues the specific objectives that are outlined:

- Reducing the total fertility rate from 6.2 children per woman in 2006 to 3.6 in 2030;
- Reducing the contribution of adolescent girls to total fertility by 55% by 2030;
- Increasing the contraceptive prevalence rate by 1.5 percentage points per year, or 51.5% in 2030;
- Reducing the infant mortality rate from 91.7 per thousand in 2006 to 61.9 per thousand in 2030;
- Increasing life expectancy at birth from 57 years in 2006 to 64.8 years in 2030;
- Promoting consistent, effective, integrated and concerted migration management to optimise its impact on development;
- Ensuring effective coordination and better monitoring and evaluation of the implementation of the PNP and PAP at the central and decentralised level.

2.1.4.3. National Health Policy (PNS)

Adopted in 2000 the PNS aims for an integrated health system capable of ensuring health for all through accessible preventive and curative care based on equity and ethics. It was originally aimed at reducing the morbidity of mortality. It has changed over the years and now aims to:

- Increase national health coverage;
- Improve the quality and use of health services;
- Strengthen the fight against communicable and non-communicable illnesses;
- Reduce HIV transmission;
- Develop human resources in the health area;
- Improve access of the people to health services;
- Increase funding for the health sector.

2.1.4.4. National Public Hygiene Policy (PNHP)

The PNHP was adopted in March 2003. It aims to prevent illnesses and poisonings as well as improve comfort and enjoyment of life. The strategy of the sanitation subsector, whose objectives are to safeguard natural and human environments, prevent the deterioration of environments and protect living species and property, fits perfectly with the objectives of the PNHP.

2.2. Legal framework

Burkina Faso has developed legal instruments by adopting texts on the environment, mining, water resources, land and land development, gender, the fight against poverty and health and safety.

2.2.1. Constitution of 2 June 1991 revised by Law no. 33 2012/AN of 11 June 2012

The constitution of the Fourth Republic contains numerous references to environmental issues. Thus, the preamble affirms awareness of the People of Burkina Faso in relation to " (. . .) absolute necessity to protect the environment (. . .). " According to Article 14 of the Constitution: " (. . .) natural resources belong to the people and must be used to improve their living conditions. " Here we can see an indication in terms of environmental policy tending to ensure a balance between protection of natural resources and valorisation for the benefit of man (the populations). Article 29 of the Constitution recognises the right to a healthy environment to the Burkinabe citizen, while stating that "protection, defence and promotion of the environment are a duty for all. " Finally, the Constitution establishes a right to petition for the benefit of communities against any activity that could harm the environment or cultural and historical heritage (Article 30).

2.2.2. Laws and regulations

The various laws and decrees applicable to the project are subsequently described in the paragraphs below, in addition to their most relevant articles for this project.

2.2.2.1. In area of the environment and forests

■ Law no. 006-2013/AN of 2 April 2013 on the Environment Code in Burkina Faso

The purpose of this law is to protect living beings against harmful or uncomfortable attacks and risks that hinder or endanger their existence as a result of the degradation of their environment and to improve their living conditions (Article 3).

The fundamental principles governing environmental management are set out in Articles 5 to 9. Article 8 states that: "Local people, non-governmental organisations, associations, civil society organisations and the private sector have the right to participate in the management of their environment. They participate in the decision-making, development, implementation and evaluation of plans and programmes that affect their environment. Local populations exercise a right of use over natural resources. This right guarantees them access to genetic resources and the sharing of the benefits associated with their exploitation. "

Article 25 of this law states that: "Activities that may have significant environmental impacts are subject to advance notice by the Ministry of the Environment. This notice is established based on a Strategic Environmental Assessment (EES), an Environmental and Social Impact Assessment (ESIA) or an Environmental and Social Impact Statement (ESIS). "

In addition, the Code specifies that the ESIA must be supplemented by a public inquiry to seek the views of the parties concerned in relation to the environmental impact study presented (Article 27).

Similarly, the Code deals with waste issues. According to Article 49: "Any producer, importer, distributor and transporter is required to recover the waste generated by the materials or products they produce or sell. The competent authorities require them to dispose of this waste or to participate in waste recovery and disposal systems from other identical or similar products. Failure to comply with administration's instructions entails the suspension of the offender's activities without prejudice to criminal prosecution."

Buildings, industrial, commercial, craft and agricultural establishments, mining and quarries, motor vehicles, or any other movable object owned, operated or owned by any natural or legal person, are constructed, operated or used in application of this law (Article 65).

Anyone who causes pollution is held liable for damage caused to third parties by his or her own action (Article 70).

Concerning wastewater, Article 80 states: "In order to manage rainwater, wastewater, and excrement, from homes or classified establishments, a collective and non-collective sanitation system is instituted in each municipality."

The Code presents measures to prevent and manage technological risks and disasters (Articles 95 and 99).

■ **Law no. 003-2011 of 5 April 2011 on the Forest Code in Burkina Faso**

According to the terms of this law, forests, wildlife and fishery resources as a national heritage must be managed in a sustainable manner. This management contributes to the production of environmental goods and services, to the preservation of the natural environment, to the conservation of biological diversity, to adaptation to climate change (Article 4). This law specifies how forests and wildlife are protected (Articles 41, 42). It submits any performance of major work resulting in clearing to prior approval by the Minister responsible for the environment on the basis of an environmental impact assessment (Article 50). Similarly, Article 51 stipulates that, regardless of the forests system in question, the Minister responsible for forests may, by decree, determine areas that are exempt from clearing in view of their particular importance in maintaining ecological balance.

■ **Decree no. 98-321/PRES/PM/MEE/MIHU/MATS/MEF/MEM/MCC/MCIA of 28 July 1998 regulating landscape development in Burkina Faso**

In the meaning of Article 21: "The encroachment of alignment planting sites is strictly prohibited subject to the results of an environmental impact study. " Article 29 specifically targets industrial units in these terms: "Any project to construct buildings and to install major infrastructure must include a landscape development component. "

■ **Decree no. 98-323/PRES/PM/MATS/MIHU/MS/MTT of 28 July 1998 regulating the collection, storage, transport, treatment and disposal of urban waste**

Article 5 of the decree provides that: "It is forbidden to throw, abandon, or dump urban waste, whatever its nature or quantity, on public roads and squares, in forests and in general, on places not intended for this purpose. "

According to Article 6 of the same decree: "Anyone who produces urban waste is required to ensure that it is collected by appropriate structures. "

■ **Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 setting standards for release of pollutants into air, water and soil**

This decree specifies air quality standards (Articles 3 to 6), the emission discharge standards due to fixed facilities, water quality standards, discharge of wastewater into surface water and sewers (Articles 7 to 13), as well as soil pollutant standards (Articles 14 and 15).

■ **Decree no. 2001-342/PRES/PM/MEE of 17 July 2001**

This decree covers the scope of application, content and procedure of the study and the environmental impact statement.

In application of the Environment Code, this decree paves the way for a series of other decrees or orders that determine and clarify the regulatory framework for the ESIA. It defines the scope and describes the procedure for carrying out the ESIA and the ESIS and gives the contents of their report. In Annex 1 of this decree, the "list of works, projects, developments, activities and planning documents subject to the Environmental Impact Assessment or Notice is presented. "

■ **Decree no. 2008-312/PRES/PM/MECV/MATD/MEF of 9 June 2008**

This decree deals with the creation of management of village areas with hunting interests.

■ **Decree no. 2015-1187/PRES-TRANS/ PM / MERH / MATD / MME / MS / MARHASA / MRA/ MICA/MHU/ MIDT /MCT of 22 October 2015**

This decree deals with conditions and procedures for carrying out and validating the strategic environmental assessment, the study and the environmental and social impact statement.

■ **Decree no. 2015-1203/PRES-TRANS/PM/MERH/MJDHPC of 28 October 2015**

This decree deals with the way the environmental inspection is organised and conducted.

■ **Order 2006-025 /MECV/CAB of 19 May 2006**

This order deals with the creation, allocation, composition and operation of the Environmental Assessments Technical Committee (COTEVE) and provides guidance on the process of revision of the ESIA.

■ Order 2004-019/MECV of 07 July 2004

This order deals with the determination of the list of forest species benefiting from special protection measures.

2.2.2.2. In area of water management

■ Law relating to water management

Good water management is ensured in Burkina Faso by Law no. 002-2001/AN of 8 February 2001 concerning the law providing guidance relating to water management.

Per the terms of Article 1 of this law, "the objective of water management is to respect the environment and the priorities defined by the law:

- To ensure the drinking water supply to the population;
- To meet or reconcile the requirements of agriculture, livestock, fishing and aquaculture, mineral extraction, industry, energy production, transport, tourism, recreation and other human activities that are legally carried out;
- To preserve and restore water quality;
- To protect aquatic ecosystems;
- To address the needs of health, public safety, civil security and the problems posed by floods and droughts. "

Article 4 states that "the biological diversity of aquatic ecosystems, their role in regulating and renewing water resources, the importance of the social, economic and cultural functions in which they participate, give their conservation a priority and a public interest. "

Article 5 states: "Water is part of the nation's common heritage. It is part of the public domain. "

Finally, under Article 49 Section 1, it states that "natural persons or legal entities who use water for non-domestic purposes may be subject to a financial contribution based on the volume of water extracted, consumed or mobilised. "

■ Parafiscal Water Law

Law no. 058-2009/AN of 15 December 2009 establishing a parafiscal tax for water agencies deals with in these terms:

Article 1 "A parafiscal tax called the Water Financial Contribution (CFE) is introduced on the removal of untreated water, changes to the water system and water pollution. "

Article 2 "The CFE includes:

- The untreated water tax;
- The water system modification tax;
- The water pollution tax. "

Article 3 "The levy on untreated water subject to the payment of the tax concerns [. . .] mining and industrial activities.

Article 5 "The facilities, activities or works subject to the pollution tax are those that cause a spill, overflow, discharge, direct or indirect deposit of material of any kind and more generally due to any fact that could cause or increase water degradation by altering its chemical or biological physical characteristics, whether surface water or ground-water. "

■ Decree no. 2006-590/PRES/PM/MAHRH/MECV/MRA of 6 December 2006 protecting aquatic ecosystems

This decree concerns: (i) permanent or temporary waterways (streams, gullies, ravines, backwaters, rivers); (ii) natural or man-made water reservoirs (flood lakes); (iii) wetlands in general.

The decree sets out the prescribed uses. Thus, it is strictly forbidden: 1) to release polluting or toxic effluents; 2) to take water samples above the thresholds established; 3) to discharge wastewater; 4) to cause water flows resulting in a change in their level, mode of flow or system.

■ **Decree no. 2003-265/ PRES/PM/MAHRH** of 27 May 2003

This decree concerns prerogatives of the Minister responsible for water in the event of exceptional circumstances.

■ **Decree no. 2003-285/PRES/PM/MAHRH** of 9 June 9 2003

This decree concerns the establishment of the basins and sub-watersheds.

■ **Decree no. 2003-286/PM/PRES/MAHRH of 9 June 2003**

This decree deals with the determination of areas of competence of water resource management structures.

■ **Decree no. 2004-580/PRES/PM/MAHRH/MFB2004-580/PRES/PM/MAHRH/MFB** of 15 December 2004

This decree concerns domestic water uses.

■ **Decree no. 2004-581/PRES/PM/MAHRH/MFB** of 15 December 2004

This decree concerns the definition and procedure for delimiting water protection perimeters for human consumption.

■ **Decree no. 2005-187/PRES/PM/MAHRH/MCE** of 4 April 2005

This decree determines the nomenclature of facilities, projects, works and activities subject to authorisation or declaration.

■ **Decree no. 2005-192/PRES/PM/MAHRH/MFB** of 4 April 2005

This decree concerns the procedures for the development, approval, implementation and monitoring of water management and development schemes.

■ **Decree no. 2011-445/PRES/PM/MEF/MAH** of 18 July 2011

This decree concerns the determination of the rates and methods for recovering the untreated water tax.

■ **Decree no. 408/PRES/PM/MRA/MAHRH/MATD** of 3 July 2007 establishing conditions for the exploitation of water resources for pastoral purposes

This text specifies the characteristics of access corridors (width of at least 100 metres) and the safety zone (radius of at least 100 metres) around the watering points of the herd (pools, wells, boreholes, etc.).

■ **Decree no. 2007-485/PRES/PM/MAHRH** of 27 July 27 2007

This decree concerns the conditions and procedures for providing information about their work by any developer and / or rehabilitator of water works.

■ **Decree no. 2015 -1205/PRES-TRANS/ PM/ MERH/ MEF/ MARHASA/ MS/ MRA/ MICA/ MME/ MIDT/MATD/** of 28 October 2015

This decree concerns the standards and conditions for wastewater discharge.

2.2.2.3. In area of land and development of the territory

■ **Law no. 055-2004/AN of 21 December 2004 on the General Code of Territorial Authorities in Burkina Faso**

This law redefines the territorial framework of the decentralisation and authorities of the different levels of decentralisation. It specifies the environmental responsibilities of communities (Articles 88, 89, 90).

■ **Law no. 017-2006/AN of 18 May 2006 with the Code of Urban Planning and Construction in Burkina Faso**

The purpose of this law is to organise and regulate area of urban planning and construction in Burkina Faso. To do this, it clearly defines the institutional framework responsible for these activities: (i) central and decentralised structures (Articles 3 to 6); (ii) consultative structures (Articles 7 to 9).

■ **Law no. 034-2012/AN of 2 July 2012 on Agrarian and Land Reform in Burkina Faso (RAF)**

On the one hand, this law determines the status of the lands of the national land area in the sense that the land is in principle the property of the State, the general principles that govern the development and sustainable development of the land, the management of resources and other natural resources, as well as the regulation of real estate rights, and, on the other hand, the guidelines for an agrarian policy. It specifies the principles of land use and sustainable development in Articles 3 and 40, in particular the principle of biodiversity conservation and the principle of water and soil conservation. It also defines in sections 1 to 6, the sectoral Master Plan, as well as the Master Plan for Development of the Territory and the Territorial Development Directive.

■ **Law no. 034-2009/AN of 16 June 2009 on rural land system**

This law deals with the recognition and protection of rural land rights and, in particular, state and local government land rights, the land domain for which they are responsible, and prevention and prior conciliation (Articles 25, 26, 27, 30, 94, 96, 97).

■ **Decree no. 2012-862/PRES/PM/MEF/MATD of 12 November 2012 authorizing the collection of revenue in relation to the services of community land services.**

This decree establishes, for the benefit of community budgets, revenues received from the services rendered by rural land services or by state offices. It also sets the amount of revenue collected, such as stamp tax, involvement in land boundary fees, registration fees, documentary research fees and fees for services rendered.

■ **Decree no. 2012-1041/PRES/PM/MEF/MATDS/MAH/MRA/MEDD of 31 December 2012**

This decree recognises the non-development of rural land acquired for profit and establishment of rates and procedures for collecting the tax for not developing this land.

This text deals with the determination and manner in which the tax is collection, followed by prosecutions and penalties relating to the payment of taxes.

■ **Decree no. 2005-188/PRES/PM/MAHRH/MCE of 4 April 2005**

This decree provides conditions for the enactment of the general rules and requirements applicable to facilities, projects, works and activities subject to authorisation or declaration.

■ **Decree no. 2005-515/PRES/PM/MAHRH of 6 October 2005**

This decree concerns the procedures for authorizing and reporting facilities, works, projects and activities.

■ **Decree no. 590/PRES/PM/MAHRH/MECV/MRA of 6 December 2006**

This decree concerns the protection of aquatic ecosystems.

■ **Decree no. 2014-481/PRES/PM/MATD/MEF/MHU of 3 June 2014**

This decree determines the conditions and methods for application of Law no. 034-2012/AN of 2 July 2012 relating to agrarian and land reform in Burkina Faso.

■ **Order no. 2009-20/MRA/SG/DGEAP of 8 June 2009**

This decree concerns the standards for cattle tracks that specify the methods and criteria to be followed for the setting of the track markers.

■ **Law no. 009-2018/AN of the 3 concerning expropriations for public use and compensation for persons affected by developments and projects of public use and general interest in Burkina Faso.**

2.2.2.4. In area of gender

■ **Decree no. 2009 672/PRES/PM/MEF/MPF** of 8 July 2009 on national gender policy

The Decree was developed to promote equality and equity between men and women.

■ **Decree no. 2011-070/PRES/PM/MPF** of 21 February 2011 concerning the Operational Action Plan

Like national policy, the overall objective is to promote participatory and equitable development of men and women.

2.2.2.5. In area of health-safety

■ **Law no. 023/94/ADP** of 9 May 1994 concerning the Public Health Code in Burkina Faso

The law defines the rights and duties inherent in protecting the health of the population. It prohibits air pollution, dumping, burying industrial toxic waste, importing toxic waste and specifies that industrial waste must be disposed of in accordance with the national regulatory provisions. Thus, within the meaning of Article 16, "air pollution is understood to mean the presence in air and atmosphere of smoke, toxic, corrosive, odorous or radioactive dust or gases caused by random nature or by man and likely to adversely affect environmental health and the health of the population. " According to the terms of Article 23: "The dumping or burying of industrial toxic waste is strictly prohibited. "

Article 24 provides that: "Industrial toxic waste and special waste must be disposed of in accordance with national and international regulations. "

■ **Law no. 022/2005/AN** of 24 May 2005 concerning the Public Hygiene Code

Its objective is to preserve and promote public health, and to address various aspects of public hygiene, including those of industrial and commercial facilities. Any industrial unit manager must take measures to protect the health of workers, their families and the residents.

■ **Law no. 017 -2014/AN** of 20 May 2014 prohibiting the production, import, marketing and distribution of non-biodegradable plastic packaging and bags

Article 1 states that this law aims to "eliminate the spread in the natural environment of plastic waste generated by the non-rational use of non-biodegradable plastic packaging and bags; to further protect public health and hygiene; to preserve the quality of the soil, water and air; to improve the living standard of the populations; promote the use of biodegradable plastic packaging and bags. "

This law applies to: "any producer of non-biodegradable plastic packaging and bags in the national territory; any importer of non-biodegradable plastic packaging and bags in the national territory; any distributor of non-biodegradable plastic packaging and bags in the national territory; any natural person or legal entity engaged in commercial, industrial, artisanal or professional activities requiring the use of plastic packaging and bags" (Article 3).

Article 6 sets out the following prohibitions: "any abandonment of plastic packaging or bags in the natural environment, on public roads or in places other than landfills provided by the competent public authorities; any spill, release of plastic packaging and bags into the streets and other public places, in urban and rural

areas, in sewage infrastructures, on trees, in and around waterways and bodies; any deposit of solid or liquid products packaged in plastic packaging and bags in the public domain, including inland waters; any immersion of solid or liquid products packaged in plastic packaging and bags in inland waters, dams and rivers; any release or abandonment of plastic packaging and bags in inland waters; any production, import, marketing, distribution of unapproved plastic packaging and bags. "

■ **Decree no. 2001-251/PRES/PM/MS** of 30 May 2001 (OJ 2001 No. 25)

The decree concerns adoption of documents entitled "Strategic Framework for The Fight against HIV / AIDS 2001-2005" and "Action Plan to Combat HIV / AIDS in Burkina Faso in 2001. "

■ **Decree no. 2001-731/PRES/PM/MJDH** of 28 December 2001 (OJ 2002 No. 05)

This decree concerns adoption of the policy and plan of action and guidance for the promotion and protection of human rights.

2.2.2.6. Other important texts

■ **Law no. 034-2002/AN of 14 November 2002 concerning the law for guidance relating to pastoral activities in Burkina Faso**

The spaces allocated to pastoral activities confer collective rights (real rights) on the user of the pasture. They may only be deprived of their rights due to public use and subject to fair and prior compensation (Articles 13, 16).

■ **Law no. 024-2007/AN of 13 November 2007 protecting cultural heritage**

This law defines and gives content to cultural heritage; it specifies easements related to recognised property and their inclusion in the inventory, consideration of archaeological component in the context of major works (Articles 2, 8, 9, 10, 11, 12, 13, 14, 15, 38). In accordance with this law and its decrees, Burkina Faso's cultural heritage is protected.

■ **Law no. 008-2014/AN of 8 April 2014 concerning the law for guidance relating to sustainable development**

This law deals with the objective, purpose and scope of Articles 1, 2 and 3. In addition, it deals with the fundamental rights and obligations of sustainable development actors and also of implementation bodies and institutions. Thus, Article 16 enshrines the creation of a fund for future generations under the supervision of the Ministry responsible for sustainable development. The fund is funded primarily by a portion of revenues from the exploitation of non-renewable natural resources and is used to finance sustainable development activities in the country.

2.2.3. Process of the Environmental and Social Impact Assessment

According to Law no. 006-2013/AN of 2 April 2013 on the Environment Code in Burkina Faso, activities that could have significant environmental impacts, such as the present construction project of the CHRU in Fada, are subject to prior notice from the Ministry responsible for the environment through the BUNEE in the context of the TOR of the mission.

2.2.3.1. Applicable environmental standards in the context of the ESIA of the Fada CHRU

2.2.3.1.1. Drinking water quality

Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 concerns the establishment of the standards for release of pollutants into air, water and soil; as such, it indicates the limits in terms of drinking water quality, discharges of wastewater into surface water, and of pollutants into air and soil.

Drinking water quality standards are indicated in the Table below.

Table 3: Drinking water quality standards

Order no.	Parameters	Units	Threshold values	Mandatory threshold
1	pH	-	6.5 ÷ 8.5	Not provided
2	Colour	mg / samp. Pt	10	20
3	MES	mg/l	25	Not provided
4	Temperature	°C	18-40	Not provided
5	Conductivity	µs / cm at 20 °C	1,000	Not provided
6	Odour	Dil. at 25 °C	3	Not provided
7	Nitrate	mg/l NO ₃	25	50
8	Fluorides	mg/l F	0.7	1.5
9	Dissolved iron	mg/l	0.1	0.3

Order no.	Parameters	Units	Threshold values	Mandatory threshold
10	Manganese	mg/l	0.05	Not provided
11	Copper	mg/l	0.02	0.05
12	Zinc	mg/l	0.5	3
13	Boron	mg/l B	1	Not provided
14	Arsenic	mg/l	0.01	0.05
15	Cadmium	mg/l	0.001	0.005
16	Total Chrome	mg/l	Not provided	0.05
17	Lead	mg/l	Not provided	0.05
18	Selenium	mg/l	Not provided	0.01
19	Mercury	mg/l	0.0005	0.001
20	Barium	mg/l	Not provided	0.1
21	Cyanide	mg/l	Not provided	0.05
22	Sulphate	mg/l	150	250
23	Chlorides	mg/l	200	Not provided
24	Phosphates	mg/l	0.4	Not provided
25	Phenols	mg/l	Not provided	0.001
26	Dissolved or	mg/l	Not provided	0.05
27	Polycyclic aromatic carbide	mg/l	Not provided	0.0002
28	Total Pesticides	mg/l	Not provided	0.001
29	DBO3	mg/l	< 3	Not provided
30	Kjeldahl nitrogen	mg/l	1	Not provided
31	Ammonia	mg/l	0.05	Not provided
32	Total organic carbon	mg/l	Not provided	Not provided
33	Total coliforms	/100 ml	50	5,000
34	Faecal coliforms	/100 ml	20	2,000
35	Faecal Streptococci	/100 ml	20	1,000
36	Salmonella	ml	0 / 5,000	0 / 1,000

Source: Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 setting standards for release of pollutants into air, water and soil, Article 7.

2.2.3.1.2. Wastewater discharges into surface water

The Table below presents the standards for wastewater discharges into surface waters.

Table 4: Standards for discharges of wastewater in surface water

Order no.	Parameters	Limit values (mg/l)
1	Aluminium (dissolved, 0.45 micron)	10
2	Antimony	0.1
3	Ammonia and Ammonium	1
4	Silver (dissolved, 0.45 micron)	0.1
5	Arsenic (dissolved, 0.45 micron)	0.14
6	Barium (dissolved, 0.45 micron)	5
7	Chlorine dioxide	0.05
8	Beryllium	0.01
9	Boron (dissolved, 0.45 micron)	2
10	Active Bromine	0.2
11	Cadmium (dissolved, 0.45 micron)	0.1
12	Calcium	500

Order no.	Parameters	Limit values (mg/l)
13	Dissolved organic carbon	10
14	Total organic carbon	65
15	Active chlorine	0.05
16	Chlorides	600
17	Total Chrome	0.1
18	Cobalt (dissolved, 0.45 micron)	0.5
19	Faecal coliforms (/ 100 ml)	2,000
19	Copper (dissolved, 0.45 micron)	1
20	Cyanides	0.1
21	Biochemical oxygen demand	50
22	Chemical oxygen demand	150
23	Tin (dissolved, 0.45 micron)	2
24	Iron (dissolved, 0.45 micron)	20
25	Fluorides	10
26	Saponific oils and fats	20
27	Dissolved or emulsified hydrocarbons	2
28	Total hydrocarbons	10
29	Magnesium	200
30	Manganese	1.2
31	DecanTable materials	1/1/2 hrs
32	Insoluble materials, totals	20
33	Mercury (dissolved, 0.45 micron)	1.7
34	Molybdenum	0.5
35	Nickel (dissolved, 0.45 micron)	2
36	Nitrates	50
37	Nitrites	1
38	Chlorinated organic pesticides	0.003
39	pH	6.4 ÷ 10.5
40	Phenols	0.2
41	Phosphates	5
42	Total Phosphorus	0.8
43	Lead (dissolved, 0.45 micron)	0.5
44	Potassium	50
45	Salmonella per 100 ml	Not provided
46	Selenium	0.8
47	Sodium	300
48	Chlorinated solvents	0.1
49	Faecal Streptococci per 100 ml	10 000
50	Sulphates	600
51	Sulphides	0.2
52	Temperatures (°C)	18 ÷ 40
53	Titanium	0.001
54	Zinc	5
55	MES	200

Source: Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 setting standards for release of pollutants into air, water and soil, Article 10.

2.2.3.1.3. Environmental air quality

The Table below presents ambient air quality standards.

Table 5: Environmental air quality standards

Order no.	Substances	Limit values (in µg/m ³)
1	Carbon monoxide (CO)	30
2	Sulphur Dioxide (SO ₂) 300	200 ÷
3	Nitrogen dioxide (NO ₂)	100
4	Particles 300	200 ÷
5	Lead (Pb)	2
6	Ozone (O ₃) 200	150 ÷

Source: Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 setting standards for release of pollutants into air, water and soil, Article 3.

2.2.3.1.4. Soil quality standards

Table 6: Soil quality standards

Order no.	Parameters (mg/kg ms or specified)	Threshold values
1	PH	5.5 ÷ 8
2	Conductivity	4 µs/cm
3	Sodium absorption rate	12
4	Antimony	40
5	Silver	40
6	Arsenic	300
7	Barium	2,000
8	Beryllium	20
9	Cadmium	30
10	Total Chrome	800
11	Cobalt	300
12	Copper	1,000
13	Free cyanide	100
14	Total cyanide	500
15	White iron	300
16	Total fluoride	2,000
17	Mercury	30
18	Molybdenum	40
19	Nickel	700
20	Lead	2,500
21	Selenium	70
22	Zinc	3,000
Monocyclic aromatic hydrocarbons		
23	Benzene	5
24	Chlorobenzene	10
25	1.2 Dichlorobenzene	10
26	1.3 Dichlorobenzene	10
27	1.4 Dichlorobenzene	10
28	Ethylbenzene	70
29	Styrene	50
30	Toluene	200

Order no.	Parameters (mg/kg ms or specified)	Threshold values
31	Xylene	190
32	Not chlorinated	10
33	Chlorinated	5
Polycyclic Aromatic Hydrocarbons (PAH)		
34	Benzo (a) anthracene	350
35	Benzo (a) pyrene	10
36	Benzo (b) fluoranthene	350
37	Dibenzo (a, h) anthracene	10
38	Indenol (1.2.3-c, d) pyrene	350
39	Naphthalene	50
40	Phenanthrene	300
41	Pyrene	100
Chlorinated hydrocarbons		
42	Chlorinated Aliphatics	50
43	Polychlorobiphenyls (PCB)	50
44	Chlorobenzene	40
45	Hexachlorobenzene	55

Source: Decree no. 2001-185/PRES/PM/MEE of 7 May 2001 setting standards for release of pollutants into air, water and soil, Article 14

2.2.3.2. Noise

At the national level, there is no noise level standard to meet. However, the Public Health Code in Article 122 publishes: "The installation of noisy workshops or any other source of loud noise is prohibited in the vicinity of schools, health facilities, places of worship, cemeteries, barracks, residential areas and other administrative services. "

According to Article 123: "The misuse of loudspeakers, sound alarms and the installation of any noisy workshop are prohibited in urban areas, unless special permission from the municipal authority is authorised. "

In absence of a national standard, WHO standards in this area must be met. They are presented in the following Tables, respectively for external and internal noises.

Table 7: Standards for outdoor noise

Receptors	One hour LAeq (DBA)	
	Day (7 a. m. to 10 p. m.)	Night (10 p. m. to 7 a. m.)
Residential, institutional and educational	55	45
Industrial and commercial	70	70

Source: WHO, 1999

Table 8: Standards for internal noise

Location of receptors	LAeq	Durations (hours)
Residences	35	16
Bedrooms	30	8
Schools	35	During classes
Hospitals	30	24
Industry, commercial and shopping centres and transport centres	70	24

Source: WHO, 1999

2.3. Institutional framework

Burkina Faso is a democratic, secular and unitary state containing decentralised territorial communities divided into 13 regions and 351 municipalities. These communities have legal personalities and financial autonomy. The region is both a territorial community and an administrative district.

In administrative organisation of Burkina Faso, we distinguish central and local structures that have a more or less close link with the environment and / or with mining operations.

2.4.1. Central structures

At the central level, several institutions play a role in the design, coordination, implementation and control of state actions concerning environmental security, protection and preservation.

2.4.1.1. Ministry of Environment, Green Economy and Climate Change (MEEVCC)

This Ministry is the institutional obligor responsible for the environment in Burkina Faso. It defines and implements State policy in environmental matters, develops legislative texts and monitors their application. It controls environmental regulation, sanitation, the protection of natural resources and promotes environmental research. According to Article 11 of Law no. 006-2013/AN of 2 April 2013 concerning the Environment Code in Burkina Faso, "The Ministry responsible for the environment is the obligor of the institutional coordination of environmental quality in Burkina Faso. "

2.4.1.2. National Board for the Environment and Sustainable Development (CONEDD)

The CONEDD reports directly to the MEEVCC and is the structure responsible for promoting environmental and sustainable development policy and legislation.

Its mission is to facilitate the consideration of the fundamental principles of environmental preservation in the economic and social development of the country. The objective of this Board is to guide the Government in its environmental management and sustainable development policy.

The CONEDD is made up of four (04) specialised commissions responsible for reflecting on major concerns affecting the country, including the problem of pressure on soils and mineral resources. The specialised commission on natural resources management deals with these issues and is mandated to:

- Take stock of national projects and experiences to identify problems related to responsible management of natural resources;
- Propose solutions for better management of natural resources, mitigation of conflicts between users and better consideration in the establishment of local development plans;
- Propose guidelines for effective implementation of Agrarian and Land Reform (RAF).

2.4.1.3. National Office of Environmental Assessments (BUNEE)

The BUNEE is part of the MEEVCC and is mandated to promote, supervise and manage the country's entire environmental assessment process. Its mission is to coordinate the implementation, monitoring and promotion of environmental evaluation and inspection policy.

For example, the BUNEE holds review sessions, on the one hand, the TOR prepared by project proponents and, on the other hand, studies and impact statements that are filed with the MEEVCC for review and approval.

It provides an opinion on admissibility of these studies following review by the COTEVE and makes a recommendation to the Minister of Environment and Fishery Resources on the environmental acceptability of projects for the issuance of the environmental permit for the project.

As such, the process of validating this report and obtaining the reasoned opinion falls within its competence.

2.4.1.4. Environmental Assessments Technical Committee (COTEVE)

The COTEVE is a scientific advisory body tasked with assessing environmental impact studies for any project subject to Decree no. 2001-342/PRES/PM/MEE of 17 July 2001 concerning the scope of application, content and procedure of the ESIA and the ESIS. The Committee provides technical advice to the BUNEE on the content of the impact studies.

2.4.1.5. Consultation frameworks for decentralised rural development

The ongoing administrative decentralization process in Burkina Faso has provided for the establishment of regional (CCR), provincial (CCP) and community (CCC) consultation frameworks since 2009. These advisory bodies, whose status and operational methods are defined by ministerial decree, aim to promote the involvement of all stakeholders in the planning of territorial development, to promote partnership and to ensure harmonisation of development tools. Regional Consultation Frameworks (CCR) are also expected to play a leading role in monitoring and evaluating regional development plans.

At the regional, provincial or community level, the composition of the various consultation frameworks includes representatives of administrative and ministerial authorities, customary authorities and religious authorities, civil society, from the private sector and the media.

2.4.1.6. Ministry of Agriculture and Hydraulic Developments

It is responsible for:

- Continuously ensuring agricultural protection to meet people's food needs;
- Ensuring balanced management of water needs;
- Facilitating the consultation of the various stakeholders involved in agriculture and water resource management.

From the environmental point of view, MAAH's technical services have technical responsibility for the management of water and agricultural resources. It has competent human resources and masters the management techniques of this ecologically sensitive area.

2.4.1.7. Ministry of Animal and Fishery Resources

It is working to create a reference framework for interventions in the sub-sectors. It has a National Livestock Development Policy (PNDEL), strategy documents, an Action Plan (PAPISE) and numerous livestock programmes.

2.4.1.8. Ministry of Health (MS)

The remit of this Ministry is, among other things: (i) the definition of health standards; (ii) the regulation and control of occupational medicine; (iii) taking into consideration environmental impact studies and assessments in the country's development projects and programmes.

2.4.1.9. Ministry of Public Service, Labour and Social Security (MFPTSS)

It ensures the implementation and monitoring of the Government's policy on public service, labour, industrial relations and social security.

In terms of work, the Ministry is responsible for: (i) the development and revision of labour legislation and regulations; (ii) promoting the reintegration of workers who have lost their jobs; (iii) monitoring application of international labour standards; (iv) the fight against child labour, etc.

In terms of social security, the Ministry is responsible for: (i) the development and control of application of laws, standards and regulations in matters of social security, mutuality, occupational health and safety and occupational hygiene; (ii) the development and revision of legislation and regulations relating to the social protection of migrant wage workers and their families.

2.4.2. Local structures

The administrative organisation in Burkina Faso focuses on the decentralization and devolution of State services; there are in a hierarchical form: the region, the province, the department / the municipality, the village, the sectors / the neighbourhoods (Law no. 055-2004/AN concerning the General Code of Territorial Communities in Burkina Faso).

Thus, the Regional Board and the various city halls will be immediate contact persons for the developer in the context of this project.

2.5. Multilateral environmental agreements

2.5.1. Multilateral conventions and agreements

Burkina Faso has ratified more than 30 conventions, treaties and protocols in matters of ecosystem protection, hazardous waste management and the control of various nuisances. They are presented in the following Table:

Table 9: Main conventions, treaties and protocols ratified by Burkina Faso

Convention title	Location and date	Date and decree of ratification
African Convention on the Conservation of Nature and Natural Resources	Algiers 15/09/1968	28/09/1969 Decree no. 68-277 of 23/11/1968
Convention on humid areas of international importance, particularly as a habitat for water birds	Ramsar 02/02/1971	Zatu AN VII 2 of 23/08/1989 Kiti AN VII 3 bis of 23/08/1989
Convention on the Protection of World, Cultural and Natural Heritage	Paris 23/11/1972	02/07/1987 Dec. no. 85-297 of 03/06/1985
Convention on International Trade in Endangered Species of Wild Flora and Fauna	Washington 03/03/1973	11/01/1990 Zatu AN VII 2 of 23/08/1989 Kiti 85-185 of 30/12/1985
Amendment to the Convention on international trade in endangered species of wild flora and fauna threatened with extinction (art. XXI)	Gaborone 30/04/1983	Dec. no. 91-399 of 10/10/1991
Convention on the Conservation of Migratory Species belonging to Wildlife	Bonn 23/06/1979	01/10/1990 Zatu AN VII 2 of 23/08/1989 Kiti AN VII 3 bis of 23/09/1989
Convention on the Conservation of Wildlife and the Natural Environment	Berne 19/09/1979	01/10/1990 Zatu AN VII 2 of 23/08/1989 Kiti AN VII 3 bis of 23/09/1989
Convention for the Protection of the Ozone Layer	Vienna 22/03/1985	28/06/1988 Zatu 86-16 05/03-1986 Kiti 86-70 05/03/1986

Convention title	Location and date	Date and decree of ratification
Montreal Protocol on substances that weaken the ozone layer	Montreal 16/09/1987	18/10/1989 Zatu AN VII 21 of 13/01/1989 Kiti AN VI 164 of 20/01/1989
Amendment of the Montreal Protocol on substances that weaken the ozone layer	Copenha- gen 1992	Law no. 11/95/ADP of 27/04/1995. Dec. no. 95- 380 of 27/09/1995
Convention on the Ban of the Import into Africa and the Control of Transboundary Movement	Bamako 30/01/1991	Law no. 19/93/ADP of 24/05/1993. Enacted Dec. no. 93-191 of 16/06/1993.
Framework Convention on Climate Change	Rio 12/06/1992	Law no. 22/93/ADP of 24/05/1993. Enacted Dec. no. 93-194 of 16/06/1993. Dec. no. 93-287 of 20/09/1993.
Convention on Biological Diversity	Rio de Janeiro 05/06/1992	Law no. 17/93/ADP of 24/05/1993. Enacted Dec. no. 93-194 of 16/06/1993. Dec. no. 93-292 of 20/09/1993.
International Convention on the Fight Against Desertification in Countries Severely Affected by Drought and / or Desertification	Paris 17/06/1994	Law no. 33/95 of 29/12/1995. Enacted Dec. no. 95-500 of 01/12/1995. Dec. no. 95-569 of 29/12/1995.
International Convention for the Protection of Vegetation	Rome 06/12/1951	Law no. 61/94ADP/ of 22/12/1994. Enacted Dec. no. 95-16 of 18/01/1995. Dec. no. 95-93 of 07 March 1995.
Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal	Basel 1989	Decree no. 98- 424/PRES/PM/MAET/MEE of 5 October 1998 concerning the ratification of the Basel Convention.
Kyoto Protocol		31 March 2005
Cartagena Protocol on biotechnological risk prevention		31 March 2005

Source: General Office for The Improvement of the Living Environment - GOILE, undated

2.5.2. Texts stemming from the conventions ratified by Burkina Faso

Other relevant pieces of legislation arising from the conventions ratified by Burkina Faso include:

- Law no. 17/93/ADP of 24 May 1993 authorizing ratification of the Convention on Biological Diversity;
- Law no. 22-93/ADP of 24 May 1993 authorizing ratification of the United Nations Framework Convention on Climate Change;
- Law no. 61-94/ADP of 22 December 1994 authorising Burkina Faso's accession to the International Convention for the Protection of Plants;
- Law no. 33-95/ADP of 9 November 1995 authorizing the ratification of the international convention on the fight against desertification in countries severely affected by drought and / or desertification, particularly in Africa;
- Law no. 36-98/AN of 29 July 1998 authorizing the ratification of the Basel Convention, adopted in Basel on 22 March 1989, and its September 1995 amendments on the control of transboundary movements of hazardous waste and their disposal;

- Law no. 03-2002/AN of March 21 2002 authorizing the ratification of amendment to the Montreal Protocol on its ozone-depleting substances, signed in Montreal on 17 September 1997;
- Law no. 04-2002/AN of 21 March 2002 authorizing the ratification of the Rotterdam Convention on the informed prior consent procedure applicable to certain hazardous chemicals and pesticides that are the subject of international trade;
- Law no. 27-2002/AN of 9 October 2002 authorising Burkina Faso's accession to the Kyoto Protocol on climate change;
- Law no. 01-2003/AN of 20 January 2003 authorizing the ratification of the FEMTF 0511242-BUR donation agreement concluded on 10 July 2002 in Washington, D. C. , between Burkina Faso and the World Bank to finance the Partnership for Improved Natural Ecosystem Management (PAGEN);
- Law no. 522-2003/AN of 8 October 2003 authorising the ratification of the Stockholm Convention on Persistent Organic Pollutants (POPs).

2.6. Requirements of funding agencies

The implementation of the project, in addition to being subject to national social and environmental protection requirements, must also comply with international best practices. The safeguard policies of the World Bank Group (WB or the Bank) must be integrated into the project cycles. Depending on whether the project is financed by public or private funds, it must meet World Bank or IFC performance standards.

2.6.1. World Bank Environmental and Social Framework

The Bank undertakes a preliminary environmental review of each proposed project to determine the size and type of environmental assessment required.

The new Environmental and Social Framework (CES), which came into force in October 2018 is gradually replacing the Bank's current policies on safeguarding matters. This new framework provides broad coverage of social and environmental issues, including important advances in relation to transparency, non-discrimination, social inclusion, Hygiene-Health-Safety of workers and residents, land acquisition, public involvement and accountability. The CES also places greater emphasis on the capacity of beneficiary governments to address social and environmental problems.

The social and environmental standards defined by the CES, which apply to borrowers, aim to protect people and the environment from the potential risks and negative impacts of the projects it funds through mitigation measures, on the one hand, and on the other hand, they tend to maximise the positive impacts. These standards require beneficiary governments receiving grants or loans to take into consideration certain social and environmental risks in order to benefit from World Bank support for investment projects, while relying on their own social and environmental policy.

According to the World Bank classification, the Fada CHRU construction project has been classified as a Category A, based on the potential environmental impacts of the project. Thus, **the NES no. 1, Assessment and management of social and environmental risks and effects**, outlines the Borrower's responsibilities to assess, manage and monitor the social and environmental risks and impacts associated with each stage of a Bank-funded project through Investment Project Financing (PFI), in order to attain social and environmental results consistent with social and environmental standards (ESS).

2.6.2. Sustainability Framework of the International Finance Corporation (IFC) or IFC

The performance standards defined in the sustainability framework of the IFC or IFC are intended for clients (private sector), to whom they provide guidance for identifying risks and impacts, and have been designed to help them prevent, mitigate and manage risks and impacts so that they may continue to pursue their activities in a sustainable manner. In this regard, these performance standards also cover the obligations of clients to collaborate with stakeholders and to provide them with information on activities at the project level.

Performance Standard 1: **"Assessment and management of social and environmental risks and impacts"** emphasises the importance of good management of a project's social and environmental performance throughout its lifespan. To be effective, an Environmental and Social Management System (SGES) must ensure the continuation of a dynamic and continuous process, implemented and supported by the

management team and which involves engagement between the client, its workers, local communities directly affected by the project (affected communities) and, where applicable, other stakeholders.

In summary, the Fada CHRU construction project will follow the ideals of the international social and environmental safeguard policies, including the Performance Standards of the International Finance Corporation (IFC) and the Environmental and Social Standards (NES) of the World Bank. And this, in relation to the financing of the CHRU, would be eligible for private and public funding.

Table 10: International standards for the Fada N'Gourma CHRU construction project

Performance Standards of the IFC	World Bank Environmental and Social Standards
- NP 1: social and environmental risks and impacts; - NP 2: labour and working conditions; - NP 3: rational use of resources and pollution prevention; - NP 4: community health and security; - NP 5: land acquisition and voluntary resettlement; - NP 6: biodiversity conservation and sustainable management of living natural resources; - NP 8: cultural heritage.	All the NES of the World Bank

In terms of social and environmental assessment, NES 1 and NP 1 highlight the following points.

Table 11: Key principles of NES 1 and NP 1

Policy	Principles
NES 1	- Potentially negative environmental impacts on the physical environment, ecosystem functions, human health and physical cultural heritage, as well as individual social impacts, are identified and assessed ahead of the Project; - Individual social impacts are identified and assessed ahead of the project cycle; - Inevitable negative impacts are minimised or mitigated as much as possible; - Information on the social and environmental impacts of the project and provided in a timely manner to all stakeholders who have the opportunity to contribute to the formulation of proposed mitigation measures.
PS1	Identify and assess the social and environmental risks and impacts of the project.

Policy	Principles
	– Adopt a hierarchy of mitigation measures in order to anticipate and prevent impacts, or when it is not possible, mitigate as much as possible, and when residual impacts persist, to compensate for the risks and impacts faced by the workers, affected communities and the environment. – Promote better social and environmental performance for clients through the efficient use of management systems. – Ensure that affected communities' grievances and external communications from other stakeholders are responded to and managed appropriately. – Promote and provide the necessary means for concrete dialogue with affected communities throughout the project cycle to cover issues that may affect those communities, and to ensure that environmental and environmental information and relevant social issues are disclosed and disseminated.

Table 12: Comparative analysis of project categorization following World Bank and national procedures

The nature and scope of the investment	Categorization according to national environmental assessment procedures	Categorization according to World Bank procedures	Points of convergence	Points of divergence	Provisions to take
Policies, plans, projects and programmes or any other initiative conducted beforehand from the policies, plans and programmes that have a significant impact on the environment	Strategic Environmental Assessment (EES) leading to a CGES [Strategic Environmental Management Committee]	Strategic Environment Assessment (EES) or a CGES	Complete an EES for the plans and programmes	The 2015 Decree on Environmental Assessments of BF defines the CGES as a set of comprehensive measures defined after an EES for a policy, plan or programme	Complete a EES for the plans and programmes Implement a CGES if investment sites are not known at the time of the programme evaluation
Work, projects, development and activities that could have significant direct or indirect impacts on the environment	Category A: Activities subject to an Environmental and Social Impact Assessment (ESIA)	Category A for projects with very negative, critical, diverse and unprecedented impacts: ESIA if investment sites are known at the time of the project evaluation	ESIA of sites	Conducting a public inquiry as part of national proceedings if ESIA CGES if investment sites are not known at the time of the evaluation of the (World Bank) project	Complete an ESIA Implement a CGES if sites are unknown

The nature and scope of the investment	Categorization according to national environmental assessment procedures	Categorization according to World Bank procedures	Points of convergence	Points of divergence	Provisions to take
		Category B for projects with less severe negative effects than Category A projects: Type B environmental assessment CGES if the investment sites are unknown in the evaluation phase			
	Category B: Activities subject to an Environmental and Social Impact Statement (ESIS)		Smaller environmental assessment than the ESIA	The ESIS at the national level still does not correspond strictly with the environmental assessments of Category B projects CGES not required for Category B projects at national level	Use a pre-planning session with the BUNEE
	Category C: Activities subject to social and environmental requirements	Category C for projects with minimal or no negative effects: no EE required	No environmental assessment required		Complete the social and environmental requirements

The nature and scope of the investment	Categorization according to national environmental assessment procedures	Categorization according to World Bank procedures	Points of convergence	Points of divergence	Provisions to take
	None	Category FI if the Bank invests funds through a financial intermediary in sub-projects that could have negative effects on the environment		Non-existent category in the national procedure	Complete the instrument in accordance with the Bank's procedures
Any project that may result in an involuntary physical and / or economic displacement	ESIA / Resettlement Action Plan (RAP) if the number of people is at least 200	RAP	Separate procedures from those of the ESIA		Complete the ESIA and RAP separately
	Succinct Resettlement Plan (PSR) if the number of people is between 50 and 199	PSR	Separate procedures from the ESIS		Complete the ESIS and the PSR separately
	Resettlement measures and methods to be included in the ESIA report if the number of persons is less than 50		Separate procedures from the ESIS		Perform the ESIS and the PSR separately

Source: Insuco, 2019

3. Description of the project

The Fada N'Gourma Regional Hospital University Centre (CHRU) can be grouped into 6 large complexes, namely:

- **Technical platform:** it consists of medical and surgical emergency services, resuscitation, intensive care, operating theatre, endoscopy, medical imaging, laboratory and blood bank, sterilisation station and pharmacy;
- **Mother-child section:** this consists of a maternity ward, gynaecology ward, maternity ward and delivery areas, neonatology, paediatric and gynaecological obstetric emergencies services, the paediatric service and the nutrition service and the vaccination service;
- **Hospitalisation Platform:** this consists of hospitalisation for the following services:
 - Internal medicine / gastroenteritis / neuro / geriatrics;
 - Cardiovascular service / diabetes / metabolism / nephrology;
 - Infectious illnesses / dermatology / haematology service;
 - Mental health service;
 - General / digestive / urological surgery service;
 - Orthopaedic surgery / trauma and rehabilitation service;
 - ENT / ophthalmology / maxillo-facial stomatology service.
- **Consultations and administration area:** this includes the services of admission, cafeteria, administration, the haemodialysis unit, day hospital surgery, outpatient consultations, functional explorations, physiotherapy, orthoprosthesis, and the interface structure;
- **Logistics / technical and mortuary area:** includes the kitchen, laundry room, maintenance workshop and storage area, fluids station, waste and mortuary area;
- **Family building.**

The guiding principles of this organisation of the programme are the following:

- Separation between the movements of the sick and the movements of visitors;
- Allow for an easy and consistent extension of the different platforms;
- Ensure the smooth flow of pedestrian and vehicle traffic within the CHRU;
- Ensure a privileged connection between the technical platform and emergency services.

The CHRU has a capacity of 280 beds. The complete list of buildings that it will be composed of follows:

ROOM	Qty	SU per room (m2)	SU (m2)
COLUMN DRILL	1	7.00	7.00
PLASTER MEASUREMENT TEST	1	15.00	15.00
OFFICE	1	12.00	12.00
TECHNICAL AREA	1	3.00	3.00
CONSULTATION OFFICE	1	15.00	15.00
ENTRANCE	1	7.50	7.50
WAITING AREA	1	10.00	10.00
INTERFACE STRUCTURE			62.00
STORAGE AREA	1	15.00	15.00
SALES AREA	1	25.00	25.00
TOILET	1	7.00	7.00
CONSULTATION 1	1	15.00	15.00
KITCHEN			202.50
LOCKER ROOM – TOILET	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
STORAGE	1	10.00	10.00
COLD ROOM	1	10.00	10.00
UNPACKING	1	8.00	8.00
TRASH AREA	1	5.00	5.00
GAS AREA	1	5.00	5.00
VEGETABLE PROCESSING ROOM	1	8.00	8.00
COOKING	1	40.00	40.00
MANAGER'S OFFICE	1	15.00	15.00
DINING HALL	1	60.00	60.00
OFFICE	1	10.00	10.00
DISHWASHING AREA	1	10.00	10.00
TOILET	1	3.50	3.50
CHR LAUNDRY AREA			224.50
CLEAN LAUNDRY STORAGE AREA	1	50.00	50.00
DRYING AND IRONING AREA	1	80.00	80.00
MIXING AREA	1	36.00	36.00
ENTRANCE	1	12.00	12.00
OFFICE	1	12.00	12.00
WOMEN'S LOCKER ROOM AND TOILET	1	15.00	15.00
ENTRANCE	1	4.50	4.50
MEN'S LOCKER ROOM AND TOILET	1	15.00	15.00
STORAGE MAINTENANCE* WORKSHOP			188.00
LOCKER ROOM	1	10.00	10.00
MAIN WORKSHOP	1	25.00	25.00
TECHNICAL AREA	1	3.00	3.00
BIOMEDICAL AND ELECTRONIC WORKSHOP	1	25.00	25.00
WORKSHOP HEAD OFFICE	1	15.00	15.00
STORAGE	1	110.00	110.00
FLUIDS STATION			51.00
MEDICAL AIR STATION	1	18.00	18.00
LOCAL BOTTLE STATION 02	1	15.00	15.00
MEDICAL VACUUM STATION	1	18.00	18.00
WASTE			100.00
MORTUARY ROOM			320.00
HALL + WAITING AREA	1	15.00	15.00
FORMALITY WINDOW	1	12.00	12.00
VIP WAITING AREA	1	15.00	15.00
MEN'S LOCKER ROOM	1	10.00	10.00
WOMEN'S LOCKER ROOM	1	10.00	10.00
EXHIBIT AREA AND PRAYER ROOM	1	50.00	50.00
MORTUARY CARE ROOM	1	20.00	20.00

ROOM	Qty	SU per room (m2)	SU (m2)
TOILET	1	3.50	3.50
WHEELCHAIR AREA	3	10.00	30.00
OUTPATIENT INDIVIDUAL ROOM	3	15.00	45.00
PATIENT LOCKER ROOM	2	3.50	7.00
PATIENT TOILET	2	3.50	7.00
CARE STATION	1	15.00	15.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
STAFF TOILET	2	3.50	7.00
PERSONNEL BREAK-ROOM	1	12.00	12.00
OFFICE	1	10.00	10.00
FUNCTIONAL TESTS			185.50
WAITING AREA	1	15.00	15.00
TOILET	1	3.50	3.50
TOILET	1	3.50	3.50
FUNCTIONAL TESTS ROOM	5	15.00	75.00
CARE STATION	1	15.00	15.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
PHYSICIAN'S OFFICE	1	12.00	12.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
STAFF TOILET	1	3.50	3.50
PERSONNEL BREAK-ROOM	1	12.00	12.00
OFFICE	1	10.00	10.00
PHYSICAL THERAPY			142.00
CARE ROOM	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
CUBICLES (5 UNITS)	1	40.00	40.00
REHABILITATION MATERIAL STORAGE AREA	1	15.00	15.00
PHYSICIAN'S OFFICE	1	12.00	12.00
PHYSICAL THERAPY OFFICE	1	12.00	12.00
SECRETARY'S OFFICE	1	12.00	12.00
STORAGE	1	10.00	10.00
TECHNICAL AREA	1	3.00	3.00
LOCKER ROOM AND PERSONAL TOILET	1	15.00	15.00
ORTHOPROSTHESIS			153.00
TOOLS	1	6.50	6.50
BAND SAW	1	7.50	7.50
RESIN AREA	1	7.50	7.50
ELECTRIC OVEN THERMOFORMING AREA	1	10.00	10.00
MILLING MACHINE	1	6.50	6.50
SURFACE MILLING MACHINE	1	6.00	6.00
TOILET	1	3.50	3.50
STORAGE	1	6.00	6.00
SEWING MACHINE	1	5.00	5.00
VACUUM PUMP (COMPRESSOR)	1	7.00	7.00
BENCH GRINDER	1	3.00	3.00
DISASSEMBLY WORKBENCH	1	10.00	10.00
FINISHING	1	5.00	5.00

ROOM	Qty	SU per room (m2)	SU (m2)
PROTHESIS LAB	1	25.00	25.00
DENTAL TECH AREA	1	5.00	5.00
DENTAL SURGEON OFFICE	1	15.00	15.00
OFFICE	1	15.00	15.00
DENTIST'S CARE ROOM	1	20.00	20.00
DENTAL CONSULTATIONS	1	15.00	15.00
OFFICE	1	15.00	15.00
NURSE'S OFFICE	1	12.00	12.00
STAFF TOILET	1	7.00	7.00
WAITING AREA	1	50.00	50.00
WOMEN'S LOCKER ROOM	1	8.00	8.00
STAFF TOILET	1	7.00	7.00
CONSULTATION	1	15.00	15.00
CONSULTATION	1	15.00	15.00
CARE ROOM	1	15.00	15.00
STORAGE	1	7.00	7.00
TECHNICAL AREA	1	5.00	5.00
ARCHIVES	1	12.00	12.00
TRAINEE ROOM	1	20.00	20.00
TOILET + PHYSICAL MEDICINE AND REHABILITATION ROOM	1	11.50	11.50
CONSULTATION	1	15.00	15.00
CONSULTATION 2	1	15.00	15.00
CONSULTATION	1	15.00	15.00
MEN'S LOCKER ROOM	1	8.00	8.00
STAFF TOILET	1	7.00	7.00
CONSULTATION	1	15.00	15.00
CONSULTATION	1	15.00	15.00
CONSULTATION	1	15.00	15.00
SECRETARY'S OFFICE	1	12.00	12.00
MANAGER'S OFFICE	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
CONSULTATION	1	15.00	15.00
CONSULTATION	1	15.00	15.00
HAEMODIALYSIS UNIT			268.00
WAITING AREA	1	15.00	15.00
TOILET	1	3.50	3.50
TOILET	1	3.50	3.50
DIALYSIS ROOM (12 BEDS)	1	96.00	96.00
WATER TREATMENT	1	12.00	12.00
PHARMACY RESERVE	1	15.00	15.00
CARE STATION	1	15.00	15.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
STAFF TOILET	2	3.50	7.00
PERSONNEL LOCKER ROOM	2	8.00	16.00
PERSONNEL BREAK ROOM	1	12.00	12.00
OFFICE	1	10.00	10.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
PHYSICIAN'S OFFICE	1	12.00	12.00
DAY SURGERY HOSPITAL			191.00
WAITING AREA	1	15.00	15.00
TOILET	1	3.50	3.50

ROOM	Qty	SU per room (m2)	SU (m2)
TOILET	2	7.00	14.00
MAINTENANCE AREA	1	4.00	4.00
CASHIER 1 (OPEN SPACE)	1	6.00	6.00
CASHIER 2 (OPEN SPACE)	1	6.00	6.00
CASHIER 3 (OPEN SPACE)	1	6.00	6.00
CASHIER 4 (OPEN SPACE)	1	6.00	6.00
INVOICING	1	10.00	10.00
INVOICING 2	1	10.00	10.00
ADMISSION OFFICE	1	12.00	12.00
CAFETERIA			202.00
MEN'S TOILET	1	7.00	7.00
WOMEN'S TOILET	1	7.00	7.00
CAFETERIA	1	80.00	80.00
BEVERAGE SUPPLY AREA	1	6.00	6.00
OFFICE	1	10.00	10.00
DISHWASHING AREA	1	12.00	12.00
MEN'S LOCKER ROOM	1	10.00	10.00
COLD STORAGE	1	8.00	8.00
WOMEN'S LOCKER ROOM	1	10.00	10.00
KITCHEN	1	35.00	35.00
FOOD STORAGE	1	8.00	8.00
GAS AREA	1	6.00	6.00
TECHNICAL AREA	1	3.00	3.00
ADMINISTRATION			387.00
NURSING CARE DIRECTOR'S OFFICE	1	15.00	15.00
CARE UNITS COORDINATION OFFICE	1	12.00	12.00
EVALUATION AND RESEARCH OFFICE	1	12.00	12.00
OFFICE	1	8.50	8.50
TOILET	2	7.00	14.00
UNINTERRUPTABLE POWER SUPPLY AREA	1	8.00	8.00
PHOTOCOPY AREA	1	10.00	10.00
TECHNICAL AREA	1	3.00	3.00
MEETING ROOM	1	35.00	35.00
LIBRARY ARCHIVES	1	25.00	25.00
SWITCHBOARD	1	8.50	8.50
SANITATION TECHNICIAN'S OFFICE	1	10.00	10.00
ASSISTANT'S OFFICE	1	10.00	10.00
ECONOMIC SERVICES DIRECTOR'S OFFICE	1	12.00	12.00
LEGAL AND LITIGATION AFFAIRS OFFICE	1	12.00	12.00
CONTINUOUS TRAINING AND CAREER OFFICE	1	12.00	12.00
TOILET 3	2	7.00	14.00
LOCAL SERVER	1	8.00	8.00
CASHIER'S OFFICE	1	10.00	10.00
TECHNICAL AREA	1	5.00	5.00
SECRETARY'S OFFICE	1	12.00	12.00
MEDICAL SECRETARY'S OFFICE	1	12.00	12.00
HEAD PHYSICIAN'S OFFICE	1	12.00	12.00
GENERAL DIRECTOR'S OFFICE	1	20.00	20.00
ADMINISTRATIVE SECRETARY'S OFFICE	1	12.00	12.00
WAITING AREA	1	15.00	15.00
STATISTICAL INFORMATION PROCESSING OFFICE	1	12.00	12.00
SOCIAL OFFICE	1	12.00	12.00
ACCOUNTING OFFICE	1	12.00	12.00
MANAGER'S OFFICE	1	12.00	12.00
FINANCIAL DIRECTOR'S OFFICE	1	12.00	12.00
OUTPATIENT CONSULTATIONS			459.50

ROOM	Qty	SU per room (m2)	SU (m2)
ORTHOPAEDIC SURGERY / TRAUMATOLOGY AND REHABILITATION			346.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TECHNICAL AREA	1	3.00	3.00
TRASH DISPOSAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
ORL / OPHTHOMOLOGY/ MAXILO-FACIAL STOMATO SERVICE			311.00
PHYSICIAN'S OFFICE	1	12.00	12.00
UNIT HEAD'S OFFICE	1	15.00	15.00
NURSE'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
STRETCHER AREA	1	8.00	8.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
CARE ROOM	1	15.00	15.00
MEETING ROOM	1	50.00	50.00
TOILET	1	7.00	7.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
WAITING AREA	1	15.00	15.00
ADMISSION SERVICES			146.00
PHARMACY	1	30.00	30.00
STORAGE AREA	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
MANAGER'S OFFICE	1	12.00	12.00
WAITING AREA	1	12.00	12.00

ROOM	Qty	SU per room (m2)	SU (m2)
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
MENTAL HEALTH SERVICE			190.00
PHYSICIAN'S OFFICE	1	12.00	12.00
UNIT HEAD'S OFFICE	1	15.00	15.00
INTERNS' OFFICES	1	20.00	20.00
CARE ROOM	1	15.00	15.00
TOILET	1	7.00	7.00
TECHNICAL AREA	1	3.00	3.00
STORAGE	1	8.00	8.00
WAITING AREA	1	20.00	20.00
ROOM 1 BED	2	15.00	30.00
ROOM 2 BEDS	3	20.00	60.00
GENERAL SURGERY / DIGESTIVE / UROLOGICAL SERVICES			346.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00

ROOM	Qty	SU per room (m2)	SU (m2)
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
CARDIOVASCULAR / DIABETES / METABOLISM / NEPHROLOGY SERVICES			346.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
INFECTIOUS ILLNESSES AND HOSPITALISATION			346.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00

ROOM	Qty	SU per room (m2)	SU (m2)
HOSPITALISATION 1 BED	1	15.00	15.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
TOILET	1	7.00	7.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
VACCINATION NUTRITION SERVICE			117.00
STORAGE	1	30.00	30.00
MAJOR OFFICE	1	15.00	15.00
CONSULTATION AND CARE ROOM	1	30.00	30.00
LOCKER ROOM	1	10.00	10.00
INFANT'S BATHROOM	1	12.00	12.00
VACCINATION ROOM	1	20.00	20.00
INTERNAL MEDICAL / GASTROENTERO / NEURO / GERIATRIC SERVICES			346.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00

ROOM	Qty	SU per room (m2)	SU (m2)
DELIVERY CUBICLE 1	1	12.00	12.00
DELIVERY CUBICLE 2	1	12.00	12.00
DELIVERY CUBICLE 3	1	12.00	12.00
DELIVERY CUBICLE 4	1	12.00	12.00
DELIVERY AREA 5	1	12.00	12.00
DELIVERY CUBICLE 6	1	12.00	12.00
PRE-DELIVERY ROOM 1	1	12.00	12.00
PRE-DELIVERY ROOM 2	1	12.00	12.00
PRE-DELIVERY ROOM 3	1	12.00	12.00
NEW-BORN RESUSCITATION ROOM	1	10.00	10.00
NEW-BORN RESUSCITATION ROOM	1	10.00	10.00
MIDWIFE'S OFFICE	1	15.00	15.00
OBSTETRICAL ULTRASOUND ROOM	1	15.00	15.00
GUARD TRAINEE ROOM	1	15.00	15.00
PREMATURE CUBICLE	1	25.00	25.00
ON-CALL PHYSICIAN'S OFFICE	1	15.00	15.00
PHYSICIAN'S OFFICE	1	12.00	12.00
PHYSICIAN'S OFFICE	1	12.00	12.00
SECRETARY'S OFFICE RECEPTION	1	12.00	12.00
MIDWIFE'S OFFICE	1	15.00	15.00
WOUND DRESSING ROOM	1	12.00	12.00
STORAGE	1	12.00	12.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
NEONATOLOGY			219.00
NURSING ROOM	1	20.00	20.00
CRIBS ROOM (qty = 10)	1	25.00	25.00
VIEWING ROOM	1	15.00	15.00
ENTRANCE	1	4.00	4.00
INCUBATOR ROOM 1	1	40.00	40.00
INCUBATOR ROOM 2	1	40.00	40.00
LOCKER ROOM	1	15.00	15.00
STORAGE	1	10.00	10.00
EQUIPMENT STORAGE	1	20.00	20.00
TECHNICAL AREA	1	3.00	3.00
SUS OFFICE	1	15.00	15.00
CARE ROOM	1	12.00	12.00
PAEDIATRIC EMERGENCIES			181.00
SECRETARY'S OFFICE RECEPTION AREA	1	8.00	8.00
PHYSICIAN'S OFFICE	1	12.00	12.00
ROOM 1 BED	2	15.00	30.00
ROOM 2 BEDS	3	20.00	60.00
NURSE CARE	1	12.00	12.00
WAITING AREA	1	12.00	12.00
LOCKER ROOM	1	10.00	10.00
OBSERVATION	1	24.00	24.00
TECHNICAL AREA	1	3.00	3.00
ARCHIVES	1	10.00	10.00
PAEDIATRIC SERVICE			629.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00

ROOM	Qty	SU per room (m2)	SU (m2)
INTERNS' OFFICES	1	20.00	20.00
TOILET	1	7.00	7.00
GYNAECOLOGY HOSPITALISATION			303.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 1 BED	1	15.00	15.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
TOILET	1	7.00	7.00
MATERNITY SURGICAL UNIT + DELIVERY CUBICLE			596.00
OPERATION ROOM	1	40.00	40.00
STERILE STORAGE	1	8.00	8.00
PRE-DISINFECTION	1	8.00	8.00
PATIENT PREPARATION	1	10.00	10.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGEON SCRUB AREA	1	6.00	6.00
OPERATION ROOM	1	40.00	40.00
STERILE STORAGE	1	8.00	8.00
PRE-DISINFECTION	1	8.00	8.00
PATIENT PREPARATION	1	10.00	10.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGEON SCRUB AREA	1	6.00	6.00
MEDICAL AIR AND VACUUM AREA	1	5.00	5.00
NITROUS OXIDE AND OXYGEN AREA	1	5.00	5.00
MEN'S UNCLEAR CHANGING AREA	1	8.00	8.00
WOMEN'S UNCLEAR CHANGING AREA	1	8.00	8.00
MEN'S CLEAN CHANGING AREA	1	8.00	8.00
WOMEN'S CLEAN CHANGING AREA	1	8.00	8.00
RECOVERY ROOM 4 BEDS	1	24.00	24.00
ENTRANCE 1	1	6.00	6.00
ENTRANCE 2	1	6.00	6.00
DIRTY INSTRUMENT DISPOSAL AREA	1	12.00	12.00
ENTRANCE 3	1	6.00	6.00
ENTRANCE 4	1	6.00	6.00
ENTRANCE 6	1	6.00	6.00
PRE-ANAESTHETIC CONSULTATION	1	12.00	12.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL SURVEILLANCE POOL	1	15.00	15.00

ROOM	Qty	SU per room (m2)	SU (m2)
OFFICE 2	1	12.00	12.00
WASHING	1	25.00	25.00
PACKING ROOM	1	30.00	30.00
STERILISATION	1	20.00	20.00
STERILE MATERIAL STORAGE	1	30.00	30.00
TROLLEY RETURN AREA	1	15.00	15.00
TROLLEY PICK-UP AREA	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
STORAGE AREA	1	5.00	5.00
STORAGE AREA	1	5.00	5.00
PHARMACY			391.00
HALL / CLINIC WAITING HALL	1	40.00	40.00
OFFICE 2	1	12.00	12.00
OFFICE 1	1	12.00	12.00
MEDICINE AND RELATED ITEMS STORAGE ROOM (25 – 30 °C): FREE STORAGE	1	60.00	60.00
MEDICINE AND RELATED ITEMS STORAGE ROOM (25 – 30 °C): SALES STORAGE	1	60.00	60.00
STORAGE ROOM FOR PRODUCTS BETWEEN 2 – 8 °C	1	15.00	15.00
HAZARDOUS PRODUCTS STORAGE ROOM	1	15.00	15.00
DISPENSING ROOM	1	15.00	15.00
PREPARATION AND PACKING ROOM	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
INFORMATION SERVICE	1	15.00	15.00
CLINICAL SERVICES DISTRIBUTION ROOM	1	25.00	25.00
RECEPTION AREA	1	20.00	20.00
MEDICAL CONSUMABLES AND RELATED ITEMS AND MEDICAL-TECHNICAL MATERIAL	1	50.00	50.00
SUBSTANDARD PRODUCTS STORAGE ROOM	1	15.00	15.00
BLEACH AREA	1	12.00	12.00
MATERNITY HOSPITALISATION			383.00
MEETING ROOM	1	20.00	20.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	7.00	7.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 1 BED	1	15.00	15.00
HOSPITALISATION 1 BED	1	15.00	15.00
TOILET	1	7.00	7.00
CARE ROOM	1	10.00	10.00
TRASH DISPOSAL AREA	1	3.00	3.00
TECHNICAL AREA	1	3.00	3.00
MAINTENANCE AREA	1	5.00	5.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
HOSPITALISATION 2 BEDS	1	20.00	20.00
TOILET	1	7.00	7.00
UNIT HEAD'S OFFICE	1	15.00	15.00
WAITING AREA	1	15.00	15.00
STRETCHER AREA	1	8.00	8.00
NURSE'S OFFICE	1	12.00	12.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
HOSPITALISATION 4 BEDS	1	28.00	28.00
TOILET	1	7.00	7.00
PHYSICIAN'S OFFICE	1	12.00	12.00

ROOM	Qty	SU per room (m2)	SU (m2)
ARCHIVES ROOM / CLASSROOM	1	25.00	25.00
WAITING AREA	1	15.00	15.00
PREPARATION ROOM – LOCKER ROOM	1	10.00	10.00
SCANNER ROOM	1	40.00	40.00
SCANNER TECHNICAL ROOM	1	10.00	10.00
UNDRESSING	2	3.00	6.00
PATIENT PREPARATION	1	24.00	24.00
PATIENT CARE PREPARATION	1	10.00	10.00
MATERIALS AREA	1	10.00	10.00
PHYSICIAN'S OFFICE 01	1	15.00	15.00
PHYSICIAN'S OFFICE 02	1	15.00	15.00
RX / ULTRASOUND WAITING ROOM	1	40.00	40.00
OS/POU MON RADIOGRAPHY	2	30.00	60.00
UNDRESSING	4	3.00	12.00
RADIOLOGIST'S ROOM (MANIPULATOR)	1	15.00	15.00
MAMMOGRAPHY	1	15.00	15.00
UNDRESSING	1	3.00	3.00
PHOTO COPY AREA	1	10.00	10.00
ULTRASOUND 02	1	15.00	15.00
ULTRASOUND 01	1	15.00	15.00
UNDRESSING	2	3.00	6.00
DENTAL PANORAMIC	1	15.00	15.00
TOILET	1	3.50	3.50
BLOOD BANK LAB			490.50
BACTERIOLOGY ROOM	1	30.00	30.00
BIOMOLECULE ROOM 1	1	15.00	15.00
BIOMOLECULE ROOM 2	1	15.00	15.00
BIOCHEMISTRY ROOM	1	20.00	20.00
PARASITOLOGY ROOM	1	30.00	30.00
IMMUNOLOGY ROOM	1	25.00	25.00
HAEMATOLOGY ROOM	1	30.00	30.00
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
LOCKER ROOM	1	10.00	10.00
MEETING ROOM	1	40.00	40.00
WAITING AREA	1	20.00	20.00
MEDIA PREPARATION ROOM	1	15.00	15.00
SCRUB AREA + STERILISATION	1	15.00	15.00
MAINTENANCE	1	3.00	3.00
TOILET	1	3.50	3.50
SPECIAL SAMPLING	1	12.00	12.00
CURRENT SAMPLING	1	15.00	15.00
GUARD ROOM	1	15.00	15.00
MAJOR OFFICE	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
STORAGE	1	15.00	15.00
BLOOD BANK	1	15.00	15.00
UNIT HEAD'S OFFICE	1	15.00	15.00
SECRETARY'S OFFICE + ARCHIVES	1	20.00	20.00
STORAGE	1	40.00	40.00
ANATOMICAL PATHOLOGY	1	40.00	40.00
STERILISATION STATION			185.50
TOILET	1	3.50	3.50
MEN'S LOCKER ROOM	1	5.00	5.00
WOMEN'S LOCKER ROOM	1	5.00	5.00
OFFICE 1	1	12.00	12.00

ROOM	Qty	SU per room (m2)	SU (m2)
WOMEN'S LOCKER ROOM	1	10.00	10.00
TOILET	1	3.50	3.50
TOILET	1	3.50	3.50
UNIT MANAGER'S OFFICE	1	15.00	15.00
OFFICE	1	12.00	12.00
GUARD'S ROOM	1	15.00	15.00
ASEPTIC OPERATION ROOM 1	1	40.00	40.00
STERILE STORAGE	1	8.00	8.00
PATIENT PREPARATION	1	10.00	10.00
PRE-DISINFECTION	1	8.00	8.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGICAL SCRUB AREA	1	6.00	6.00
ASEPTIC OPERATION ROOM 2	1	40.00	40.00
PATIENT PREPARATION	1	10.00	10.00
STERILE STORAGE	1	10.00	10.00
PRE-DISINFECTION	1	8.00	8.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGICAL SCRUB AREA	1	6.00	6.00
ENDOSCOPY			232.00
WAITING AREA	1	12.00	12.00
TOILET	1	3.50	3.50
TOILET	1	3.50	3.50
PATIENT ENTRANCE	1	8.00	8.00
PATIENT PREPARATION	1	20.00	20.00
ENDOSCOPY ROOM	2	25.00	50.00
ENDOSCOPE CLEANING	1	20.00	20.00
ENDOSCOPE STORAGE	1	15.00	15.00
PATIENT REST	1	40.00	40.00
CARE STATION	1	12.00	12.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
PHYSICIAN'S OFFICE	1	12.00	12.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
MEDICAL IMAGING			717.00
GENERAL INTERPRETATION ROOM (RADIO – SCANNER – TRAINING)	1	30.00	30.00
PHYSICIAN'S OFFICE	1	12.00	12.00
MAJOR OFFICE	1	15.00	15.00
APPOINTMENTS	1	20.00	20.00
NON-AMBULATORY PATIENT WAITING AREA	1	20.00	20.00
MRI / CAT SCAN WAITING AREA	1	40.00	40.00
TOILET FOR DISABLED PEOPLE	1	4.50	4.50
TOILET	1	7.00	7.00
TOILET	1	7.00	7.00
MEETING ROOM	1	30.00	30.00
WAITING AREA	1	15.00	15.00
TOILET	1	7.00	7.00
MR ROOM 1	1	45.00	45.00
UNDRESSING	2	3.00	6.00
MRI TECHNICAL AREA	1	10.00	10.00
PATIENT PREPARATION	1	24.00	24.00
PATIENT CARE PREPARATION	1	10.00	10.00
MATERIALS AREA	1	10.00	10.00
RADIOLOGIST'S OFFICE	1	15.00	15.00

ROOM	Qty	SU per room (m2)	SU (m2)
INTENSIVE CARE (4 BEDS)			267.50
OPEN SPACE ROOM	4	18.00	72.00
SHOWER ROOM AND TOILETS	1	8.00	8.00
CARE STATION	1	15.00	15.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
GUARD'S ROOM	1	12.00	12.00
WAITING AREA	1	15.00	15.00
WAITING AREA	1	20.00	20.00
TOILET	1	3.50	3.50
SECRETARY'S OFFICE	1	12.00	12.00
MEN'S UNCLEAN CHANGING AREA	1	8.00	8.00
WOMEN'S UNCLEAN CHANGING AREA	1	8.00	8.00
MEN'S CLEAN CHANGING AREA	1	8.00	8.00
WOMEN'S CLEAN CHANGING AREA	1	8.00	8.00
MATERIAL STORAGE	1	10.00	10.00
OPERATING UNIT			740.50
TECHNICAL AREA	1	3.00	3.00
EQUIPMENT AREA	1	30.00	30.00
ASEPTIC OPERATION ROOM 1	1	40.00	40.00
STERILE STORAGE	1	8.00	8.00
PATIENT PREPARATION	1	10.00	10.00
PRE-DISINFECTION	1	8.00	8.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGICAL SCRUB AREA	1	6.00	6.00
ASEPTIC OPERATION ROOM 2	1	40.00	40.00
PATIENT PREPARATION	1	10.00	10.00
STERILE STORAGE	1	8.00	8.00
ASEPTIC OPERATION ROOM 3	1	40.00	40.00
STERILE STORAGE	1	8.00	8.00
PATIENT PREPARATION	1	10.00	10.00
PRE-DISINFECTION	1	8.00	8.00
SURGEON DRESSING AREA	1	8.00	8.00
SURGICAL SCRUB AREA	1	6.00	6.00
ASEPTIC OPERATION ROOM 3	1	40.00	40.00
PATIENT PREPARATION	1	10.00	10.00
STERILE STORAGE	1	8.00	8.00
TECHNICAL AREA	1	3.00	3.00
PATIENT WAITING AREA	1	24.00	24.00
TOILET	1	3.50	3.50
ANAESTHETIST'S OFFICE	1	15.00	15.00
MEN'S RETURN LOCKER ROOM	1	15.00	15.00
MEN'S ADMISSION LOCKER ROOM	1	15.00	15.00
WOMEN'S ADMISSION LOCKER ROOM	1	15.00	15.00
WOMEN'S RETURN LOCKER ROOM	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	3.50	3.50
RECOVERY ROOM	1	80.00	80.00
SURPERVERSOR'S OFFICE	1	15.00	15.00
TOILET	1	3.50	3.50

ROOM	Qty	SU per room (m2)	SU (m2)
EMERGENCY SERVICES			586.00
TOILET	1	7.00	7.00
WOMEN'S LOCKER ROOM	1	20.00	20.00
ROOM 2 BEDS	4	20.00	80.00
OBSERVATION 1	1	26.00	26.00
OBSERVATION 2	1	26.00	26.00
MEDICAL EMERGENCIES SECRETARY'S OFFICE	1	12.00	12.00
MEN'S LOCKER ROOM	1	20.00	20.00
TOILET	1	7.00	7.00
STAFF	1	30.00	30.00
PHYSICIAN'S OFFICE 2	1	12.00	12.00
PHYSICIAN'S OFFICE 1	1	12.00	12.00
NURSE	1	12.00	12.00
TOILET FOR DISABLED PEOPLE	1	4.50	4.50
WAITING AREA	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
SHOCK TREATMENT ROOM	1	28.00	28.00
TOILET	1	3.50	3.50
TOILET	1	3.50	3.50
TRIAGE ROOM	1	15.00	15.00
SURGICAL EMERGENCY SECRETARY'S OFFICE	1	12.00	12.00
OBSERVATIONS 2	1	26.00	26.00
OBSERVATION 1	1	26.00	26.00
ROOM 2 BEDS	4	20.00	80.00
TRIAGE ROOM	1	15.00	15.00
WAITING AREA	1	25.00	25.00
TOILET	1	3.50	3.50
TECHNICAL AREA	1	3.00	3.00
TOILET FOR DISABLED PEOPLE	1	4.50	4.50
TOILET	1	3.50	3.50
NURSE	1	12.00	12.00
PHYSICIAN'S OFFICE 1	1	12.00	12.00
PHYSICIAN'S OFFICE 2	1	12.00	12.00
PLASTER ROOM	1	15.00	15.00
RESUSCITATION (8 BEDS)			339.50
OPEN SPACE ROOM	8	18.00	144.00
SHOWER ROOM AND TOILETS	1	8.00	8.00
CARE STATION	1	15.00	15.00
DIRTY LAUNDRY ROOM	1	5.00	5.00
CLEAN LAUNDRY ROOM	1	5.00	5.00
TECHNICAL AREA	1	3.00	3.00
TECHNICAL AREA (STORAGE)	1	5.00	5.00
TRASH DISPOSAL AREA	1	3.00	3.00
PHYSICIAN'S OFFICE	1	12.00	12.00
INTERNS' OFFICES	1	20.00	20.00
CARE SUPERVISOR'S OFFICE	1	15.00	15.00
GUARD'S ROOM	1	12.00	12.00
WAITING AREA	1	15.00	15.00
WAITING AREA	1	20.00	20.00
TOILET	1	3.50	3.50
SECRETARY'S OFFICE	1	12.00	12.00
MEN'S DIRTY LOCKER ROOM	1	8.00	8.00
WOMEN'S DIRTY LOCKER ROOM	1	8.00	8.00
MEN'S CLEAN LOCKER ROOM	1	8.00	8.00
WOMEN'S CLEAN LOCKER ROOM	1	8.00	8.00
MATERIAL STORAGE	1	10.00	10.00

ROOM	Qty	SU per room (m2)	SU (m2)
AUTOPSY ROOM	1	15.00	15.00
WHITE / COLD ROOM	1	80.00	80.00
LOCKER ROOM	1	10.00	10.00
WASTE	1	3.00	3.00
STORAGE	1	8.00	8.00
MEDICAL EXAMINER'S OFFICE	1	15.00	15.00
TOILET	1	3.50	3.50
STOREROOM	1	5.00	5.00
ROOM PERSONNEL BREAK ROOM	1	15.00	15.00
TECHNICAL AREA	1	3.00	3.00
TOILET	1	3.50	3.50
ROOM MANAGER'S OFFICE	1	15.00	15.00
TECHNICAL AREA	1	12.00	12.00
LAUNDRY ATTENDANT'S KITCHEN			80.00
KITCHEN	1	25.00	25.00
STORAGE	1	15.00	15.00
PACKING	1	15.00	15.00
WASHING	1	25.00	25.00

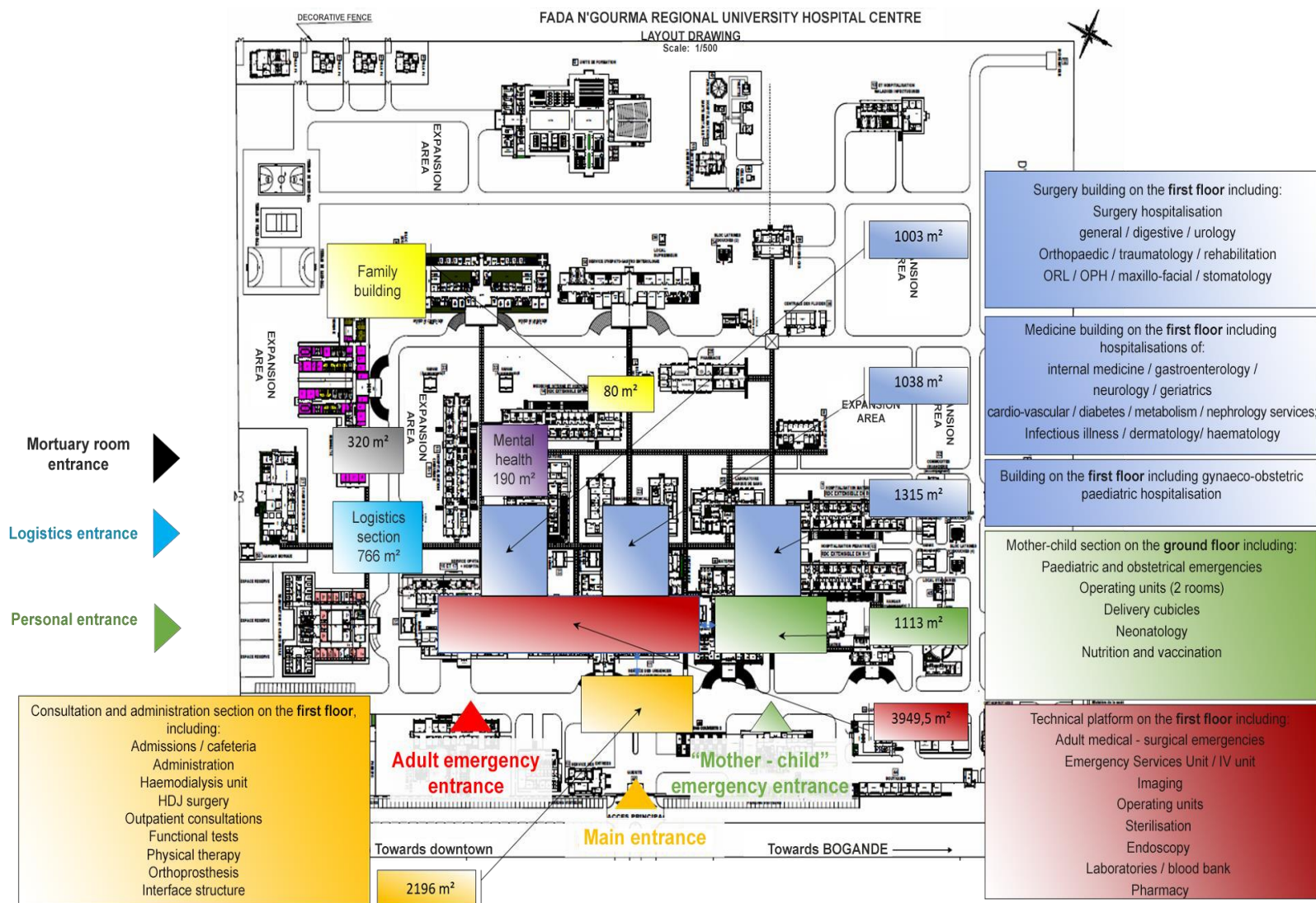


Figure 2: Plan of the Fada N'Gourma CHRU

4. Description of the initial state of the environment

4.1. Biophysical environment

4.1.1. Location and climate

■ Geographic location

The city of Fada N'Gourma enjoys the status of the capital of the Eastern Region, of the province of Gourma and of an urban municipality. It is a centre of concentration with several administrative authorities. The CHRU site is accessible by NR 18 from Fada N'Gourma to Bilanga.

■ Climate

In order to characterise the climatic conditions in the study area, the measurement stations of meteorological parameters that have long series of data in order to satisfy the requirements of any climate study have been selected. These are the measurement stations of Fada N'Gourma and Kantchari, which are for the area of influence of the project the reference stations. The fundamental element of such a study is the nearest normal standard. Here, this will be the normal (average) period of 1981-2010.

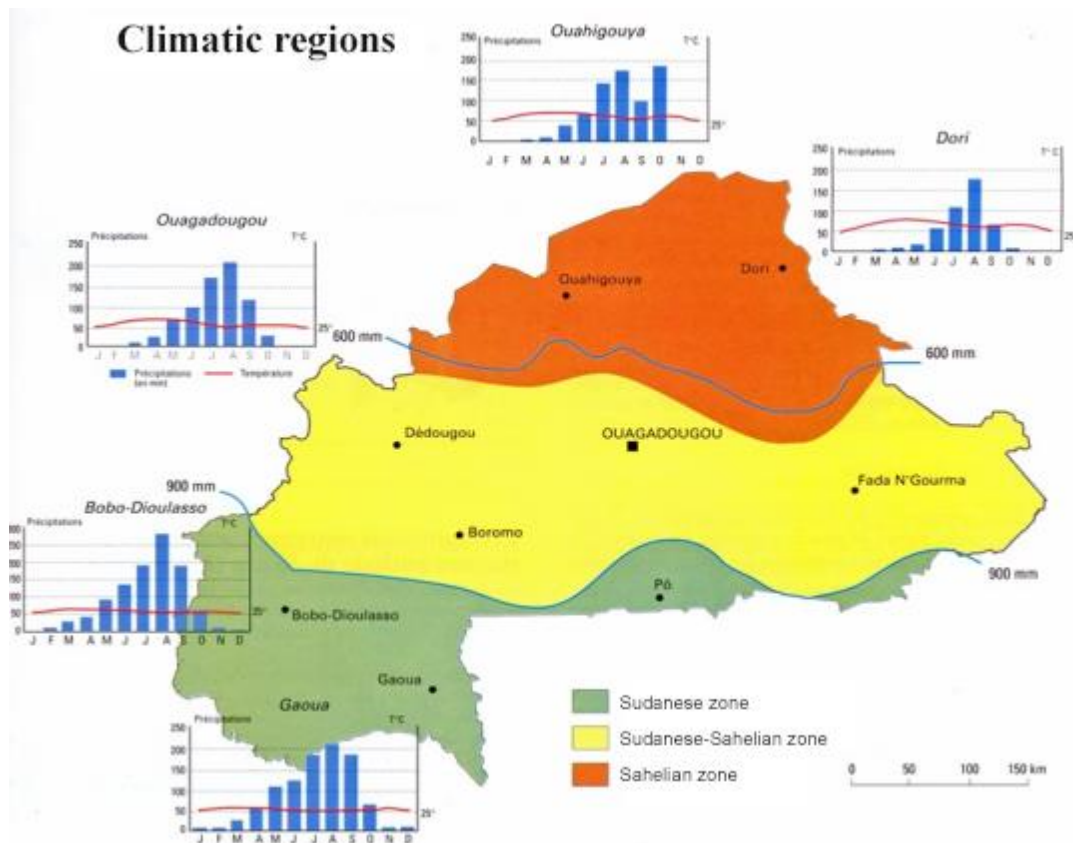
Table 13: Meteorological parameters of area of influence

Stations	OMM number	Study period	Distance between localities (km)	Longitude West / East	Latitude North	Altitude (m)	The nature of the station	Opening date
Fada N'Gourma	89	1981-2014	153 km from Kantchari	01°21 E	12° 04 N	292	S	1919
Fada N'Gourma	8	1981-2014	381 km from Ouagadougou	01°31 E	12° 28 N	270	P	1943

*Sources: SOCREGE / WSP, 2018 * NB: S = synopsis; P = precipitation measurement*

The parameters studied are precipitation, extreme air temperatures, extreme humidity, wind at 10 m, evaporation of Class "A" pan, potential evapotranspiration (Penman PET), maximum rainfall heights in 24 hours, number of rainy days, the length of sunshine and overall radiation.

The study area is located entirely in the part of the country between 600 mm and 900 mm, i.e. the Sudan-Sahelian zone. The average annual quantities of stations in our area for the period 1981-2014 range from 705.6 mm to 806.8 mm. Those of the 1981-2010 normal range go from 666.7 mm to 808.1 mm.



Map 3: Burkina Faso's climate regions

By observing the rainfall profiles of the stations in area, apart from the interannual variability, the trend is more to the stability of the observed quantities. However, a slight upward trend is noticeable. During 1994 and 2003 all stations experienced an increase in cumulative accumulations. The opposite is observed with a decline over the years of 1984, 1990, 1997 and 2000. Interannual variability is also different from one station to another. Analysis of the data in the area still shows us annual accumulations exceeding the 900 mm coast, characteristic of the Sudanese-type climate.

Potential evapotranspiration (PET) is the parameter of Penman. Its values are lower than those of the BAC but observe the same behaviour, namely that the highest values are found in the warmest, driest months and the lowest in the rainy months. It is inversely proportional to rainfall with bimodal behaviour throughout the year. The highest value was 180.1 mm in March compared to 128.5 mm in August in Fada.

As for sunshine and overall radiation, they complement each other because the radiation depends on the length of the sunshine. Sunshine represents the duration of sunlight or the time the sun shone over an area during the day. Sunshine and radiation are also proportional to cloud cover. It is therefore obvious that areas with clear skies will record high radiation values. So it is the opposite in our region where the sky is mostly cloudy.

In relation to values, a maximum of 9 hours of sunshine is noted around November to February and a minimum of 6 to 7 hours in August. For overall radiation, the high values are in the hot months (1,800 to 1,997 D / cm² in Fada).

Temperatures at the Fada N'Gourma station have the following values:

- Lows are observed in December - January (16 to 17 °C) with a slight decrease in August and September (22 to 32 °C), which gives a bimodal behaviour to the scale of the year;
- Maximums are observed in March - April (39.7 to 40 °C) and November (36.6 °C) with the same behaviour as the minimum;
- Average annual extremes are 35 °C and 22 °C;

- This behaviour of two minimums and two maxims is unique to our African sub region. They relate to the cold period and the rainy season.

In relation to humidity levels, based on data from the same stations, they present the following characteristics:

- The minimum is observed during the cold period of January - February (11%). The value starts to rise to a peak around August (59 to 64%), the wettest month;
- The maximum is recorded in August - September (92 to 97%). This maximum begins to decrease with the decrease in humidity of 32 to 38% in February. It can therefore be said that the humidity parameter has a unimodal behaviour in the region;
- The average annual maximum is around 70% and the minimum of 32% over the period of 1981 - 2010.

The study area, like the entire country, has two types of winds:

- Prevailing north-north-easterly winds called harmattan, which blow during the dry season (November to March). These are dry winds, sometimes cool (November - January), then warm in February and March. They can carry dust;
- Winds from west to south prevail or monsoon winds occur during the rainy season from April to October. They are mostly carriers of rain and high winds.

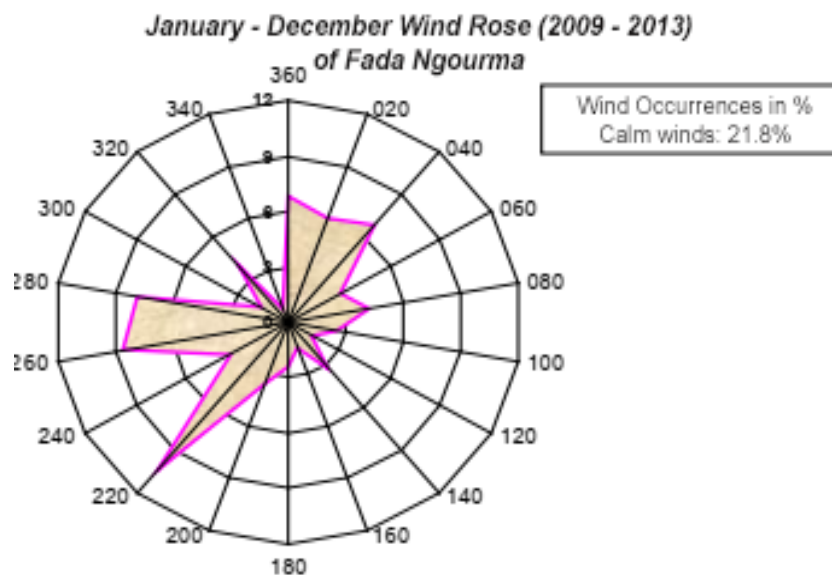


Figure 3: Wind rose from 2009 to 2013 in Fada N'Gourma

Source: SOCREGE / WSP, 2018

The study area has as many wet winds as dry winds. Average monthly speeds range from 0.8 to 2.8 m/s but can reach 10 to 12 m/s. The Fada wind rose above shows calm winds at 21.8%, thus less than 0.5 m/s. With wind peaks of up to 10.5 m/s and average winds between 0.8 and 1.9 m/s, the majority of winds are low speed. There are three (3) clear areas from which the winds blow: northeast, southwest and west. The southwest sector is the one with the highest speeds.

4.1.2. Air and noise quality

■ Air quality

Air quality was not evaluated in this study. For example, data collected in the study area in 2018 by Socrège / WPS were used to define and analyse air quality.

Thus, the study of air quality within the study area was based on the general characterization of air quality and emission sources in two locations as mentioned in the Table below:

Table 14: Location of air quality study points

Point no.	Location of the point	Region	Community	Province	Geographical coordinates
Point 1	Kantchari	East	Rural Kantchari	Tapoa	12°29'N 1°31'O
Point 2	Fada N'Gourma (military base)	East	Suburb of	Gourma	12°03'00"N 0°22'01"E

Source: SOCREGE / WSP, 2018

Analysis of the data from this collection, carried out by Socrège / WPS in 2018 identifies as sources of dust emissions, the following phenomena:

- The harmattan;
- Traffic of certain vehicles and two-wheeled vehicles on non-paved roads near the collection point;
- Fuels.

Many factors contribute to the dynamics of these dust emissions. These are:

- Climate or natural factors that influence the value of dusty emissions, particularly harmattan at all collection points;
- Anthropogenic factors, which are supported mainly by the movement of vehicles and two-wheeled vehicles on unpaved tracks (road traffic), the use of fuel such as firewood, as well as livestock breeding, including the movement of herds to pastures.

■ Sound quality

Sound quality was not assessed in this study. Thus, data collected in the study area in 2018 by Socrège / WPS were used to define and analyse sound quality.

As with air quality, the sound environment was characterised by noise sources and ambient noise at the two checkpoints shown above. Noise is defined as an undesirable sound. It is a ubiquitous phenomenon in daily life that shows a significant number of potential sources.

The analysis of the sound environment of the entire project area, carried out by Socrège / WPS in 2018 led to the conclusion of a very limited noise nuisance at the level of the study area.

High values above the day and night recommendation were found. These high values generally last 2 to 8 seconds.

The noise sources identified in each area are presented in the following Table:

Table 15: Sources of noise identified in the study points

Name of the location area of the point	Sources of noise identified
P1 - Kantchari	road traffic the cries of the birds the rustling of the wind (harmattan)
P2 - Fada N'Gourma	road traffic the rustling of the wind the cries of the birds

Source: SOCREGE / WSP, 2018

The sources of noise that have been identified are more anthropogenic than natural. Among other sources, road traffic is the source:

- When it comes to the engine, it therefore depends on the vehicle (heavy vehicles produce more noise than light vehicles) or the two-wheeled vehicle, its speed, its acceleration;
- Rolling on the road, tyres, pavement and road condition.

The source of sporadic values above the standard is believed to be related to the resonance of training in the firing range of the Fada military camp about 5 km from the right-of-way of the CHRU.

4.1.3. Flora and fauna

4.1.3.1. Flora resources

The project's area of influence is characterised as a whole by tree and shrub formations with an herbaceous mat in the lowlands. On farms, vegetation is constituted by essentially a savannah park with a high concentration of useful species such as *Vitellaria paradoxa* (shea). The shrub-covered savannah is dominated by the Combretaceae and is located on the hard plate located in the plateau areas. In addition to the dominant Combretaceae, there are also species such as *Piliostigma reticulatum*, *Balanites aegyptiaca*, *Guiera senegalensis*, *Ziziphus Mauritiana*, *Sclerocarya birrea*, and *Pterocarpus erinaceus*.

The treed savannah, on the other hand, is dominated mainly by *Vitellaria paradoxa*, *Parkia biglobosa*, and *Lannea microp carpa*.

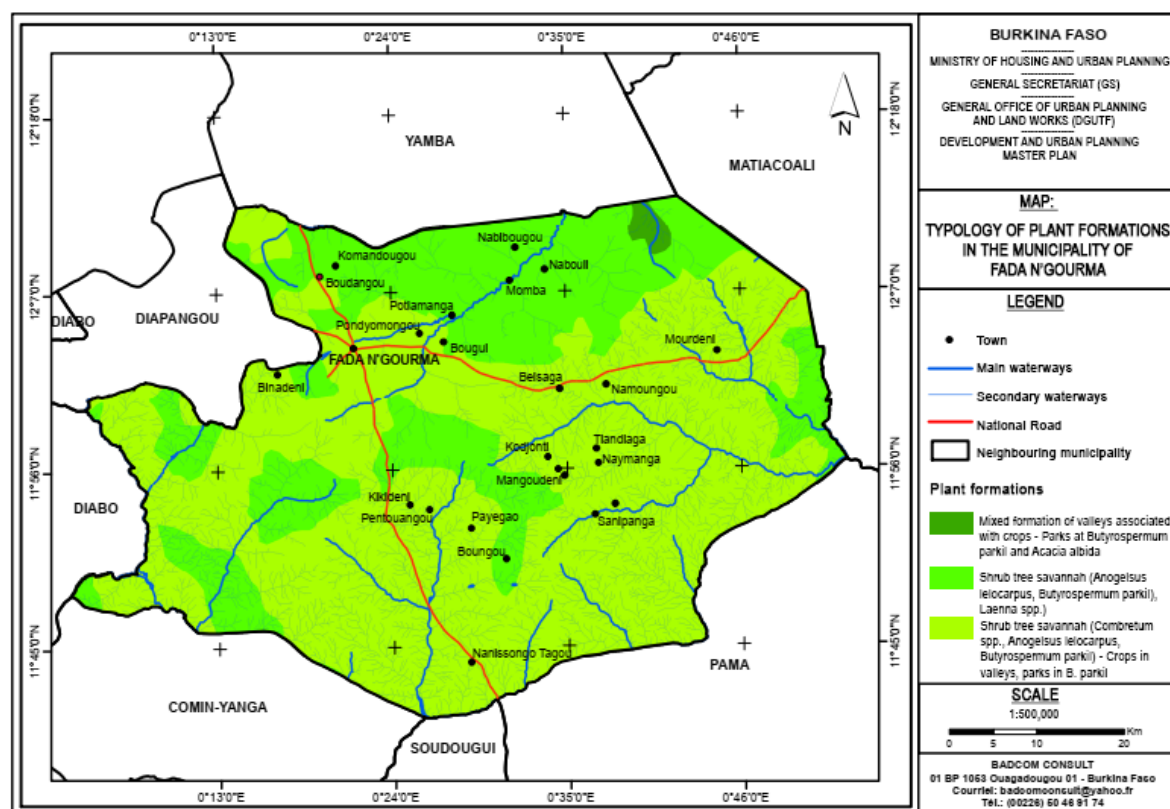
The vegetation along waterways, often characterised as gallery forest, consists of *Mitragina inermis*, *Daniela oliveri*, *Ficus capensis*, *Khaya senegalensis*, *Diospyros mespiliformis* and *Ficus iteophylla*.

During the rainy season, various herbaceous plants cover all the grounds and constitute very important fodder for the livestock. The most commonly encountered herbaceous plants are: *Diheteropogonamplectans*, *Eleusine indica*, *Andropogon pseudapricus* and *Andropogon gayanus*. It is within the limits of these vegetal formations that the initiatives of creation and management of forest areas and pasture are developed among which we can note:

- The municipal forest of Fada N'Gourma or the forest of BOUGUI with an area of 270 ha, created by municipal order no. 2007 no. 024/MAT/REST/PGRM/FDG/CD of 13 December 2007 for the creation of the inter-village area of grazing areas in the municipality of Fada N'Gourma and located between the villages of Bougui, Potiamanga, Gbersaga and Kondjonti, which traditionally are the owners of the land granted;
- The forest in sector 9 of Fada N'Gourma, recognised under Decree no. 2011/51/MATD/REST/PGRM/FDG/CO of 15 April 2011 and whose receipt covers no. 2011/67/MATD/REST/PGRM/FDG/CO of 20/12/2001 which covers an area of 3 ha. This forest is bound to the west by the village of Boudangou, to the east by Potiamanga and to the north by the farming hamlets of Tiparga and Tibari;
- The Village Hunting Areas (ZOVIC) number eleven (11) in the municipality and cover a total area of 5,315.47 ha. Four (4) of the eleven (11) ZOVIC were officially created by decree of the Municipal Board. These are the ZOVIC of Boumoana, Sandkpenga, Kodjonti, and the inter-village ZOVIC of Boungou, Setougou and Sandkpenga. Many activities are carried out as part of the development of forest resources at the ZOVIC level. These activities include: conducting studies prior to the preparation of development and management plans; the lifting of the limits to the GPS; the installation of signs; training and equipment of the Monitoring Committees, etc. However, only the ZOVIC of Boumoana has a development and management plan financed by AFAUDEB;
- The agro-ecological farm of the ARFA NGO was established in 1997. It is an experimental farm for training and awareness development located 45 km from Fada N'Gourma on the road to Pama in the village of Natiaboani. Covering an area of 13 hectares, it is operated for the purpose of exploiting NWFPs, in this case *Balanites* seeds, tamarind, jujube, moringa seeds, monkey bread, honey, etc. ;
- Namoungou Pasture Area: The Namoungou Pasture Area covers an area of 12,187 ha. It was created as a result of agreement between four (4) villages, Bandingui, Naboudi, Momba and Namoungou, and their farming hamlets. The objective was to resolve problems between farmers and herders. It was officially recognised by Decree no. 2007-024 / MAT/ REST/ PGRM/ FDG/ CD of 13 December 2007.

In addition to this, we can mention the Bantia Botanical Garden with an area of 15 ha started by an individual person in April 2001. It is located in the village of Onakpaliangou about 7 km from the city of Fada N'Gourma, on the road in the direction of Pama. Many activities are carried out there such as the exploitation and development of wood and non-wood forest products (wood, andropogon, nere seeds, acacia nilotica seeds, cashews, honey, quail eggs, etc.). The plant species existing in this forest area are essentially: *Parkia biglobosa* (ODubu), *Combretum micrantum*, *Ficus sp (kankanbu)*, *lannea microcarpa* (O Thiabu), *Tamarindus indica* (O Pugbu), *Vitellaria paradoxa* (O Sambu), *Andasonia digitata*, *Acacia nilotica*, *Acacia senegal*, *Gardenia ternifolia* (O Alendilenba), *Piliostigma thonninguii* (ONaba-niigu), *Diospyros mespiliformis* (O Gaabu), *Andropogon gaganus*.

With regard to wildlife species, we encounter wild guinea fowl, squirrels, hares, turtles, crocodiles, snakes including vipers, boas, garter snakes, monitors, "slapped mouths", etc.



Map 4: Typology of plant formations in the municipality of Fada N'Gourma

The following Table summarises the situation of conservation spaces in the municipality of Fada N'Gourma.

Table 16: Location of conservation areas in the municipality of Fada N'Gourma

Designation	Location (village)	Area (ha)
Forest of sector No. 9	Fada N'Gourma	350
Agro-ecological of the NGO ARFA	Natiaboani	13
Municipal forest	Bougui	270
11 ZOVIC	-	5,315.47
Pasture zone	Namoungou	12,187
Village forest	Koare	
Singou Wildlife Conservation Area	Tanwalbougou	
Pama North Wildlife Conservation Area	Namoungou	
Botanical Garden	Onakpaliangou	15

Source: Participatory territorial diagnosis, PSAE 2016

There has been a continuous deterioration of these conservation areas due to three key factors:

- The rainfall deficit experienced by the municipality for decades with often chronic cases thus causing pockets of drought;
- The anthropogenic factor, through the unsuitable production system (agricultural colonisation), the harvesting activities, the excessive cutting of certain trees, the bush fires that provoke and accelerate this degradation;
- Grazing that puts pressure on these reserves.

Furthermore, concerning human pressure, Table 17 below summarises the estimate of amount of resource removals made by the Fada N'Gourma Environment Department from 2012 to 2016.

Table 17: Estimated forest resource harvests from 2012 to 2016

Headings	2012		2013		2014		2015		2016	
	Quantity	Amount collected (CFA francs)	Quantity	Amount collected (CFA francs)	Quantity	Amount collected (CFA francs)	Quantity	Amount collected (CFA francs)	Quantity	Amount collected (CFA francs)
Steres (wood)	14,626	6,000,000	16,176	4,958	20,923	6,276,900	21,851	6,555,300	25,972	7,791,600
Perches (unit)	243	24,300	251	75,300	267	80,100	304	91,200	346	103,800
Quintals (coal)		103,800	2,725	681,250	3,811	952,750	4,958	1,239,500	2,500	1,625,000
Hunting (permit)		149,000	ND	ND	ND	ND	ND	ND	ND	9,688,100
Clearing		78,000	ND	ND	ND	ND	ND	120,000	ND	174,000
Total collected		7,209,100		5,609,350		7,309,750		8,006,000		19,382,500

Source: Fada N'Gourma Environment Department, May 2017, ND = data not available

The Table shows that forest resource harvests have changed dramatically over the past five years. From 2012 to 2016, the exploitation of wood steres almost doubled from 14,626 steres to 25,972 respectively. For coal, it more than doubled from 2,725 quintals in 2013 to 6,500 in 2016.

According to Fada N'Gourma's Environment Department, wood is mainly exploited in the forest of **Natiaboani** and coal in the forests of: **Bougui, Momba, Kikideni, Nagambou Namoungou, Binadeni, Potiamanga, and Koare.**

This exploitation, although a source of currency for the population and the municipality, poses a serious threat to the survival of forest resources in the municipality. Measures to control logging are needed to make forest resources sustainable and to further develop the resources.

4.1.3.2. Wildlife Resources

The main wildlife resources are listed in the following Table:

Table 18: Wildlife of the Eastern Region

No.	Scientific names	Name in English	Observations		
			Threatened	Protected	Vulnerable
1	<i>Loxodonte africana</i>	Elephant	x		
2	<i>Alcelaphus buselaphus major</i>	Western hartebeest			x
3	<i>Syncerus caffer brachyceros</i>	Savannah buffalo		x	
4	<i>Cephalophus rufilatus</i>	Red-flanked duiker	x		
5	<i>Sylvicapra gramma</i>	Crowned duiker	x		
6	<i>Hippotragus equinus koba</i>	Roan antelope		x	
7	<i>Ourebi Ourébi quadriscoipa</i>	Dwarf antelope	x		
8	<i>Kobus kob</i>	Kob antelope		x	
9	<i>Kobus ellipsiprymnus defasso</i>	Water buck		x	
10	<i>Redunca</i>	Bohor reed buck			
11	<i>Tragelaphus scriptus seriphus</i>	Harnessed bushbuck			x
12	<i>Hippotamus africanus</i>	Hippopotamus		x	

No.	Scientific names	Name in English	Observations		
			Threatened	Protected	Vulnerable
13	<i>Phacochoerus africanus</i>	Warthog	x		
13	<i>Lepus cepensis</i>	Cape Hare	x		
14	<i>Hystrix cristata</i>	Crested porcupine			x
15	<i>Erythrocebus patas</i>	Red Monkey	x		
16	<i>Chlorocebus tanlalus</i>	Green monkey	x		
17	<i>Anubis Papio</i>	Olive Baboon	x		
18	<i>Cenys aureus or adustus</i>	Jackal		x	
19	<i>Lycaon pictus</i>	Cape wild dog		x	
20	<i>Panthera pardus</i>	Leopard		x	
22	<i>Panthera Leo</i>	Barbary Lion		x	
23	<i>Crocuta</i>	Spotted Hyena		x	
24	<i>Bulbucus ibis</i>	Cattle egret		x	
25	<i>Ardeo cinerea</i>	Grey Heron		x	
26	<i>Dendrouyana viduata</i>	White-faced whistling duck	x		
27	<i>Necrosyrtes monhus</i>	Hooded vulture		x	

Source: Fada N'Gourma Environment Service / April 2015

From the employment of documentary data, it has also emerged that the vegetation cover is degrading more and more. This confirms the observations made from the diachronic land use maps. Disturbances have caused significant changes in appearance of the vegetation cover. Thus, a decrease has been noted in the density of vegetation, the disappearance of certain species such as *Parkia Biglobosa* (African locust bean or nere), *Vitellaria paradoxa* (shea), *Adansonia digitata* (baobab), some wild animals, rapid drying of streams, etc. There are many things that seem to explain this:

- The rainfall deficit from which the area has suffered for decades with often chronic cases, thus causing pockets of drought;
- The anthropogenic factor, through the unsuitable production system and the harvesting activities that cause and accelerate this degradation. Thus, in this agro-pastoral zone, the straying of animals due largely to the obstruction of livestock tracks, certain practices such as cutting and pruning of trees by the breeders, contributed to the deterioration of the woody and herbaceous stratum. This probably explains in part the fact that the degradation is particularly marked at the pastoral and watering grounds.

Other factors of degradation, and not the least, are the increase in the area planted and the significant part of excessive cutting of certain trees.

However, at the level of the municipality of Fada N'Gourma, several commitments were made by the local authorities (development of the strategic plans, creation of frameworks of consultation) and we note an improvement in awareness of the population, in relation to the negative anthropogenic effects on forest cover. In fact, several eco-citizenship actions are being carried out in order to restore forest vegetation cover, through individual and collective reforestation actions.

4.1.4. Earth's environment

4.1.4.1. Topography

The topography of the municipality of Fada N'Gourma is on the whole relatively flat. There are, however, a few hills in particular around Nalambou, in the north and in area of Namoungou.

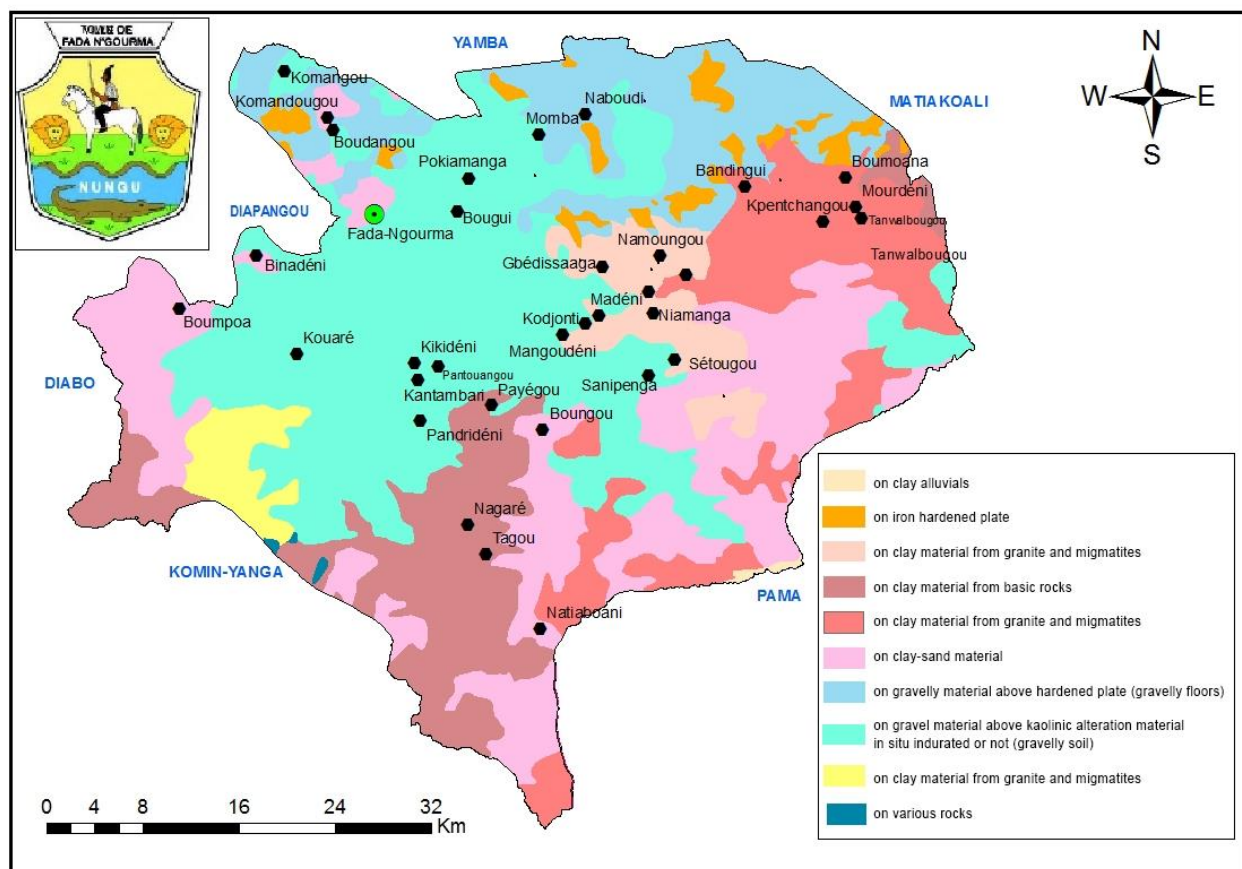
4.1.4.2. Pedology

The city is located in an area where soils are mainly found on clay material coming from migmatitis granites or various basic rocks, soils on sandy clay material from granites and soils on various rocks. These last two types are the most dominant. They occupy almost half of the departmental space, stretching from the centre to the west. However, these soils are subject to continuous degradation due to the phenomenon of erosion.

The soils of the municipality are generally fertile, conducive to agricultural activity and are divided into three types:

- More or less deep bleached, tropical ferruginous soils hardened like a cuirass and tropical ferruginous soils bleached with gravel in spots or concretions. They are unsuitable for agriculture;
- Pseudo-gley hydromorphic soils;
- Low-evolved soils from alluvial to pseudo-gley.

These types of soils are found on several materials as shown in the Map below:



Source: BNDT 2012 (IGB).

on 20/04/2017

Issued: O. Hamidou

Author: ACI/D SA

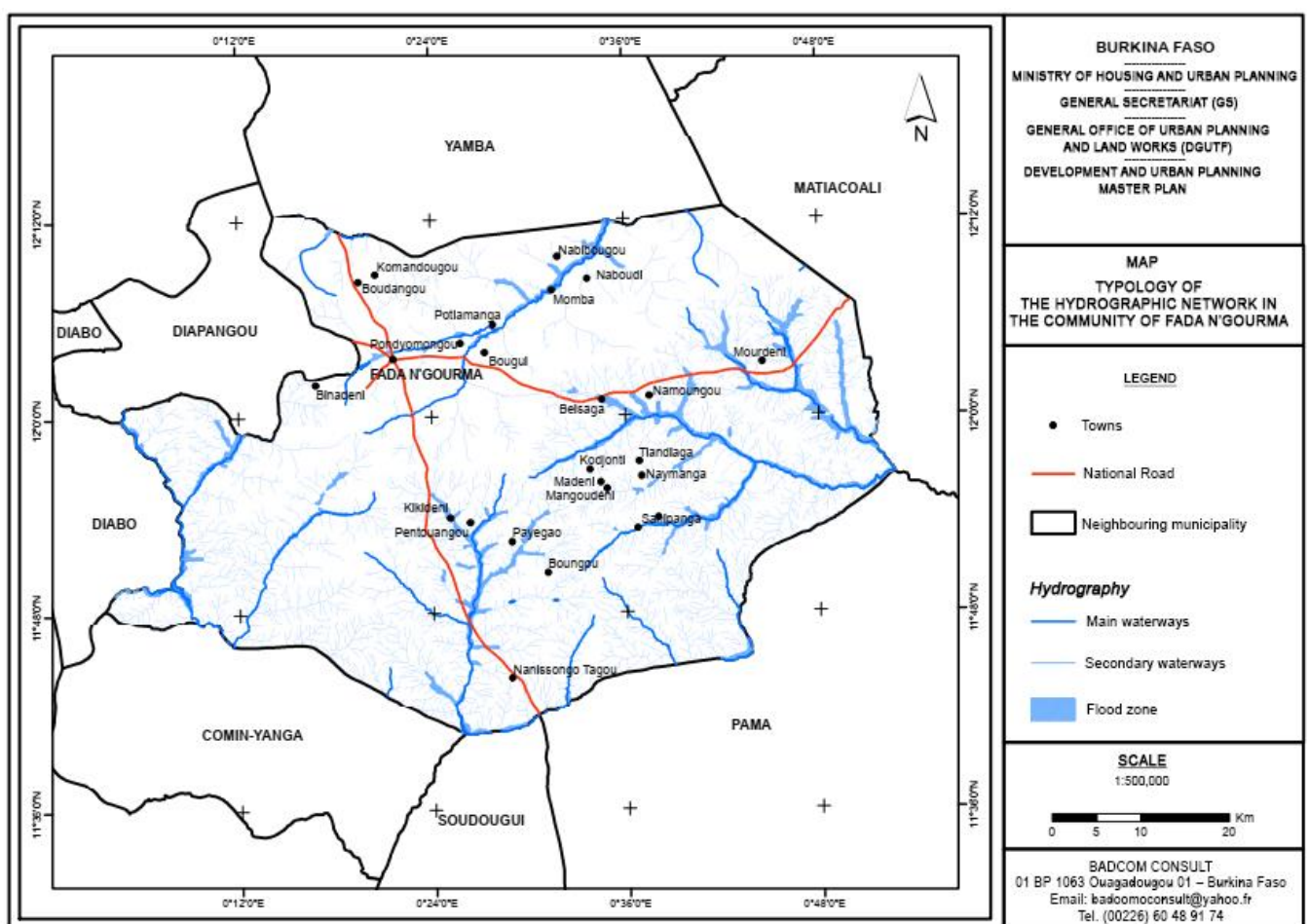
Map 5: The types of soils in the municipality of Fada N'Gourma

4.1.4.2.1. Hydrology

The territory of the municipality of Fada N'Gourma is part of the Niger watershed to the north and that of the Oti to the south. Thus, in terms of water, the municipality is crevassed by four rivers that are the Tanwalbougou, Natiaboani, Natiari and Oupenchyambangou. One finds also on these waterways some natural (mares) and artificial (dams or buli) reservoirs. Also, the major rivers are fed by numerous runoff drains that accelerate upstream land degradation, and silting downstream of the river. The importance of the drains in the various villages of the municipality, provoked in the latter the desire to develop water reservoirs for agricultural and / or pastoral purposes. The Map below shows the situation of rivers and dams in the municipality.



Photo 1: Surface flow at the CHRU site (Insuco, 28/05/2019)



Map 6: Water network and water bodies in the municipality of Fada N'Gourma

In terms of water resources, the municipality of Fada N'Gourma has in 2015 540 modern water points (drilling, wells and fountains) and eight (08) artificial water reservoirs including six (06) dams located in Bougui, Natiaboani, Koare, Fada city and Momba. These water reservoirs are generally silted, leading to a reduction in the water retention time, which cannot now exceed the month of May. Dams were generally built for agricultural purposes with capacities ranging from 55,000 to 1,521,676 m³. The following Table shows the situation and the volume of dams in the municipality of Fada N'Gourma.

Table 19: Water reservoirs (dams) of the municipality of Fada N'Gourma

No.	Villages	Name of the work	Type of work	Year of completion	Volume (m ³)	Usage
1	Bougui	Bougui	Dam	2002	700 000	Agricultural
2	Fada N'Gourma	Fada 2	Dam	1991	310,000	Agricultural
3	Fada N'Gourma	Fada I	Dam	-	55,000	Agricultural
4	Momba	Piengou	Dam	-	-	Pastoral
5	Natiaboani	Natiaboani	Dam	1940	432,000	Agricultural
6	Koare	Koare	Dam	2013	1,521,676	Agricultural

Source: DRAHH / East Database

The use of the documents in our possession indicates that there is a lack of comprehensive data in the characterization of surface water quality. Data on certain water quality parameters and indicators are patchy and often not up to date. The results of analyses available at the Gourma Water Agency (GWA) indicate the following values on the chemical and biological quality of surface water:

- Conductivity: the values obtained are between 25 µS/cm and 327 µS/cm with values upstream being lower than those downstream;
- Station temperatures range from 27.50 °C to 33. 50 °C;
- The pH is between 6.7 and 8.7 and is therefore within the tolerable limit (5 to 9) for most plant and animal species and especially fish;
- Turbidity: the results obtained are above 1,100 NTU except for three (3) of the stations;
- Organic pollution: COD ranges from 37 mg/l to 248 mg/l.

In terms of drinking water supply, the municipality of Fada N'Gourma faces serious difficulties because the Tandiar dam where the ONEA pumping station is located is very sandy and has been in a critical state since March.

For fishing resources, the precariousness of water reservoirs does not allow for the establishment of an organised and professional fishery. However, traditional fishermen exist in the different villages. It should be noted that most of the fish that feed the municipality of Fada N'Gourma comes from Kompienga.

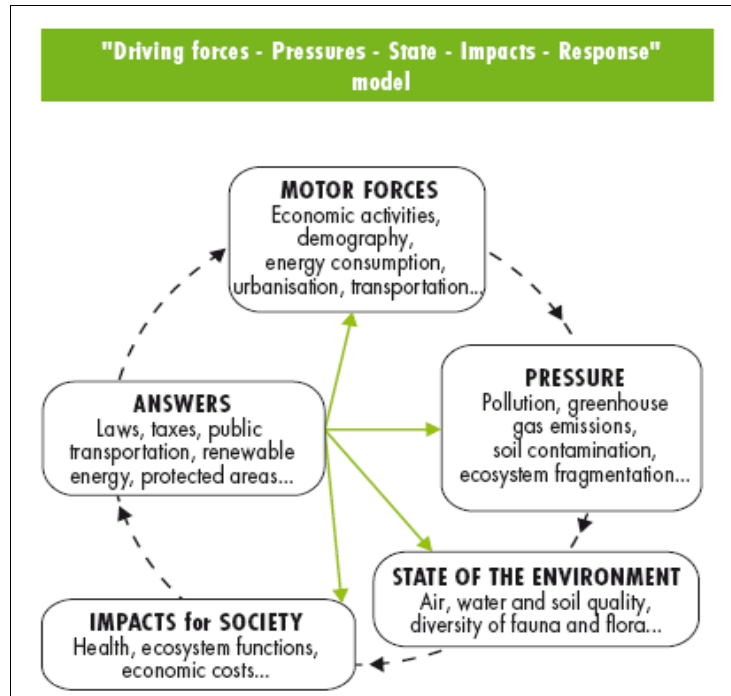
From the exploitation of previous work conducted in the study area for similar missions, the finding is that surface waters naturally contain total coliforms, generally environmental, and faecal streptococci indicating old faecal pollution, probably further upstream from the catch area. In general, the waters in the boreholes are of acceptable quality in terms of their potability. The pH of the water determines the physical-chemical balances, in particular the calco-carbon balance and therefore action of water on the carbonates (attack or deposition). The potability standard for this parameter is between 6.5 and 8.5. All the water analysed is therefore within the standards in terms of pH. However, the waters of the 3 boreholes are all acidic; they could therefore be corrosive and attack the metal parts of the manual pumps installed in the boreholes. This may explain the brown / rusty coloration of the water in wells 1 and 2. People refuse to drink water from well 1 because of its colour and taste.

The measurement of conductivity allows us to determine the amount of salt dissolved in the water. The water from the wells is moderately mineralised and that from surface water is highly mineralised (1,437 µS/cm). This translates into an average concentration of major ions in water from the wells and a high concentration in surface water (a concentration of bicarbonates of 775.3 mg/l and a sodium concentration of 262.3 mg/l). The elevated turbidity (351 NTU) of the surface water and the observation of the sample indicates a murky water with a high colloidal load.

4.1.5. Summary of the strengths and weaknesses of the biophysical environment

In the case of this document, it is the **DPSIR model** which is relevant to organizing data and describing the relationship between the origins and consequences of environmental phenomena (principal interactions between humans and the environment). The dynamics are explained by the causal links. It is as follows:

Figure 4: Dynamics of the DPSIR model



Source: European Environment Agency, 199

From the environmental profile of the biophysical environment it establishes above in terms of the synthesis of the state of the environment, the environmental issues. This environmental profile will provide us with a framework for choosing the options that the implementation of the CHRU project will reconcile so that it is socially acceptable and ecologically sustainable.

Table 20: Summary of current pressures and initiatives developed by the populations in the Project's area of influence

Resources	Pressures	Effects and impacts	Developed initiatives
Water resources	- Uncontrolled occupation of the river banks by crops; - The discharge of pesticides and fertilisers into waterways; - Climate change; - The discharge of artisanal gold processing products into the waterways; - The silting of the sources of surface water.	- Significant reduction in water levels in the waterways, with a reduction in aquatic flora and fishing resources; - Water pollution with deterioration, or even destruction, of aquatic flora and fauna; - The effects and impacts of climate change.	- The awareness of all stakeholders concerning the consequences of human action on water resources and the establishment of an alert system concerning river pollution; - The protection of water bodies from silting (actions to restore the banks through reforestation, respect for easement zones by users, etc.); - The construction of water points to increase water supplies; - The promotion of good practices for adapting to climate change.
Land Resources	- Soil degradation through water and wind erosion; - Solid and liquid waste discharges; - The discharge of excrement onto soils and nearby habitats; - The uncontrolled exploitation of the land; - Climate change.	- The degradation and decline of the fertility of agricultural soils; - Erosion and sanding of waterways; - Land destruction and soil pollution by chemicals; - The effects and impacts of climate change; - Contamination of soil by pathogenic germs.	- Better regulation of land clearing by having the municipal board pass legislation in this regard, if necessary; - Banning the use of hazardous chemicals; - The development of the lowlands to increase land availability; - The promotion of good practices for adapting to climate change.
Forest resources	- Over-exploitation of wood energy; - Degradation of the wildlife habitat; - Uncontrolled picking / poaching; - Degradation of the vegetation cover by uncontrolled clearing for the installation of new fields and / or increased area; - Overexploitation of wood forest resources, especially species recognised as timber; - Forest clearing and deforestation.	- The concomitant reduction in forest resource areas; - Degradation of the flora and fauna habitats; - The loss of biodiversity (flora, fauna); - The effects and impacts of climate change.	- Raising awareness and capacity building for natural resource management (forest management, reforestation, monitoring, bushfire control, etc.); - Promoting other energy sources such as butane gas, biogas or solar, as well as promoting energy-efficient technologies (e. g. improved fireplaces); - The restoration of vegetation cover (reforestation and assisted natural regeneration) through, among other things, the development of forest relics.

Resources	Pressures	Effects and impacts	Developed initiatives
Wildlife	- Uncontrolled picking / poaching; - The destruction of the wildlife habitat; - Climate change.	- Degradation of the vegetation cover; - The deterioration of the wildlife habitat, which is why wildlife is more vulnerable to predators and hunters; - Uncontrolled sampling and poaching decreasing biodiversity; - The migration of wildlife species; - The effects and impacts of climate change.	- Protecting wildlife through increased surveillance; - Involvement and accountability of local communities in wildlife management; - The creation of village hunting areas (ZOVIC); - The promotion of good practices for adapting to climate change.
Fishing resources	- Water pollution; - Poor fishing resource practices that affect fishing potential; - Climate change.	- Water pollution and falling water table levels; - The mortality, or even the reduction of species regeneration and fishing potential; - The effects and impacts of climate change.	- Promoting the protection of the river banks; - Raising awareness of the rational exploitation of fishing resources; - The promotion of good practices for adapting to climate change.
Pastoral resources	- Inadequate cattle and human trails; - The regression of pastoral paths; - The decrease of pastures; - Inadequate pastoral water infrastructure; - Climate change.	- Increased demand for water and amount of pasture required; - The increase in conflicts over these resources; - Reduction of pasture regeneration capacity and in the long run a decrease in forage resources; - The resurgence of climate-sensitive animal illnesses; - The effects and impacts of climate change.	- The development of a modern or semi-modern livestock breeding; - The promotion of forage crops and forage conservation; - Strengthening pastoral water resources and creating pasture areas and cattle trails; - The promotion of good practices for adapting to climate change.

Resources	Pressures	Effects and impacts	Developed initiatives
Living conditions	- Poor sewage drainage; - Mismanagement of household waste; - Mismanagement of quarries; - Dust and CO₂ discharges into atmosphere; - Climate change.	- Water and respiratory illnesses; - Visual pollution; - The deterioration of the landscape; - The effects and impacts of climate change.	- Raising public awareness of environmental protection, hygiene and sanitation, and strengthening the household waste collection system; - Good operation and career management; - The promotion of good practices for adapting to climate change.

4.2. Human environment

4.2.1. Demographic characteristics and dynamics of the population

4.2.1.1. Key characteristics of the population

According to the 2006 General Census of Population and Housing (RGPH), the population of the Eastern Region was 1,209,399, of whom 615,627 were women. At the provincial level, Gnagna had a population of 407,739 compared to 304,169 for Gourma, 80,047 for Komondjari, 75,662 for Kompienga and 341,782 for Tapoa.

As for the regional capital, Fada N'Gourma, its population was estimated in 2006 at 124,577 inhabitants, including 62,193 men and 62,384 women, in 21,022 households. By 2020, the population of Fada N'Gourma will reach 201,652 including 100,981 women.

The Table below presents the population projections for the five (05) provinces from 2015 to 2020.

Table 21: Projections of the population of the Eastern Region over five years, from 2015 to 2020

Province	2015			2020		
	Male	Female	Total	Male	Female	Total
Gnagna	260,031	270,436	530,467	301,489	312,921	614,410
Gourma	197,946	205,856	403,802	231,032	239,786	470,818
Komandjoari	53,908	56,064	109,972	64,104	66,537	130,641
Kompienga	54,737	56,919	111,656	66,730	69,261	135,991
Tapoa	225,422	234,421	459,843	264,953	275,000	539,953
Eastern Region	792,044	823,696	1,615,740	928,308	963,505	1,891,813

Source: INSD, Population Projections 2007 to 2020 by Region and Province, 2009

The problem of satisfaction of social needs arises, given the structure of the population, which is characterised by a large proportion of young persons, who constitute dependents. In fact, 49% of the population of the Eastern Region is between 0 and 14 years old; the population aged 15 to 64 represents 48%, while the percentage of people aged 65 and over is 3%.

The population of the region consists of about 68% Gourmantche, the indigenous people of the region. Alongside them are Mossi, Fulani, Zaoussé, Yaana, Hausa, etc. Thus, the main languages spoken are Gurmacema, Moore and Fulfulde.

Finally, in terms of religious practices, there is a predominance of animism, followed by Islam and Christianity.

4.2.1.2. Dynamics of the population

According to the Regional Development Plan, the region is more and more affected by the migration issue. These are generally individual or family migrations, linked to the search for better living conditions, arable land or grazing for cattle.

Individual migration mainly affects young people, who travel to urban centres (Ouagadougou, Fada), looking for work and to the gold sites.

Due to the potential of the province of Gourma (development of natural resources, development of commercial activities), it is an area of attraction and a welcome area for migrants in the region. In addition, the municipality of Fada is the most important transit city in the region, due to the proximity of the borders with Niger and Benin, hence the presence of both national and international migrants on the communal territory.

However, many population movements related to insecurity in some areas are being increasingly recorded.

4.2.1.3. Traditional socio-political organisation

Traditionally, the "Gulmu", the land of the Gourmantche, is divided into principalities called "djema", villages and neighbourhoods, with Fada N'Gourma as its capital. Emperor of the Gulmu, the Numdabo, exercises its power over the entire territory; at the principality level, chiefs inducted by the latter are responsible for the organisation of life in the villages, with the help of dignitaries. Consisting of several lineages, the villages are administered by chiefs, assisted in their tasks by notable individuals. In general, kinship ties exist between families in different neighbourhoods. Thus, there is solidarity and assistance between the latter during social events: births, marriages, deaths, etc. However, we are now witnessing a burst of concessions and neighbourhoods, due to the constraints of modern life (migration, detachment of young couples, etc.).



Photo 2: Notable persons who received the Insuco delegation (Insuco, 28 / 05 / 2019)

Tradition remains strong in the Gulmu, as communities observe customs and practice geomancy (a divinatory technique based on sand observation) that is an integral part of everyday life.

In addition, the traditional socio-political organisation coexists in good intelligence with administrative organisation.

4.2.1.4. Cultural heritage of the Eastern Region and the City of Fada N'Gourma

■ Three borders, two rivers, and cliffs

With a population of about 1.5 million inhabitants, it is one of the least dense regions of Burkina Faso. The Eastern Region has three international borders: with Niger to the east, and with Benin and Togo to the south. To the north, the Eastern Region touches the Sahelian zone. In the west, it comes to its end with the rise of the Mossi plateau.

Several rivers and waterways are spread over two watersheds: the Volta River and the Niger River. To the south, the Pendjari flows towards Lake Volta in Ghana from the Atacora Mountains in Benin, separating it from Burkina on its upstream part. To the west, the Kompienga heads south and meets the Pendjari in Benin a few kilometres from the border. On the way to the north of the region, three parallel rivers originate in Burkina Faso and cross the country to the east to reach the Niger River: the Tapoa, Bonsoaga and Sirba.

■ **Rare topography: the cliffs of Gobnangou**

Forming a ridge north of the Pendjari watershed, the cliffs of Gobnangou stretch between Tansarga in the province of Tapoa and Madjoari in the Kompienga. Quite irregular and generally low (maximum 100m), the cliffs nevertheless offer a unique character to the region by allowing the observation of grandiose panoramas. **Composed of hard and solid sandstone, the cliffs also constitute a playground for climbing enthusiasts**, who are careful not to disturb the baboons and birds that reside there. By venturing deep into it, you can discover amazing "sacred" springs and bathe under beautiful waterfalls in the rainy season.

■ **Culture and heritage: two strong potentials**

With its protected natural areas and its very prominent culture, the East has two major forces for its economy. Burkina Faso is also implementing development strategies to stimulate its sectors.

The Gourmantche people are mainly present in Burkina Faso, Niger, Benin and Togo. This demographic distribution recalls the past borders of the territories of Gourmantche influence. Today, most of the Eastern Region of Burkina Faso corresponds to former Gourmantche country. The regional capital, Fada N'Gourma, is the city of the kings of the Gourmantche kingdoms. The economic heart of the region, it is home to some of the key elements of its ancestral cultural traditions.

It is said that the first Gourmantche arrived in this region after leaving present-day Nigeria. **They would then have found in the Gobnangou Cliffs a strategic place to settle.** In fact, the soil there is fertile and the cliffs offered many hiding places in case of attacks. Water gushes from some springs from the cliffs all year round, which permits long-term sieges. We also encounter many cave remains (houses, granaries, paintings and mills) while hiking in the cliffs.

- **The legend of Nalambou Hill in the city of Fada N'Gourma**

Nalambou, a mysterious mountain in Fada N'Gourma: a source of "happiness" for those who believe in it.

"In addition to their science of predicting the future, the "sand tappers" of Gulmu have a fetish, the "Nalambou" (the tongue of a cow in gourmantchéma), which is supposed to open the doors of "happiness" to men who confide in him. A visit in mid-July, on the mountain that houses the fetish, permits us to meet guides and witnesses.

After a few swerves on the tangled trails into the bush, a stone's throw from the city of Fada N'Gourma, we find ourselves at the foot of a mountain, the one that houses the fetish of fortune, the Nalambou. A resident who confided in this mountain became chief and has 17 children already.

At 9: 30 a. m. on Thursday, 18 July 2013 the place is peaceful and atmosphere refreshing after the rain that fell during the previous night. Nalambou swarms with people every Thursday night until Friday morning, days conducive to sacrifices and other rites that can make you happy. "There are days for sacrifices among Gourmantche," says Laurent Nassouri, a local guide who is also the secretary general of the Association for the Defence and Promotion of Gourmantche Culture (ADPGC).

At his request, the prior purification of the premises is performed. Mr. Nassouri then advises everyone to pick up three pebbles that he will throw one by one on the mountain, a rite supposed to have driven out evil spirits according to him. The man, clearly talkative, masters this place well like the back of his hand. "The strength of it is the content and not what you see," he warns, while reassuring the effectiveness and reliability of the fetish: "In the way that the mountain is great, the power is also great like that."

A slew of mysteries naturally surrounds this mountain. "Most often, when we get here, we find wild guinea fowl or groups of monkeys, or other wild animals. But if we go around the mountain with our hunting dogs and search to the top of the mountain, we find nothing," recounts the guide, visibly pushed by these amazing things.

The Nalambou gave him the chieftom and 17 children. For the guide, there are many mysteries around the mountain but it is not appropriate to tell everyone. He shows us a hut containing a canary containing sacred objects. "That's all we can show you," he says, prohibiting us from taking photos. He makes it clear that there are still small sacrosanct places, hidden somewhere at the top of the mountain, that only the initiates are allowed to visit. One can, however, take comfort in the testimonies of those who have resorted to the mountain and its spirits. The sixty-year-old chancellor of Fada, Onadja Tiédano, has become a flourishing leader thanks to the fetish. "If nowadays you have power and children, you also have money, so happiness has smiled at you; I have 17 children and I continue to do so," he says with a smile. "If you put money first, you will certainly lose your dignity," he adds, sitting in front of his hut smelling the fresh air of the morning. And as the saying goes, he who holds the reins holds the purse, this traditional leader refuses in this case to ask the fetish for money and considers himself at least happy. In any case, he does not doubt authenticity of the Nalambou, a source of happiness for all those who believe in it. "It's a protective fetish. He gave to me several times what I asked him to do," he reassures us. The regional director of culture, Saidou Sinini, also agrees with the chief. He is convinced that if people continue to frequent the premises, it is because they really find their way. In any case, he claims to have respect for everything related to the sacred. "The mountain is like the Kaaba, when you look at it's a rock, where people go to pray and are answered (. . .) Anyone who also confides in the mountains and their minds, if they believe, what they want, as if by coincidence, it comes true. " Spirits capable of bending an army. Another advantage of this mountain of happiness is when a problem arises in the community. It is enough to set an ox on fire in accordance with the rules, to find the solution, according to the guide Nassouri. But, he admits, spirits no longer respond systematically as they once did because of the negligence of their king. Otherwise, the lack of rain would not constitute a real threat. "Just come and ask for rain and before people even leave the premises, the rain falls," he said. However, the guide Nassouri still recounts that during the revolution, the Burkinabe army wanted to erect a firing range from the mountain, despite the disapproval of the inhabitants. But as soon as the work began, the Caterpillar was split in two. The soldiers quickly retreated and the work was abandoned. "There were always carcasses of the Caterpillar here. They were only recently taken away by people," reveals the guide. He goes on to say that a French commander and his wife, also stubbornly built their house on the mountain, had to leave this haunted place late one night, when their house was invaded by a swarm of bees sent by the spirits of the mountain. The house abandoned by the couple has obviously disappeared, but its traces still remain. The Protestant king doesn't believe in all

these things. In addition, there are problems within the custodians of tradition. The current Gourmantche king has been accused of moving away from customary values and beliefs by crystallizing all his energy on his professional occupations. Moussa Thombiano wants to be clear: "However, it is thanks to his status as king that he has reached where he is today (deputy). " Most of our interlocutors agree that it is necessary for the Gourmantche to vote sooner or later, for another king, preferably an illiterate, who will actually take care of this matter of traditions. In addition, they feel that the current king, being Protestant, is not predisposed to look in the same direction as them because his religion and customary beliefs do not have the same obligations. From their point of view, this is a hindrance to the perpetuation of traditions within the community. To enhance the value of these sacred riches, or at least what is left of it, the regional director of culture and tourism, Saïdou Sinini proposes that the road construction projects build ramps in the direction of the surrounding tourist sites. "That is what I would have done if I was Prime Minister," he says. He also proposes that access to these sites be paid to generate fees that will be reinvested on site. For his part, the Nassouri guide wants the local authorities to be more involved in the management and promotion of tourist and cultural sites. He says that he has taken steps in this direction, but that his contacts always procrastinate in their decision. The wish of all is that the king's convictions be favourable with the happiness of his people, who can only be found at the foot of a mountain. "

Source: Website: <http://news.aouaga.com/h/12033.html>

4.2.1.5. Administrative organisation

Administratively, the Eastern Region has five (05) provinces, 27 departments and 806 villages. It is divided into 27 municipalities, 22 of which are rural and 5 urban, all with legal personality and financial autonomy and headed by elected mayors. Provincial capitals are the urban municipalities: Bogande, Diawara, Fada N'Gourma, Gayéri and Pama. Fada, the capital of the Province of Gourma, is at the same time the capital of the region.

The central authority is represented regionally by the Governor, supported by High Commissioners in each province. They coordinate actions of the decentralised services of the State and other actors. As for the departments, they are administered by Prefects.

Most ministries are represented at the regional level by their regional office based in Fada. A few are decentralised up to the provincial level with provincial branches installed in the capitals and sometimes even at the departmental and even village level.

4.2.2. Basic social services

4.2.2.1. Education

Like all regions of Burkina Faso, the education system in the Eastern Region includes pre-school, primary, post-primary and secondary, literacy and non-formal basic education, technical and vocational training.

■ Pre-school

According to the 2017 / 2018 statistical directory of pre-school education, the Eastern Region has a pre-school rate of 1.1% compared to 4.1% at the national level. Concerning the teaching infrastructures, there are 28 structures and 66 rooms distributed as follows:

Table 22: Breakdown of the region's structures and activity rooms by status for the year 2017 / 2018

Community Structures		Private Structures		Public Structures		All	
Structures	Rooms	Structures	Rooms	Structures	Rooms	Structures	Rooms
3	5	14	29	11	32	28	66

Source: DGEES / MENA, Statistical Yearbook of Preschool Education 2017 / 2018

With regard to the municipality of Fada N'Gourma, there are essentially three (3) public Sensitisation and Pre-school Education Centres (CEEP) and ten (10) private CEEP (Source: PCD of the municipality).

The difficulties encountered by these structures are the lack of teaching materials, the non-payment of school fees by parents, the lack of official recognition of some of them, the lack of support from the city hall, the lack of ongoing training of the educators, etc.

■ Primary education

According to 2017 / 2018 *Statistical Yearbook of Primary Education*, the gross school enrolment rate in the Eastern Region is 54% for boys, compared to 53.7% for girls. The province of Gourma has a gross school enrolment rate of 59.7% for boys and 52% for girls.

For the year 2016-2017, the municipality of Fada N'Gourma had three Basic Education Constituencies (CEB), 132 schools including 109 public schools and 23 private schools, with a predominance of schools with three grades.

The following Table presents the number of schools and classrooms by province and by status in the entire Eastern Region:

Table 23: Breakdown of primary schools and classrooms by province and status for 2017 / 2018

Province	Status	Schools	Classrooms
Gnagna	Private	22	76
	Public	361	1392
	Total	383	1468
Gourma	Private	43	154
	Public	301	1295
	Total	344	1449
Komandjari	Private	3	7
	Public	112	611
	Total	115	618
Kompienga	Private	2	6
	Public	74	404
	Total	76	410
Tapoa	Private	25	107
	Public	324	1158
	Total	349	1265
Eastern Region	Private	95	350
	Public	1172	4860
	Total	1267	5210

Source: DGESS / MENA, 2017 / 2018 Primary Education Statistical Yearbook

■ Post-primary and secondary education

According to the post-primary and secondary education statistical yearbook, the gross enrolment rate in the Eastern Region is 27%, compared to 38.4% at the national level. The rate broken down according to gender is 28% for boys, and 25.8% for girls at the regional level, compared with 38.3% for boys, and 38.6% for girls nationally. These low rates recorded in the region are linked, among other things, to the plethora of classroom enrolments, to the lack of infrastructure and of teachers, which does not favour better supervision of students, and the lack of financial resources for parents, etc.

With regard to the girls, in addition to these factors, the low school enrolment rate is explained by factors such as early and forced marriages of girls, unwanted pregnancies, etc.

Table 24: Post-primary and secondary establishments in the Eastern Region

Region	Status	General, technical and vocational education	Classrooms	Number of students	% of girls
East	Public	127	885	53,095	45.1
	Private	84	433	25,306	48.1
	Total	211	1318	78,401	46

Source: DGESS / MENA, 2017 / 2018 Statistical Yearbook of Post-Primary and Secondary Education

4.2.2.2. Health

■ The situation in the region

The Eastern Region, like other regions of Burkina Faso, is subdivided into operational health entities: the districts that, here, almost follow the territorial boundaries of the provinces.

At the end of 2018,³ the region had 158 CSPS and clinics, 95.3% of which meet minimum personnel standards (compared to 84.8% on the national average); 6 MC; 4 CMA and 1 hospital. There are also 15 private health facilities and 48 private medicine depots. On average, it is necessary to travel 9.8 km to reach a health centre while the national average is 6.4 km. The per capita coverage ratio is 1 CSPS per 11,544 inhabitants compared to a national average of 1 / 9,645. Finally, 43.8% of the population lives beyond 10 km from a health centre versus a national average of 21%. All of this makes the East a relatively disadvantaged region in terms of health. The region had 1,659 agents in all categories.

In 2018, the Eastern Region recorded 2,537,916⁴ cases of care, of which 252,270 (9.94%) were in the CMA and hospital. As for the hospital, it recorded 15,764 (0.62%) new cases of consultations, including 3,986 children under the age of 14. The number of contacts per capita per year is 1.28 (1.54 in Fada N'Gourma) compared to a national average of 1.22. Children under the age of 5 are 3.28 versus a national average of 3.09. The Fada N'Gourma hospital treated 49,465 pathologies of 30,636 patients. The dominant pathologies treated are presented in the following Table:

Table 25: Reasons for consultation at the Eastern peripheral level

Pathologies	Number of cases
Malaria	1,083,749
Pneumonia & Broncho-pneumonias	650,248
Non-bloody diarrhoea	138,041
Intestinal parasitosis	53,765
Rhino-pharyngitis	51,359
Dysentery	44,154
Wounds	34,770
Other affect. App. Digestive	31,810
Skin condition	25,514
Stomach ulcer	24,384

Source: Fada N'Gourma Hospital, 05/28/2019

³ 2018 National Statistical Yearbook of the Ministry of Health

⁴ Nosology of the cases

Table 26: Reasons for consultation at Fada N'Gourma Hospital

Pathologies	Number of cases
Infectious and parasitic illnesses	109,727
Respiratory related illnesses	42,047
Intestinal Infectious Diseases	14,383
Digestive related illnesses	13,757
Lesions and trauma	10,119
Eye related illnesses	8,474
Pregnancy - childbirth - postpartum care	7,006
Genito-urinary, organic illnesses	6,467
Poorly defined symptoms / signs / morbid states	5,947
Haematopoietic, blood & organic illnesses	5,333

Source: Fada N'Gourma Hospital, 05/28/2019

Mortality in the East is 11.8 deaths per 1,000 inhabitants and maternal mortality is 100.3 deaths per 100,000 women in labour.

In area of prevention, the Eastern Region, for example, has 99.5% vaccination coverage of Pneumo 3 versus a national average of 102.4%; 89.2 of Rota 3 compared with a national average of 92.7%, and 92.6% of Mena versus a national average of 88.9%. Overall, immunisation coverage is below the national average.

With regard to epidemiological surveillance, the East recorded 197 meningitis cases including 14 deaths; 455 cases of measles, 5 cases of bloody diarrhoea including 3 cases in Fada; 778 cases of acute respiratory infections, including 4 deaths and 1,118,421 cases of malaria, of which 51,747 serious cases resulted in the death of 433 people. In addition, 2 probable cases of dengue have been reported to Fada N'Gourma. The epidemiological monitoring system in the region is satisfactory and is strengthening with the new approaches of the Health Emergency Operations and Response Centre (CORUS). In addition, attention should be paid to the risks associated with previously-mentioned illnesses in all phases of the development of the CHRU construction project, both for workers and for the population.

As for **awareness-raising activities**, they affected 88,406 people concerning malaria; 13,033 concerning STI/AIDS; 43,990 concerning hygiene and sanitation, including 7,723 in Fada N'Gourma District and 12,736 on diarrhoeal illnesses, including faecal peril. An effort must be made to raise awareness and support people concerning hygiene and sanitation issues.

In terms for monitoring adverse events, the Eastern Region reported 3,877 cases of MAP I in 2018, including 5 serious cases. The district of Fada N'Gourma alone reported 2,429 cases, or 62.65% of cases in the region.

11 cases of accidents of exposure to biological liquid were noted for which 9 required ARV treatment of the health workers involved.

As for the medicine supply chain, it has the same characteristics as the whole country with less performance. In fact, 23. 6% of DMEGs did not experience a break versus a national average of 13%.

Despite good scores of health centres that meet people's standards, it must be recognised that efforts must be made to guarantee quality health care adapted to the populations of the East. For this purpose, it is important to:

- Bring the primary care closer to populations by reducing the Theoretical Medium Action Radius (RAMT);
- Improve the quality of services via a large technical platform and well-trained medical personnel;
- Have a reference hospital to the highest standards;
- Improve hygiene and sanitation in hospitals;
- Promote community-based health;
- Improve the hygiene and sanitation of the habitat.

■ Study area situation

The restricted study area does not contain any CSPS or CMA. The nearest CSPSs are more than 3 kilometres away. These are the CSPS in sector 7 of Fada N'Gourma and that of Boudangou. The people at the project site benefit from the services of the sector 7 CSPS. This centre provides essential on-site care (curative, preventive and promotional care as well as deliveries) and refers cases of complications to the hospital of Fada N'Gourma.

In general, we note, according to health officials, insufficient human resources, health infrastructures and medical-technical equipment for better care of patients. Buildings, equipment and logistics date back several years and are almost never renovated.

The use of pharmacopoeia by the project area residents is relatively low. In fact, they resort to it in cases of acute illness with recognised low danger (colic, burns, itching, etc.) or in case of diseases associated with the casting of spells on a person. Finally, they also use it for the specific case of epilepsy.

4.2.2.3. Drinking water supply and sanitation

■ Access to clean water:

In the Eastern Region, only 23.8% of households (urban)⁵ benefit from the distribution of running water. This is provided by the ONEA or by SDWS systems. Only 6.9% of households have access to a clean tap. The others are content with public fountains.

Thus, for example, in 2006 there were 3,004 drinking water points (1,176 in Gnagna, 975 in Gourma, 139 in Komondjari, 165 in Kompienga and 731 in Tapoa).

The issue of access to drinking water remains a priority in the Eastern Region, as the population is growing and the pressure on urban areas is growing.

As far as the city of Fada N'Gourma is concerned, the situation is not much better: the ONEA has only 49.4 km for household water service in addition to modern wells, boreholes and hydrants. Applications for water connections are covered for only 28.4% of households. In addition, 54.6% of the population uses hydrants, while 4.4% continue to source water from traditional wells.

In addition, not all areas of the city are connected to the water network. These include sectors 6 and 7 (which the project area covers in terms of health coverage) and peri-urban areas.

In addition, the city's water supply is characterised by frequent shortages due not only to the low capacity of the reservoirs, but also to the lack of underground water resources and the low pressure of the facilities.

We note, however, that the ONEA's production capacity has increased with the presence of two dams in sectors 9 and 10 and the city's water supply works from the Tandiar dam (17 km from the city). One of the major issues for the city on the horizon of the plan will be the question of the drinking water supply. New alternatives should be developed in the face of the foreseeable increase in the urban population. An alternative exists on the side of the Bilanga dam and the Kompienga. "⁶

⁵ Eastern Regional Development Plan (2009-2013) p 33

⁶ SDAU p 97

Table 27: Location of water points in the city of Fada N'Gourma

Sector	Water point	Water supply situation
1	5 boreholes	
2	5 boreholes	
3	The presence of a dam favourable to vegetable and rice cultivation	Insufficiency of boreholes
4		Inadequate water (inadequate water standpipes, clogged wells)
5	3 boreholes	Insufficient drinking water
6	3 boreholes	Inadequate water points (boreholes)
7	Existence of a large water table 3 boreholes + 1 well	Insufficiency of boreholes and public water standpipes
8	1 borehole	Lack of boreholes
9	The existence of a dam	Insufficiency of boreholes
10	The existence of a dam	Weakness of the water supply network and of water standpipes
11	Development of a perimeter downstream of the dam (vegetable gardening and rice farming)	

Source: PCD, 2018.

At the site of this project, there are no water points, much less potable water. On the other hand, within a radius of about 4 km, there are 3 boreholes: that of the University of Fada; a drilled well in sector 7 (periphery of the city) and a drilled well in the village of Boudangou. A traditional well digging test was negative at a depth of more than 10 metres. Depending on the season, the inhabitants of the farming hamlets adjacent to the CHRU site and the occupants of temporary habitats around them, supply themselves with water from these boreholes. The transport of water is the responsibility of the men (25L*4 on motorbikes) and sometimes by women (25L*2 on bicycles) and this, for a minimum distance of 1 km on average. The field observation and exchanges with populations of the farming hamlets and occupants of the temporary habitats also show water consumption of about 25 litres per person per day, including animals. This is well below the DGRE standard which recommends 60l/person/day.



Photo 3: Container interior used to transport and store water in the project area (Insuco, 05/28/2019)

■ Hygiene and sanitation

The situation of hygiene and sanitation is of the greatest concern in the region, characterised by the rapid development of unsanitary conditions linked, on the one hand, to the population boom and the illegal occupation of urban centres and, on the other hand, to the pollution effects related to human activities (agriculture, livestock, industry and crafts).

"In terms of sanitation, the city of Fada N'Gourma is characterised by a very weak network in the urban area and non-existent in attached villages. "⁷

⁷ SDAU. p 106

Finally, the storm water drainage network remains very weak despite the natural outlets formed by the two dams. The storm water pipeline system measures only 2,906 ml and is centred in the city centre, particularly in sectors 4, 5, 7 and 10. These are essentially open gutters used as a dump for people living along the river and are virtually unmaintained. This results in recurring floods in the city.

In addition, "the city does not have an efficient system of solid and liquid waste management. In fact, the collection and disposal of household waste remains in particular the responsibility of the households. This traditional waste management degrades the environment and the living standard. This problem is more pronounced in the management of wastewater and floodwaters. "



Photo 4: Waste deposit in the wild (Insuco, 05/28/2019)

As for household garbage, it is piled up directly in front of concessions or in dumps in the wild, dumps that the city clears. More than 24% of households in the city use the dumps in the wild.⁸ Nearly 18% of households keep garbage in containers and 11% deposit it in controlled dumps and on the street. Within households and across the city, the presence of large and small plastic bags remains significant.

In fact, almost all garbage ends up (i) in dusty contagious suspensions in the city; (ii) in gutters intended for the evacuation of rainwater; or (iii) to a lesser extent in compost.

The municipality also does not have a substantial system of garbage removal, let alone a waste sorting, treatment and recovery centre.

Finally, the management of human excrement remains the weak link in sanitation hygiene in the city of Fada N'Gourma. Nearly 54% of the population uses traditional toilets. As for households, more than 72% use them, compared to 24% for improved toilets and 1% for toilets that flush. In fact, almost half of the population continues to defecate in the open air.

⁸ SDAU. p 106



Photo 5: Excrement deposited not far from the houses in the project area (Insuco, 05/28/2019)

As far as the current hospital of Fada N'Gourma is concerned, the situation is not very good. In fact, the waste management system suffers from several ailments. Not only is the equipment related to it insufficient, but also it is in poor condition. All rooms do not have garbage cans or containers within the standards for sorting hospital waste. With the exception of sharp objects packaged in safety boxes, other garbage is not sorted. The hospital produces an average of 1.2 tons⁹ of waste per month. The incinerator works but its capacity does not allow the disposal of all waste produced in real time; so the waste contained in the garbage bags is stored in the open air and rotting, thus affecting air quality in the vicinity of the incinerator. Once incinerated, ashes are thrown into an open pit with damaged, and therefore not secure, fencing. The same is true of glassware, which is also discarded without proper treatment. The biological liquids are simply thrown into a collapsed open pit without further treatment.

The sanitation of the hospital merits improvement. Almost daily cleaning is provided, but the dilapidated infrastructures and the quality of the interior paint do not make the task any easier. The awareness of patients and patient companions needs to be strengthened to promote good practices in hospital stays and reduce risky behaviour. The hospital does not have a kitchen dedicated to the patients' companions, which entails everyone creating their own space for this purpose. As a result, a kitchen was installed practically in front of the poorly maintained toilets.

Water availability remains a problem: few water points and DLMs associated with the frequent water cuts of the ONEA. The hospital does not have a dedicated water source and the water tower system acting as a reserve is down.



Photo 6 : Bio-medical waste (DBM) stored within the CHR (Insuco, 28/05/2019)

At the site of this project, there is no waste management system. For about 2 km around, we have two scenarios:

⁹ Estimate from data from January to May 2019

Villages and areas with mainly traditional toilets and some ECOSAN-type toilets and farming hamlets (2 essentially) and temporary habitats that have no toilets. In both cases, hygiene conditions are precarious. They do not have a waste management system of any kind. In the farming hamlets adjacent to the project site, the conditions are of concern. The habitats are shared with animals (small and large ruminants as well as poultry) in the dry season or about 8 months per year. In the wet season, small and large ruminants are kept in a paddock adjacent to the restricted area of the construction project.

The animals defecate in the wild area sometimes less than 20 meters from the houses and all around the hamlets. We note the specific case of a part of area that is relatively high and for which the drainage inevitably brings the excrement back to the residences. The gravity flow in the wet season is both towards the hamlet and the restricted site of the CHRU construction project.

4.2.3. Economic activities

4.2.3.1. Agriculture

The main activity of the people of the region is agriculture, which occupies the vast majority of the working population. The region enjoys favourable agro-climatic conditions, with above-average annual rainfall and availability of slightly degraded arable land.

Despite this potential, agriculture in the region is mainly subsistence oriented and is practiced on small family farms. It is characterised by an extensive type system, traditional farming practices and low mechanisation. The main crops are: sorghum, millet, corn and peanuts.

The municipality of Fada N'Gourma still has space and good productive land, particularly in areas of Natiaboani, Nagre, Tanwalbougou and Namoungou.

4.2.3.2. Livestock breeding

The second activity of the populations in the region, livestock breeding, is a significant source of income for households and contributes significantly to the improvement of agricultural production through the use of organic manure and coupled with cultivation. Livestock farming is also characterised by extensive production systems and relatively low productivity in relation to all species: cattle, goats, poultry, etc.

There are mainly three (03) breeding systems in the municipality:

- Extensive sedentary farming, practiced mostly by farmers and which is a living savings to meet some household needs: schooling, health care, family events, etc. ;
- The semi-intensive breeding practiced most often in the city, intended for the market;
- Transhumant livestock breeding practiced by pastoralists and agro-pastoralists, who roam with their animals during the dry season, in search of water and pasture.

4.2.3.3. Forest exploitation

The vegetation in the project's area of direct influence is North Sudanian, mainly composed of wooded savannah in places. Its general tendency is degradation due to anthropogenic pressure because the households consume mainly wood for cooking essentially. The vegetation as a whole remains diverse and lush. Despite the pressure of land and agriculture, the vegetation is characterised by wooded savannah.

The species most exploited by women and farmers are: Shea; Nere; Baobab; Tamarind; Grape; Guardianna; Balanites; Detarium; Xymyna; Diospiros, Sclerocaria.

The species most exploited by breeders are: *Kaya senegalensis*, *Adansonia digitata*, *Ficus sp*, *kapokier*, *Anogeisus leocarpus*, and *Acacia nilotica*.

Wild and avian fauna has almost disappeared, but we do encounter: francolins, guinea fowl, and birds.

Table 28: Existing species exploited by populations

Local name	Scientific name	Name in English	Abundance
Saambou	<i>Vitellaria paradoxa</i>	Shea	Endangered
Thiabu	<i>Lannea microcarpa</i>	African grape	Abundant
Dubu	<i>Parkia biglobosa</i>	Nere (African locust bean)	Endangered
Kankanbu	<i>Ficus sp</i>	Fig tree	Abundant
Siebu	<i>Anogeissus leiocarpus</i>	Anogeissus leiocarpus	Abundant
Namangbu	<i>Sclerocarya birrea</i>	Plum tree	Abundant
Pugubu	<i>Tamarindus indica</i>	Tamarisk	Endangered
Kogbu	<i>Khaya senegalensis</i>	Cailcedrat	Abundant
Tuobu	<i>Adansonia digitata</i>	Baobab	Endangered
A nakoaga	<i>Detarium sp</i>	Detarium	Endangered
Bu gaabu	<i>Diospyros mespiliformis</i>	Diaspiros	Abundant

It is estimated that the products extracted from forests in the project's area of influence are extremely numerous and varied, including agricultural land, grazing areas, wood, forage, shea butter, baobab leaves and fruits, wild flowers and fruits, honey and resins. We can add the making of farm implements (hoe handles and chop-chop handles, etc.), art objects and utensils.

Wood energy is the main source of energy for rural households in area. The availability of wood is therefore an important element of the well-being of poor people, and ensuring their supply of wood is one of the most direct forms of combating poverty. The availability of firewood is therefore an integral part of the food safety of the poor.

In area of influence of the Fada N'Gourma CHRU construction project, non-wood forest products play an important role in the resources of communities. The following examples are given as an illustration:

- The shea fruit (*Vitellaria parkia*) whose pulp is succulent and the nut source of shea butter with multiple nutritional and cosmetic virtues; the bark used as medicine;
- Baobab leaves (*Andansonia digitata*) and monkey bread first of all sought after in culinary art, and secondly in drink and biscuits;
- Kapokier flower cups (*Bombax costatum*) used in the kitchen;
- Tamarind fruit (*Tamarindus indica*) and the young leaves used in the kitchen and as a catalyst in many traditional medicine combinations;
- The fruits of the wild raisin tree (*Lannea microcarpa*) eaten fresh or dried and boiled later to obtain a juice to sweeten boiled and other traditional dishes;
- The bark, fruit, nere seeds and the shell of the fruit are used as medicine, food, the base of soumbala and a catalyst in wall covering and floor coatings for the maintenance and ornamentation of the traditional habitat.

4.2.3.4. Commerce

As a secondary activity, trade develops mainly in the dry season and concerns both men and women, young people and even the elderly. However, it remains a male-dominated activity, particularly in activities that require a fairly high level of investment. Women and young people are mainly specialised in small businesses with lower levels of investment.

Trade essentially involves products such as grain products, manufactured goods, livestock products and handicrafts.

Trading activity in the Eastern Region has increased in recent years due to the construction of important commercial infrastructures, such as the Fada N'Gourma cattle market, which has a sub-regional scope. In addition to this market, the markets in the villages of Nagre, Natiaboani, Namoungou, Koare and Tawalbougou, which are weekly collection points for cattle, are great assets for the local economy.

The animals are transported to Ouagadougou and exported to Togo, Benin, Niger, Nigeria or Côte d'Ivoire.

4.2.3.5. Industry and exploitation of mineral resources

Industry is very poorly developed in the Eastern Region: the main industrial unit is the Société Cotonnière du Gourma [Gourma Cotton Company] (SOCOMA), which specialises in cotton ginning. The region also has small production or processing units in agri-food sector (Fada N'Gourma dairies, honey production unit) and pre-packaged drinking water production units.

With regard to mineral resources, the Société d'Exploitation Minière d'Afrique de l'Ouest [West African Mining Corporation] (SEMAFO) officially launched construction on Friday, 31 March 2016 of the Boungou gold mine in Tapoa province. This mine, which is expected to last seven (7) years, will provide employment opportunities for young people in the region (approximately 735 direct and 476 indirect jobs) and promote the development of a local supply of goods and services. Similarly, the local development mining funds will certainly allow the region to grow.

There are also many gold panning sites throughout the region, with 24 sites currently in operation according to the Regional Board. Gold panning sites attract young people from the region, but we encounter also women and children whether in school or not. Although this activity provides substantial income to the population, it also presents dangers for society as a whole: health risks, moral depravation, loss of schooling of children, risks of pollution, etc.

4.2.3.6. Crafts

Crafts are growing better than industry in the Eastern Region. In fact, the main types of crafts present are: food, textiles, forges, crafts, wood, etc. However, the most common crafts are utilitarian crafts, whose objects are made from local natural resources: woven mats, pottery, and leather products. It should be noted that more and more specialization is being created at the level of women in the region, with the manufacture of traditional loincloths called *Faso dan fani*.

4.2.4. Production support sectors

4.2.4.1. Transportation

The Eastern Region remains heavily landlocked, despite a strengthening of the road network, especially at the rural trails, which have benefited from the efforts of projects and programmes to improve accessibility of populations to production centres. The average density of paved roads is only about 0.021 km/km², that of regional roads 0.008 km/km², 0.011 km/km² for departmental roads and 0.127 km/km² for unclassified rural trails.

Developed trails facilitate access to the provinces of Gnagna, Komandjari, Koulpelogo and Fada N'Gourma, the capital of the region.

National Road 4 (NR 4) linking Ouagadougou - Fada N'Gourma to the Niger border and National Road 18 (NR 18) linking Ouagadougou - Fada N'Gourma - Pama are transnational paved roads that connect the municipality of Fada N'Gourma, the region and the countries such as Niger, Benin and Togo. In addition, the increase in traffic to the Togolese and Benin ports due to the Ivorian crisis in 2011 combined with numerous surcharges, has led to a sharp deterioration of the main roads, which have become difficult to pass. This state of the road network is one of the concerns of the population, because of the difficulties encountered in the evacuation of the sick and the flow of different productions.

The Eastern Region also has 5 airfields, including Fada N'Gourma, Bogande and Arly, which are equipped with navigational-assistance instruments. In addition, the first two are home to ASECNA-controlled weather centres.

4.2.4.2. Energy

Two (02) main sources of energy are used in the Eastern Region: electricity supplied from thermal power plants (managed by SONABEL), and electricity powered by hydroelectric power plants (managed by cooperatives).

Four settlements are supplied by the thermal power plants of SONABEL: Bogande, Fada N'Gourma, Diawara and Pièla. Gayéri is also supplied by a thermal power plant managed by a cooperative.

Only two urban centres have a power grid powered by the Kompienga hydroelectric power plant: it is the capital of the municipality, housing the power plant (Kompienga) and the provincial capital (Pama). The project to extend this energy to the capital of the region is finally a reality thanks to an interconnection with Koupela, a city located 75 km from Fada N'Gourma.

Some 40 village towns have electrical energy supplied by multi-functional platforms acquired through the Multifunctional Platform / Fight Against Poverty (PTF/LCP) Programme.

In addition, solar energy is also used through solar panels to supply health and educational facilities in some villages. Individual generators are also used privately by decentralised services or households.

4.2.4.3. Communication networks

The telephone coverage of the region is provided by operators at the national level: ONATEL for fixed lines; TELMOB, TELECEL and ORANGE for mobile telephones. The diversification of the services offered facilitates communication and even money transfers for different households. However, internet access remains low and internet cafes are scarce. Private access to the internet is mainly seen at the level of decentralised services and in some private companies: hotels and NGOs.

In terms of postal coverage, SONAPOST has offices in Fada N'Gourma, Bogande and Diawara, and a postal agency in Fada N'Gourma and Kantchari from which it covers the needs of all capitals of provinces and departments.

In addition, the Eastern Region has two radio stations: the private Taamba radio station in Fada N'Gourma, the Buayaba rural radio station in Diawara, for which the coverage radius is 60 kms and 50 kms respectively. A third radio station was created as a result of investments related to the celebration of 11 December 2008 in Fada N'Gourma. In addition, the region has been covered since 2005 by Télévision Nationale Burkinabè [Burkina Faso National Television] (TNB) via satellite.

4.2.4.4. Tourism and hospitality

The Eastern Region is home to many tourist sites mainly located in the southern zone, the best known of which are those related to wildlife. In fact, various tourism activities have developed in the provinces of Gourma, Kompienga and Tapoa, due to the presence of important wildlife reserves in these provinces: the vision safari (Arly Park), the photo safari, small and large hunts. The management of this sector is entrusted to concessionaires and the clientele is mainly of foreign origin.

In addition to wildlife, the area is teeming with many other attractive natural sites, including the Gobnangou and Atakora ranges, the cliffs and waterfalls of Lampoanli, Tambaga and Diaboanli, the granites hills (Tangaye, Pama), and the Kompienga caves. There are also sacred or symbolic sites such as the sacred pond of the turtles of Diawara, the sacred hill called Nalambou in the Gourma, the baobab of Diaba Lompo, the cemetery of the kings of Gulmu, the royal palace of the king of Gulmu, etc.

Once a thriving sector, tourism in the Eastern Region is currently suffering due to the growing insecurity in the region and in particular the fact that the region has been placed in a red zone by the French Ministry of Foreign Affairs.

As for the hotel sector, it has not experienced the same growth as tourism, but the organisation of 11 December 2008 in the region has made it possible to improve the offer of hotel services somewhat, especially in the municipality of Fada N'Gourma.

4.2.4.5. Financial institutions

Several financial institutions are present in the region but they are mostly concentrated in the region's capital, Fada N'Gourma. The main banks are ECOBANK, BOA, UBA, SGBB, Coris Bank, BICIAB, etc. In addition to these banks, there are microfinance institutions such as the credit union network, the Fandima Base Association, Coopec Galor, GRAINE LLC, Gourma Mutual Credit and Savings (GMCS), etc.

There is also the presence of national financing funds such as:

- The Youth Initiatives Support Fund (YISF), which funds projects for 18 to 35-year-olds, provided they are trained in entrepreneurship;
- The Employment Promotion Support Fund (EPSF), which finances youth projects with a guarantee requirement;
- The Informal Sector Activities Support Fund (ISASF), which finances youth projects with a guarantee requirement;
- The Burkinabe Economic and Social Development Fund (FBDES) set up under the transition to finance the remunerative activities of young people and women in the form of loans;
- The Professional Training and Learning Support Fund (PTLSF), which supports professional training.

5. Analysis of variants in the context of the project

5.1. Alternatives, project description and environmental issues

In terms of alternatives, there are two possible choices: to carry out or not to carry out the CHRU construction project.

■ “Without project” alternative

Table 29: Advantages and disadvantages of the “without project” alternative

Advantages	Disadvantages
- Inconveniences and temporary nuisances due to the construction; - No disruption to the usual activities of residents; - No involuntary displacement of property and people.	- The dilapidated premises of the current CHR; - The lack of sanitary plumbing; - The lack of electrical circuits; - Many damaged glass openings; - Cracking and degrading of the FOM paint in some buildings; - The failure of the waterproofing of the operating theatre, the neonatology area, the postpartum care area, the laboratory, the dining hall, etc. ; - Blocked storm water drainage channels; - False ceiling ceilings in poor condition (collapsed in some places); - The glass wool thermal insulation of the roofs is very degraded; - Air conditioning and ventilation of faulty and inadequate rooms; - The non-functionality of the homemade incinerator; - The failure of public lighting; - The failure of autonomous drinking water network (boreholes, reserves and non-functional water tower) in a context of scarcity (absence or low flow) of water from the public distribution network of the ONEA; - The lack of amenities for the patient companions (toilets, kitchen, washing area, etc.); - The absence of a resuscitation unit; - The dispersion and layout of all administrative services in the clinical service buildings; - The need for and lack of space, resulting in inconsistent occupation of buildings (the paediatric emergencies unit occupies a room in hospital surgery); - Inadequate layout of the courtyard; - The lack of car parking for users; - The absence of the shelter for the electric incinerator that delays its installation; - The lack of fences and suitable rooms for the mental health service.

The “without project” variant would reflect the absence of the Fada N'Gourma CHRU construction project. Under these conditions, vegetation would remain on the site for the construction of the CHR and there would be no air, soil and water pollution. Nor would there be any possible economic and / or physical displacement of the populations in the project's right-of-way.

This alternative also implies that the objective of the project to improve health indicators in the Eastern Region would no longer be achieved. In fact, people would continue to visit existing health facilities, in this case the current hospital, whose coverage rate, patient reception and care capacity are limited in relation to the population growth and rampant urbanisation. As a result, adoption of the “no-project” scenario would not meet the health needs and improved living conditions of populations

In addition, in the case of a “no-project” scenario, people in the project area would miss an opportunity for job creation and socio-economic development.

→ The no-project alternative ensures absence of construction-related inconvenience, but leaves the risk of a deterioration in the health situation of households across the region.

■ The "with project" alternative

By carrying out this project, we choose to build a CHRU. In this case, one can note the following advantages and disadvantages.

Table 30: Advantages and disadvantages of the "with project" alternative

Advantages	Disadvantages
- Developing leadership and governance in the health sector improving health service delivery; - The development of human resources for health; - Health promotion and disease control; - The development of infrastructures, equipment and health products; - Improving the management of the health information system; - Promoting health research; - Increased health funding and improving people's affordability of health services.	- Noise disturbances (engine noises); - Air pollution from exhaust fumes and dust; - Disturbances and temporary construction nuisances; - Disruption of the usual activities of residents; - Involuntary displacement of property and people; - Loss of flora and disturbance of wildlife habitats; - Soil degradation. The destruction of the flora and habitat of the fauna; - Soil degradation and production of solid and liquid waste; - Settlement and pollution of the soil and water; - Water and soil pollution; - Loss of vegetation cover.

This project to build Fada N'Gourma's new CHRU contributes to the implementation of the 2011 - 2020 National Plan for Health Development, which takes into consideration the Government's ongoing and major health concerns. This plan takes into consideration the sectoral policy of decentralisation of the health system. The purpose of the plan is to help increase national health coverage, improve the quality and use of health services, improve people's financial accessibility to health services, etc.

From the social point of view, the improvement of the health of the local population, the reduction of maternal and child mortality, and probable investment in the social sectors will be seen. From the economic point of view, the design of the project up to its exploitation, through its execution, the economic benefits will be very appreciable. Many materials used in the realization of the civil engineering part of the infrastructures will be acquired in the Fada N'Gourma hardware stores. The workforce will be recruited from the local population.

From the ecological point of view, the loss of plant species during the realization of this project should be noted. This loss is relatively small given that the project will be carried out in a peri-urban area where vegetation was already degraded

→ The "with project" alternative will improve the regional health options, but it involves an involuntary displacement of goods and people on the right-of-way of the site and its area of influence.

In the end, two possibilities emerged for the implementation of the CHRU: (i) an administrative reserve in the urban structure and (ii) the current suburban area of the project. The option of administrative reserve was abandoned because it is occupied by spontaneous settlements.

5.2. Justification for choosing the CHRU site of Fada N'Gourma

The site was chosen by the municipal authorities in consultation with all project stakeholders.

According to them, the site should be chosen on the basis of the following benefits:

- Accessibility / proximity with the city and on a relatively less dense axis in road traffic (widening of the national road . . . Ouagadougou, Pama and Kantchari);
- Acceptability by those potentially affected by the project by choosing the least occupied land possible and involving the prevention of displacement;
- Availability of the desired area: 60 hectares desired at the beginning;
- Culturally symbolic: near the sacred site of Nalambou supposed to look after the population and therefore even more so concerning the patients;
- Environmentally speaking, less restrictive.

In addition, on analysis, the expanded right-of-way area of the current project offered the best guarantee of above criteria and the land control provided by notable persons (in the indigenous area) ultimately tipped in the favour of this suburban area.

5.3. Key environmental and socio-economic issues of the project

The main issues arising from this project are:

- The definitive loss of 6.8 ha of farm land for 02 households;
- The loss of natural trees for the households;
- The loss of natural trees planted for the households;
- The restriction of access to cultural heritage sites (sacred hill and tombs);
- The spread of dust for residents during the CHRU construction and operation works;
- The spread of exhaust gases for residents during the CHRU construction and operation works;
- Noise pollution for residents during the CHRU operation works;
- Disruption of the water network;
- The management of road safety conditions, dust and noise pollution from the equipment;
- Prevention of STI and HIV / AIDS and unwanted pregnancies;
- The economic benefits for the populations due to the consumption related to the project during construction (labour, aggregates, etc.);
- The economic benefits to the population due to the services related to the project during the operation (gatekeeper, surveillance);
- Improvement of the regional health offer.

6. Assessment of potential project impacts

The general methodological approach is based on the exploitation of secondary data from the documents of the new CHRU development and construction project; contact with the relevant institutional actors, in this case regional stakeholders, customary authorities, live information collection and direct observation of the site and the influence of work in order to measure the level of encroachment on occupied areas.

The collection of living data is carried out through interview guides and questionnaire administration; interviews will be individual or in the form of a homogeneous or targeted focus group.

The involvement of stakeholders in the investigation process is based on a search for factual, qualitative or quantifiable data, to enable the ESIA team to objectively assess the scale of environmental damage and during the construction and operation of the project, determine the nature and possible methods of mitigation, compensation and valorisation based on the principles of equity, sustainability, involvement and conciliation and to finally propose an environmental management plan.

6.1. Method of identification and evaluation

Linking the impact-generating activities on the one hand and the components of affected environment on the other, highlights the interrelationships between the project activities and the components of the environment, as well as the main impacts. The receptor environments will be influenced by the project directly or indirectly, negatively or positively to varying degrees during and / or after the CHRU's development and construction.

6.1.1. Activities causing impacts

The consistency of the work was presented in detail in the detailed description section of the CHRU construction project. The execution of such a project will require a certain number of phases.

Table 31: Phasing of the CHRU construction project in Fada

Preparation and construction	Construction / Works	Operation / functioning
- Expropriation and release of right-of-way of the CHRU - Introduction of basic living facility and of the construction site - Deforestation and stripping of plant soil - Recruitment of personnel for construction work - Excavating the foundations	- Traffic densification - Recruitment of personnel for construction work - Presence of labour - Waste deposits from all comers and other waste - Movement of machinery - Welding and thermal cutting - Installation of equipment - Implementation of VRD - Exploitation of quarry borrow sites and of water	- Daily production of biomedical waste - Supply (transport) of equipment and consumables - Operation of the relay electrical generating set and incinerator - Equipment maintenance - Maintenance of the premises - Supply (storage and management) of equipment and consumables - Management of DPC - Oil leaks from engines in car parks - Heating and air conditioning - Cleaning up green spaces and premises - Cleaning work in high areas - Exercise of educational and research activities - Conducting educational and research work - Treatment of sewage and sludge - Treatment of household waste, infectious waste, radioactive waste, biopsies and remains - Transport / movement of patients, transport of medicines and technical medical equipment

- Biological, biochemical and radiological examinations
- Storage and dispensation of medicines and technical medical material
- Miscellaneous maintenance (material and equipment)
- Restoration (cafeteria and kitchen)
- Patient visits and personnel movement

All of these activities will have both negative and positive impacts on the project's integration environment that will need to be analysed in order to propose appropriate measures to either mitigate, compensate (negative impacts) or improve them (positive impacts).

6.1.2. Criteria for determination of impacts

Our characterization of the impacts of the CHRU construction project is based on the method developed by Fecteau¹⁰. It consists of a confrontation between the characteristics of the project and the environment to determine the relative impacts and absolute impacts of the project activities according to the perception that stakeholders and experts have.

This involves crossing the sensitivity of the environment and the severity of the impact according to the following matrix.

Table 32: Method for calculation of the importance of the impact

Sensitivity of the receptor environment	Value of affected item	The impact value corresponds to the importance given by populations to the impacted element. The impact value is high, medium or low.
	Sensitivity of the environment	The sensitivity of the environment corresponds to the fragility of the environment impacted according to its characteristics. Sensitivity is high, medium or low.
Severity of impact (or absolute importance)	Scope of the impact:	The scope of the impact corresponds to the spatial magnitude of the effects that can be produced by an intervention on the environment. It refers to a distance and / or a space in which a medium or element will undergo a change. The scope of the impact may be regional, local or specific.
	Intensity	Also known as the degree of disturbance, it corresponds to the magnitude of changes that affect the internal dynamics and function of affected environmental element.
	Duration of the impact	The duration of the impact is the amount of time that an item will undergo a change. The impact extends over a long, medium or short period.
Relative importance of the impact		The interaction between the value, scope, sensitivity and duration corresponds to the magnitude of the impact. This importance can be major, medium or minor.

Depending on the severity of the impact (absolute importance) and the sensitivity of the receptor environment, the positive and negative relative impacts will be classified as follows:

¹⁰ Martin Fecteau, Comparative Analysis of Rating Methods for Environmental Impact Assessments, research report, University of Quebec, Montreal, 1997.

- Major when the environment is impacted as a whole to the point where its quality is considered irreversible;
- Medium when the environment is impacted, but not as a whole or irreversibly;
- Minor when the environment is impacted only marginally and over a short period of time.

We arrive at the following assessment grid.

Table 33: Evaluation grid of absolute importance of impacts

Intensity	Scope	Duration	Absolute importance
Strong	Regional	Long	Major
		Average	Major
		Short	Major
	Local	Long	Major
		Average	Average
		Short	Average
	One time	Long	Major
		Average	Average
		Short	Minor
Average	Regional	Long	Major
		Average	Average
		Short	Average
	Local	Long	Average
		Average	Average
		Short	Average
	One time	Long	Average
		Average	Average
		Short	Minor
Minor	Regional	Long	Major
		Average	Average
		Short	Minor
	Local	Long	Average
		Average	Average
		Short	Minor
	One time	Long	Minor
		Average	Minor
		Short	Minor

Table 34: Evaluation grid of the relative importance of the impacts

Absolute importance of the impact	Relative value of affected component	Relative importance or total severity of the impact
Major	Strong	Major
	Average	Major
	Weak	Average
Average	Strong	Major
	Average	Average
	Weak	Average
Minor	Strong	Average
	Average	Average
	Weak	Minor

6.1.3. Environmental components affected by the project

The list of different environmental components that can be affected in the project's area of influence is as follows.

Table 35: Environmental components that may be affected by the project

Biophysical environment	Air quality; Sound environment; Soil resources; Surface and ground-water; Vegetation; Fauna and micro fauna; The landscape.
Human environment	Public health and safety; Employment; Tourist and cultural heritage; Traffic; Economic activities; Land; Women's activities; Quality of life and the well-being of people.

6.2. Project / environment interaction matrix

The comparison of the impact sources, the components that can be affected and our impact measurement matrix leads to the following matrix.

Table 36: Matrix of interactions of potential sources of impacts (project elements) and impact receptors (components of the environment)

	Impact Receptors Sources Potential	Air quality	Sound environment	Surface waters	Groundwater	Soil	Vegetation	Fauna and micro fauna	Landscape	Farm lands	Public health and Safety	Employment	Tourism and cultural heritage	Traffic	Transportation	Electricity	Land	Economic activities	Educational and scientific activities	Women's activities / conditions	Quality of life and well-being
Preparatory and construction phase	Traffic densification																				
	Expropriation and release of right-of-way of the CHRU																				
	Installation of basic living facility and the construction site																				
	Deforestation and stripping of plant soil																				
	Recruitment of personnel for construction work																				
	Workforce presence																				
	Excavating the foundations																				
	Waste deposits from all comers and other waste																				
	Movement of machinery																				
	Welding and thermal cutting																				
	Implementation of VRDs and installation of equipment																				

	Impact Receptors Sources Potential	Air quality	Sound environment	Surface waters	Groundwater	Soil	Vegetation	Fauna and micro fauna	Landscape	Farm lands	Public health and Safety	Employment	Tourism and cultural heritage	Traffic	Transportation	Electricity	Land	Economic activities	Educational and scientific activities	Women's activities / conditions	Quality of life and well-being
	Exploitation of quarry borrow sites and of water																				
Operation and Rehabilitation Phase	Operation of the CHRU																				
	Daily production of biomedical waste																				
	Supply (transport) of equipment and consumables																				
	Operation of the relay electrical generating set and incinerator																				
	Maintenance of equipment																				
	Maintenance of the premises																				
	Supply (storage and management) of equipment and consumables																				
	Management of DPC																				
	Oil leaks from engines in car parks																				
	Heating and air conditioning																				
	Cleaning up green spaces and premises																				
	Cleaning work in high areas																				

	Impact Receptors Sources Potential	Air quality	Sound environment	Surface waters	Groundwater	Soil	Vegetation	Fauna and micro fauna	Landscape	Farm lands	Public health and Safety	Employment	Tourism and cultural heritage	Traffic	Transportation	Electricity	Land	Economic activities	Educational and scientific activities	Women's activities / conditions	Quality of life and well-being
Exercise of educational and research activities																					
Conducting educational and research work																					
Treatment of sewage and sludge																					
Treatment of household waste, infectious waste, radioactive waste, biopsies and remains																					
Transport / movement of patients, transport of medicines and technical medical equipment																					
Biological, biochemical and radiological examinations																					
Storage and dispensation of medicines and technical medical material																					
Miscellaneous maintenance (material and equipment)																					
Restoration (cafeteria and kitchen)																					
Patient visits and personnel movement																					

Legend

Positive impacts		Positive impacts	
Positive and negative impacts		Negligible impacts	

6.3. Summary of the results of socio-economic surveys

6.3.1. State and dynamics of the population

■ General demographic data

According to the 2006 General Census of Population and Housing (RGPH), the population of Fada N'Gourma was estimated at 124,577 in 2006 including 62,193 men and 62,384 women in 21,022 households. Projections for the year 2020 give 201,652 inhabitants, of whom 100,981 are women.

The analysis of structures by age group points out a high proportion of young people under the age of 18, therefore a predominance of the dependent population.

The surveyed households were randomly selected within a 2 km radius around the CHRU site. Areas to the west and east of the site where no households were surveyed are areas devoid of dwellings.

100% of the household heads surveyed in the construction of the Fada N'Gourma Regional Hospital University Centre (CHRU) area of influence are men. The proportion of women in the household is 57.38%. In addition, a study of age groups of this target highlights the fact that it is largely adult. In fact, 90% of the household heads surveyed are between 20 and 60 years old. On the other hand, 10% of the population surveyed is in the 61-80 age group. The average age of the household heads surveyed is about 45.85 years.

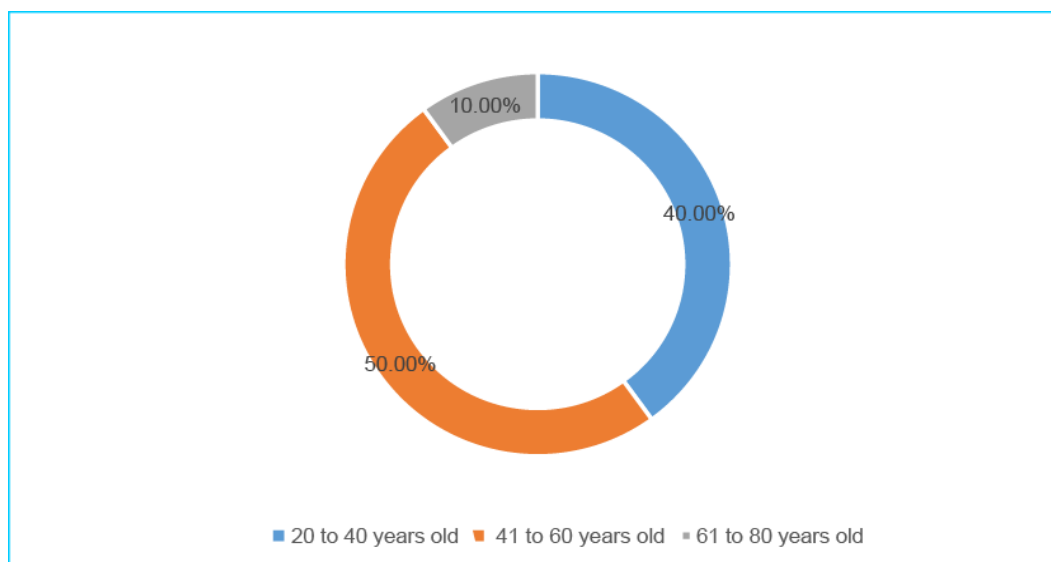


Figure 5: Proportion of heads of households by age range

Concerning the age of the other members of the households surveyed, the average age is about 16 years old, the majority of which are children. In fact, as Table 35 below shows, 75% of other household members are 20 or less; 42% of members are 10 years of age or younger.

Table 37: Proportion of other household members surveyed by age range

	Number of other household members	Percentage of other household members
Between 0 and 10 years old	51	42%
Between 11 and 20 years old	40	33%
Between 21 and 40 years old	25	20%

Between 41 and 60 years old	4	3%
Over 60 years old	2	2%

The average size of the households surveyed is 6.1 members. Table 36 below shows the percentage of households in different ranges of household members:

Table 38: Size of households surveyed

Number of household members	% of households
Between 0 and 3 members	10%
Between 4 and 6 members	45%
Between 7 and 10 members	45%

Overall, and as indicated by average household size surveyed, households are more likely to be households with many members; only 10% of the households surveyed have between 0 and 3 members, while 45% have between 7 and 10 members.

The concession is the housing unit formed by one or more buildings surrounded or not by a fence, where one or more households live. In our case, 70% of household heads are heads of concessions.

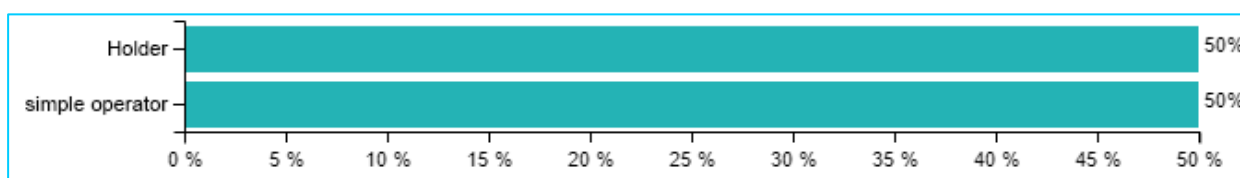


Figure 6: Proportion of household heads being concession managers

65% of household heads have a Burkinabe National Identity Card (CNIB) while 5% of householders have only a birth certificate. On the other hand, those without identity documents account for 30% of household heads.

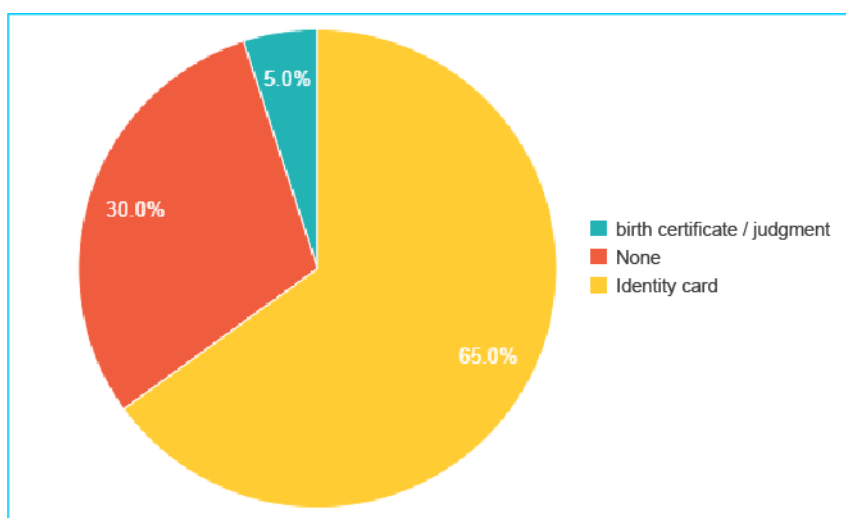


Figure 7: Possession of identity document by the head of household

None of the heads of households surveyed have disabled persons.

6.3.2. Socio-political organisation

■ Socio-political organisation

Traditionally, the "Gulmu", the land of the Gourmantche, is divided into principalities called "djema", villages and neighbourhoods, with Fada N'Gourma as its capital. The Emperor of the Gulmu, the Numdabo,

exercises its power over the entire territory; at the principality level, chiefs inducted by the latter are responsible for the organisation of life in the villages, with the help of dignitaries. Consisting of several lineages, the villages are administered by chiefs, assisted in their tasks by notable individuals. In general, kinship ties exist between families in different neighbourhoods. Thus, we note solidarity and assistance between the latter during social events: births, marriages, deaths, etc. However, we are now witnessing a burst of concessions and neighbourhoods, due to the constraints connected with modern life (migration, detachment of young couples, etc.).

Tradition remains strong in the Gulmu, as communities observe customs and practice geomancy (a divinatory technique based on sand observation) that is an integral part of everyday life.

■ Land management and access to land

Burkina Faso's land system is governed by Law no. 034-2012/AN of 02 July 2012 concerning Agrarian and Land Reform (RAF) that provides that the national land domain, consisting of all land and fixed or related property located within the boundaries of the national territory is automatically property of the State (Articles 3 and 4). However, some lands in the national land domain may be transferred as private property to natural or legal persons under certain conditions. In this case, the lands of the national land domain transferred to full ownership to natural or legal persons must be subject to physical and legal individualisation (Article 66).

In practice, this mode of management of rural land governed by Law 034 coexists with the customary system, embodied by the land head / village chief. Thus, access to rural farm land is essentially by inheritance. The traditional land tenure in Fada N'Gourma is characterised by ownership through lineage of the crop land. Each lineage owns land and its members are allocated portions of land for which area depends on the numerical importance of the household.

The other methods of acquisition, especially for immigrants, are conducted either by attribution by the customary authorities or by loans by the landowners.

However, the rights of exploitation and use of the land do not have the same character depending on the quality of the individual or group. For members of the lineage that holds the right of collective appropriation, these rights are permanent and transmittable to their heirs (men). On the other hand, they are provisional, therefore revocable for any beneficiary who is not a member of the lineage of the land head, the land in this case being simply lent.

There are also emerging modes of land transactions (land sales) related to various factors among which we can emphasise the promotion of agribusiness, urbanisation, etc. As a result, land becomes a commodity that is bought, sold or accumulated in both urban and rural areas.

As far as women are concerned, they have a right of use concerning the land but cannot own it, as long as they move from one lineage to another, through marriage. They therefore operate their husbands' land.

Figure 6 below points out that half (50%) of the heads of households in the study area have land rights under a land loan with simple operating rights, and the other half under their membership in a lineage.

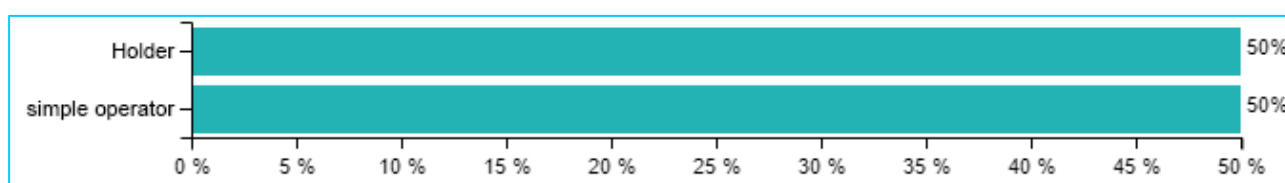


Figure 8: Conditions of access to agricultural land

6.3.3. State of the social and infrastructure sectors

6.3.3.1. The health sector

The restricted study area has no Health and Social Promotion Centre (CSPS) or Medical Centre with a Surgical Unit (CMA). The CSPS is a care unit consisting of at least one clinic, a maternity ward, common services and annexes. The CSPSs closest to the restricted study area are more than 3 km away: the CSPS in sector 7 of Fada N'Gourma and that of Boudangou.

The people at the project site benefit from the services of the sector 7 CSPS. In fact, 100% of the household heads surveyed say they use the sector 7 CSPS in terms of "health services". This centre provides essential on-site care (curative, preventive and promotional care as well as deliveries) and refers cases of complications to the current hospital of Fada N'Gourma.

In general, according to health officials, there is a lack of human resources, health infrastructures and medical-technical equipment for better care of patients. Buildings, equipment and logistics date back several years and are almost never renovated.

The use of pharmacopoeia by the project area residents is relatively low. In fact, they resort to it in cases of acute illness with recognised low danger (colic, burns, itching, etc.) or in case of diseases associated with the casting of spells on a person. Finally, they also use it for the specific case of epilepsy.

6.3.3.2. The education sector

■ Education / literacy level of the household heads surveyed

Overall, the household is characterised by a low level of education. In fact, we find that of the household heads surveyed, 65% have no education while 20% have a primary school level and 15% have secondary school, as shown in Figure 7. In Figure 8 and, regarding the level of education in public schools, 20% of household heads do not exceed primary and 15% secondary.

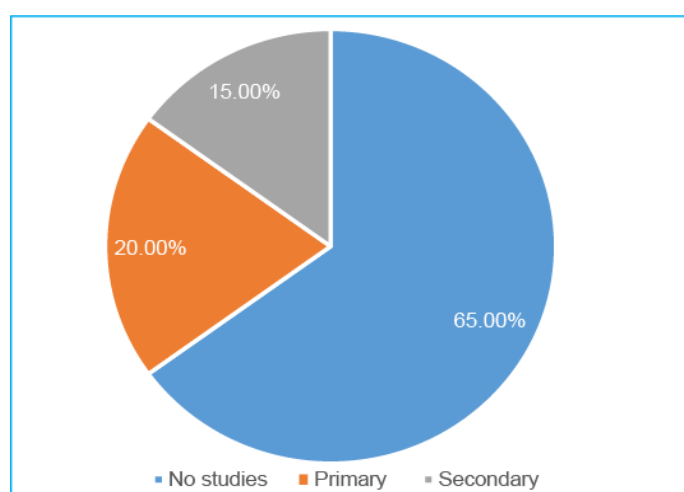


Figure 9: Proportion of heads of household by level of study

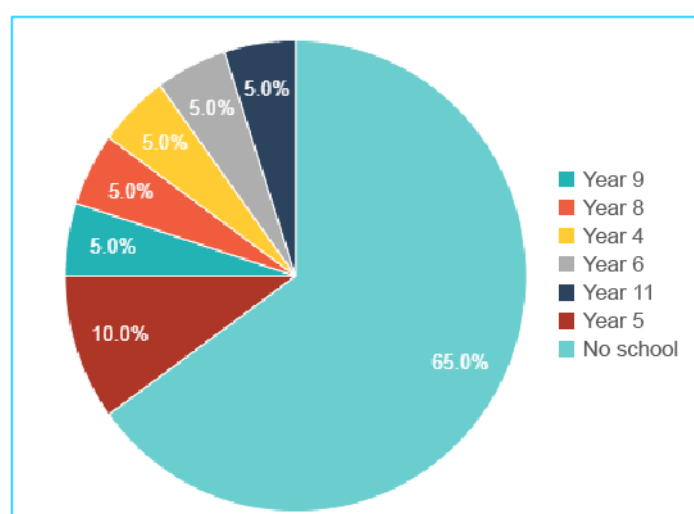


Figure 10: Last class completed by heads of household

For other members of the household, we note that 36% have no education while 45% have a primary school level and 19% have secondary school, as shown in Figure 11 below:

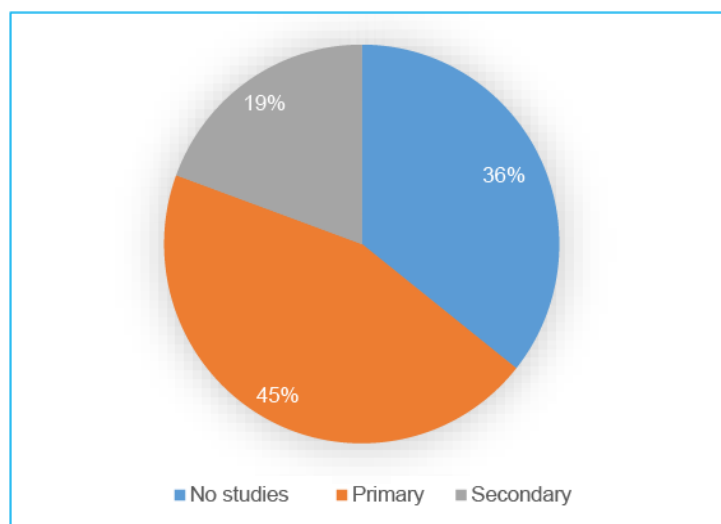


Figure 11: Proportion of other household members surveyed by level of study

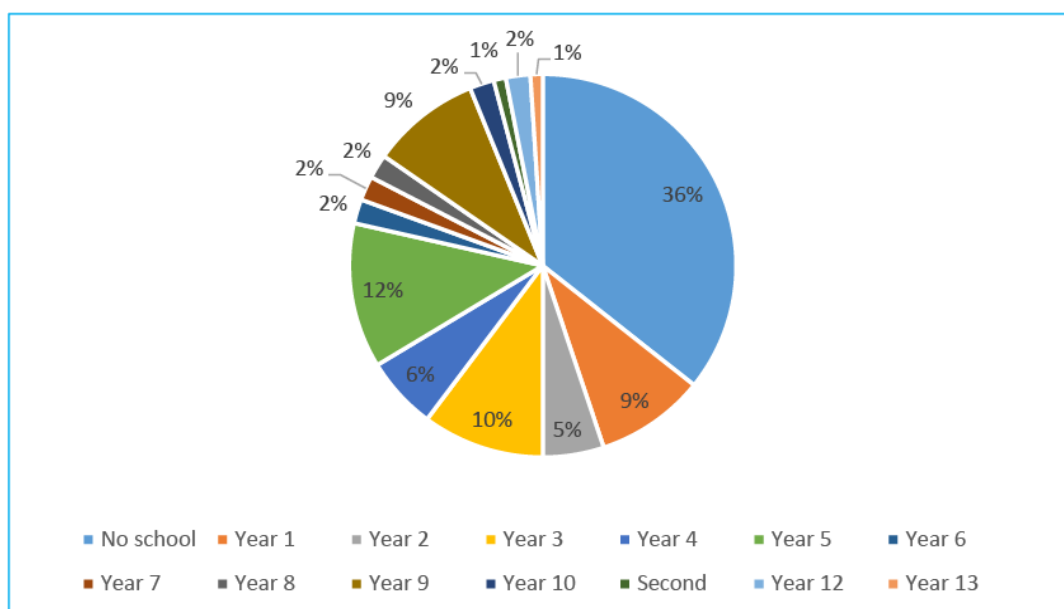


Figure 12: Last class completed by other household members surveyed

These results show a positive change in educational level between household heads and younger generations of households surveyed. In fact, the other members of the households surveyed (the majority of whom are aged 20 or under) go to school more (than the heads of household) and have a higher level of education than those of the heads of household. These results show an increase in school enrolment.

Literacy is a very important socio-cultural characteristic; it permits the population to be segmented into two groups: that of people who can read and write in French or another language, and the other group of people not able to read or write in any language (French or other languages).

In the study area, 35% of household heads can read and write in French compared to 65% of those who cannot read and write in French. As for other household members, 45% of them can read and write in French compared to 55% who cannot read and write in French. Like previous results, this shows an increase in the level of schooling between different generations. Also, as shown in Figure 15, 15% of the household heads surveyed received additional training; for more than half of them (67%) this was additional training in the construction trades.

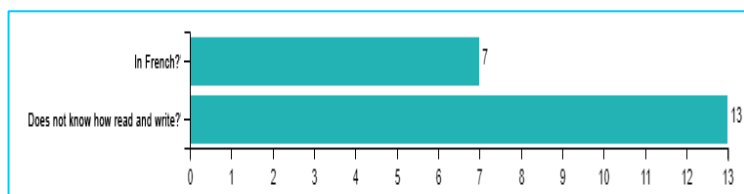


Figure 13: Heads of household who know how to read and write in French or not

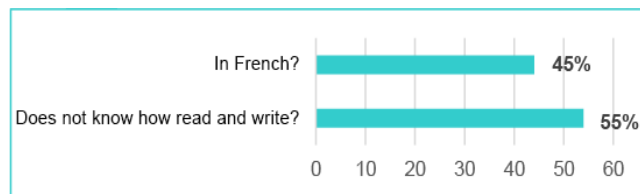


Figure 14: Heads of household who know or do not know how to read and write in French

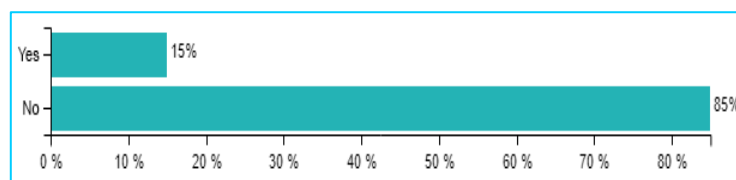


Figure 15: Heads of households having received additional training

6.3.3.3. The social action and national solidarity sector

The municipality of Fada N'Gourma benefits from actions of many NGOs and has many associations and socio-professional organisations.

As part of associations and NGOs, we have:

- The Tin Tua Association, which works in area of literacy, training, income-generating activities and support for the installation of multifunctional platforms;
- The Buayaba Development Association, which supports communities in area of food, forage crops, credit, training / literacy, nutrition, sanitation (household waste cells), etc.
- NEERTAMBA, which intervenes in the development of shallows, the recovery of soils, the strengthening of the capacity of actors, support for pastoral development, etc.
- ACF (development cooperation), which supports people in the development of market gardens;
- GIZ/ZFD (development cooperation), which intervenes in capacity building, crisis prevention in area of communal management of natural resources in connection with cross-border transhumance;
- OCADES (development aid), which intervenes in the capacity building of actors, support for production (food credit);
- Helvetas Suisse Inter corporation (development cooperation), whose areas of intervention are vocational training, entrepreneurship and business management training.

The municipality also has many village professional groups and producer organisations.

6.3.3.4. The water and sanitation sectors

The different sources of water supply are: human powered pumps, the simplified drinking water supply, the wells, catch basins, the pond, the dam or the bottles / sachets on sale.

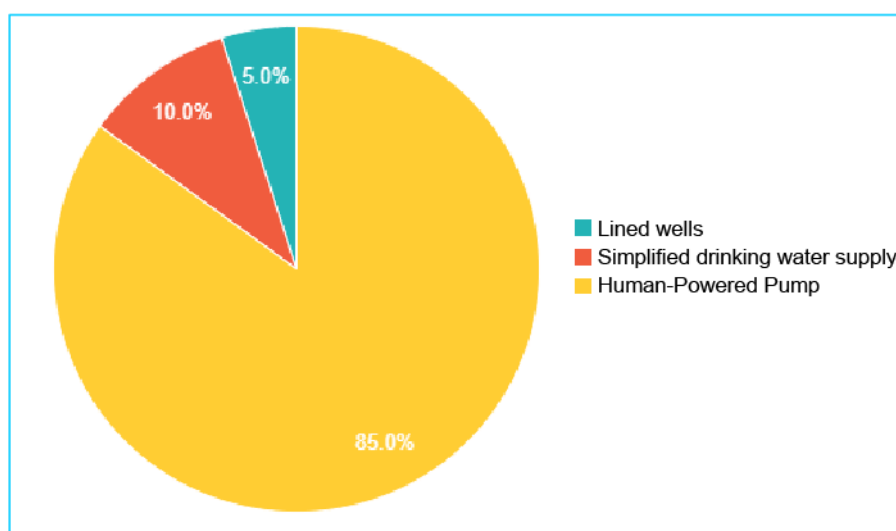


Figure 16: Drinking water source of households surveyed

According to the socio-economic survey data in Figure 16, 85% of surveyed households have access to drinking water through human powered pumps, 10% through a simplified drinking water supply system, and 5% use lined wells.

At the site of this project, there are no water points, much less potable water. On the other hand, within a radius of about 4 km, 3 boreholes are present including: that of the University of Fada N'Gourma, a borehole in sector 7 and a borehole in the village of Boudangou. Depending on the season, the inhabitants of the farming hamlets adjacent to the CHR site and the occupants of temporary habitats around, supply themselves from these boreholes.

From the socio-economic survey, it appears that sanitation or collective hygiene is very limited as the majority of households (85%) have no toilets while 10% have traditional toilets and 5% have improved toilets.

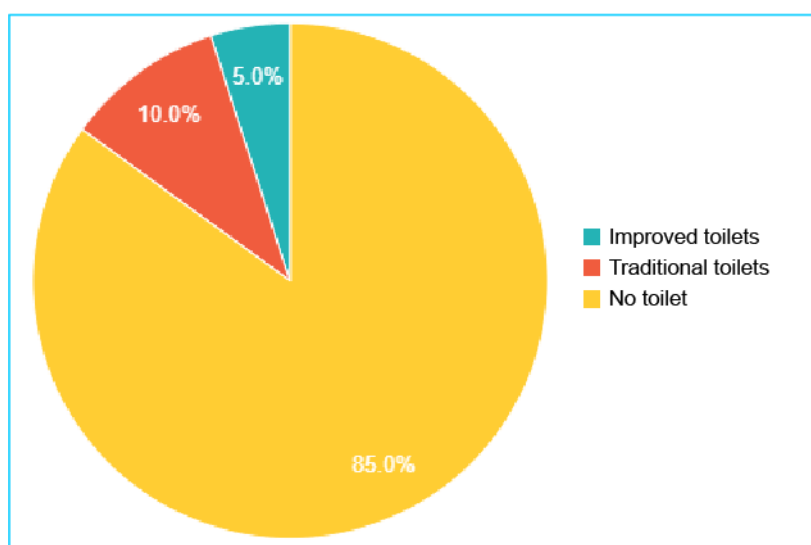


Figure 17: Types of toilets used per households surveyed

6.3.3.5. Sports, culture and tourism

In the area of sports and leisure, the city of Fada N'Gourma has sports fields (municipal stadium in sector 6), a non-functional cinema and a youth house. This notorious lack of quality sports infrastructures does not promote a real development of sports in the city. In terms of tourism, the city of Fada N'Gourma is full of tourist attractions that are the subject of national and international attraction: in this case the baobab bearing the traces of the hooves of the horse of Diaba Lompo, the Hills of Nalambou (located not far from the CHRU site), the Cemetery of the Gulmu Kings; the royal court of Fada N'Gourma, etc.

However, the sector suffers from a lack of investment and training of actors. Added to this is the insecurity that discourages potential international visitors.

6.3.3.6. The homes

All the household heads surveyed own their homes. It should also be noted that the households surveyed use an average of 3 buildings.

During the socio-economic survey, there were 50 buildings built of banco and 10 buildings in cement as shown in Table 39. 33 of these buildings have tin roofs, while 27 buildings are covered with other types of materials such as thatch. Finally, 42 buildings have banco-clad floors, 16 buildings with cement, and 2 buildings, tiled.

Table 39: Building materials of buildings owned by surveyed households

Types of materials	Number of buildings	Percentage of buildings by construction material
Local materials (banco)	50	83%
Permanent Materials (Cement)	10	17%
Other materials	0	0%

Table 40: Roofing materials of buildings owned by the surveyed households

Types of material	Number of buildings	Percentage of buildings by roofing material
Land	0	0%
Sheet metal	33	55%
Thatched roofs / Other materials	27	45%

Table 41: Floor materials of buildings owned by the surveyed households

Types of material	Number of buildings	Percentage of buildings by construction material of the floor
Local materials (banco)	42	70%
Definitive Material (Cement)	16	27%
Tiles	2	3%

The "typical" characteristics found in the majority of household dwellings surveyed are banco buildings, with a tin roof and a banco floor.

6.3.3.7. Equipment and means of transportation

Figure 18 provides the proportion of households that own one or more capital goods (radios, televisions, mobile phones, generators, beds, foam mattresses, generators, air conditioners) as well as the means of transportation (motorbikes, bicycles, carts, cars).

The capital goods owned by the majority of households are mobile phones (85%). Radio and television came in second and third place, with 55% and 20% of households owning these goods respectively.

No household has a generator or air conditioner.

Overall, household-owned means of transportation are bicycles (95%) and motorbikes (65%). Only 5% of households own a car. The cart is used by 65% of households for field work and the transport of certain items during construction.

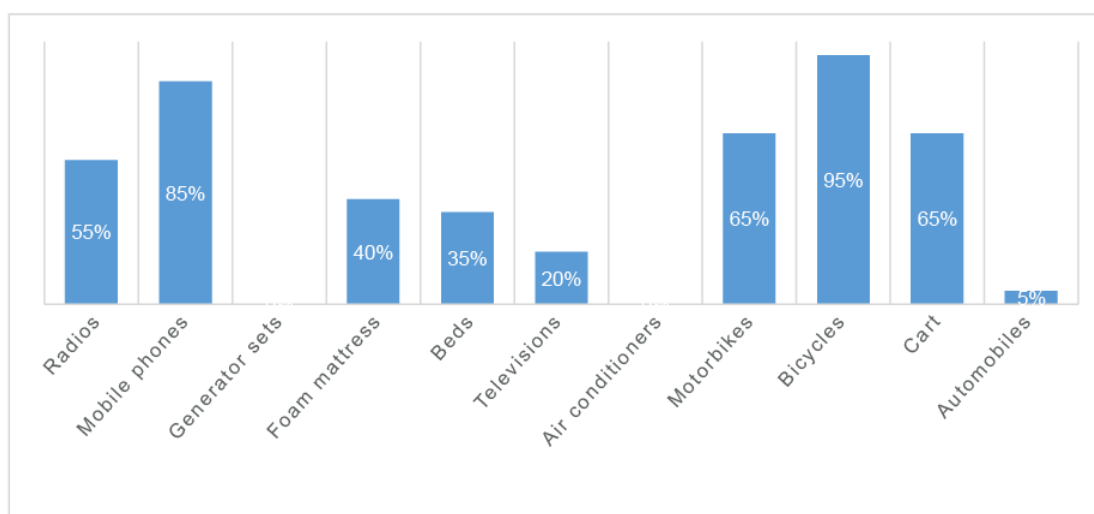


Figure 18: Proportion of households by possession of capital goods and means of transportation

6.3.4. Status of the production support sectors

The sampled socio-economic survey shows that agriculture (exercised by 65% of the households surveyed) is by far the main activity of household heads, followed by livestock breeding (20%), wage work (10%) and the construction trades (5%).

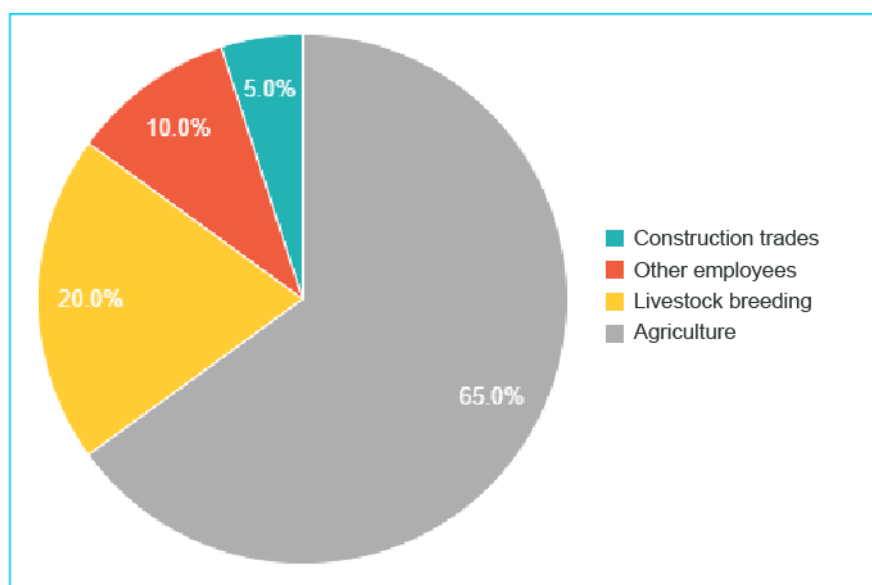


Figure 19: Main activity of the household heads surveyed

For the other members of the households surveyed, as shown in the figure below, more than half (53%) are schoolchildren / students, 21% are mainly involved in agriculture, 12% are in the livestock breeding sector and 7% of them do not work in any activity.

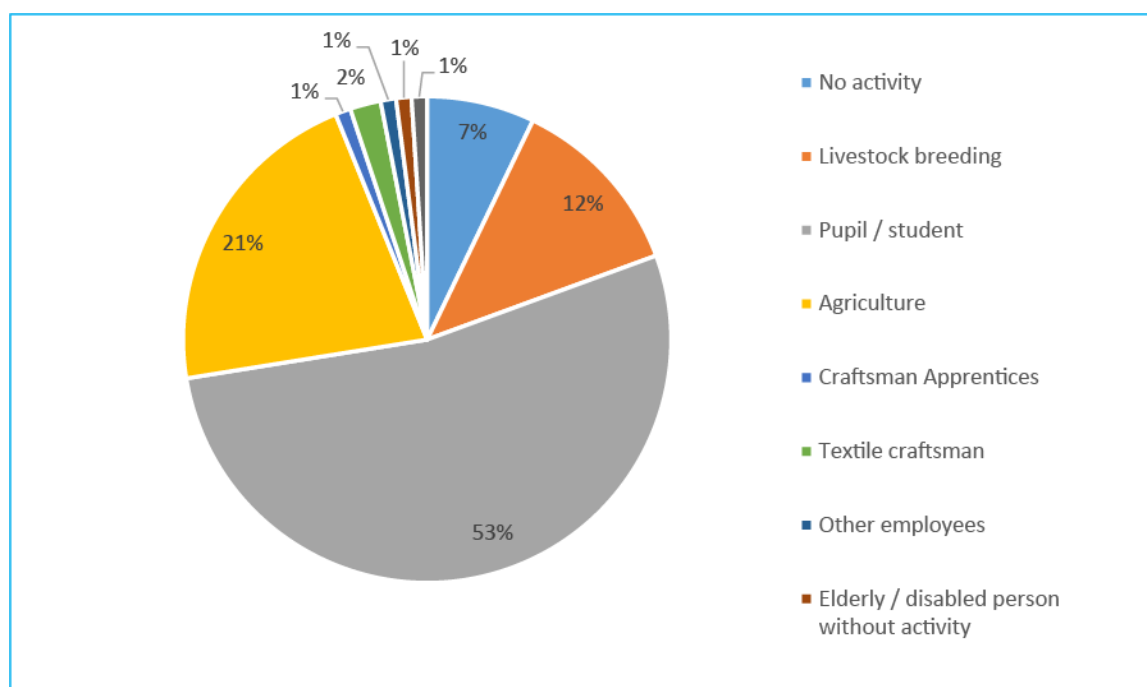


Figure 20: Main activity of other household members surveyed

In addition to being the main activity of household heads, agriculture is also, for 50% of the household heads surveyed, the main source of household income. While 20% of households have livestock breeding as their main source of income, 20% are construction workers and 10% are wage workers, as shown in Figure 21.

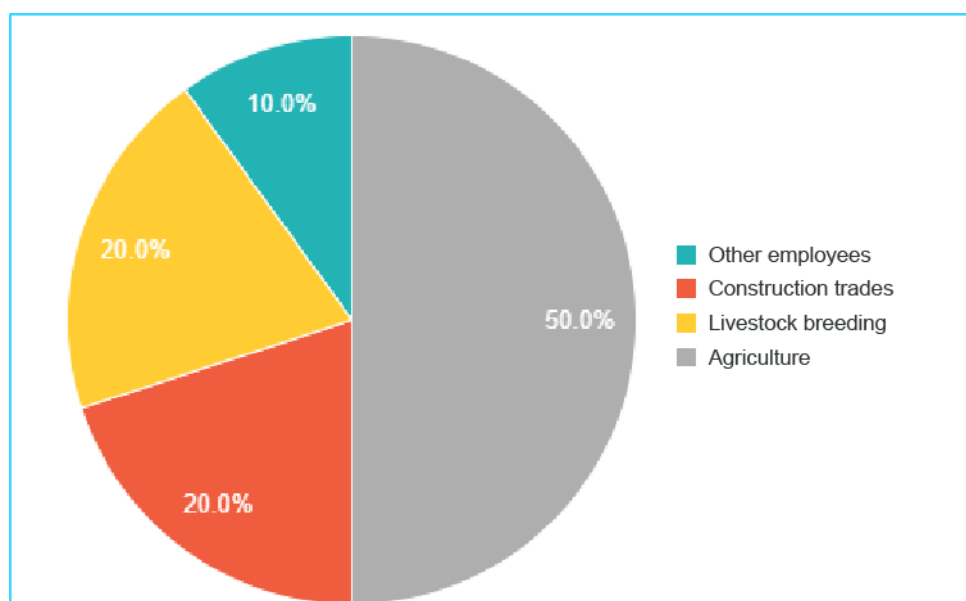


Figure 21: Main source of household income

6.3.4.1. Agriculture

■ The different crops grown by the households surveyed

Farms are mainly focused on growing millet, corn, cowpeas, okra, sesame, sorghum, peanuts and ground peas. The most cultivated crops by households are millet (cultivated by 95% of households) and corn (cultivated by 90% of households). This is followed by cowpeas and okra, which are grown by 80% and 70% of households respectively.

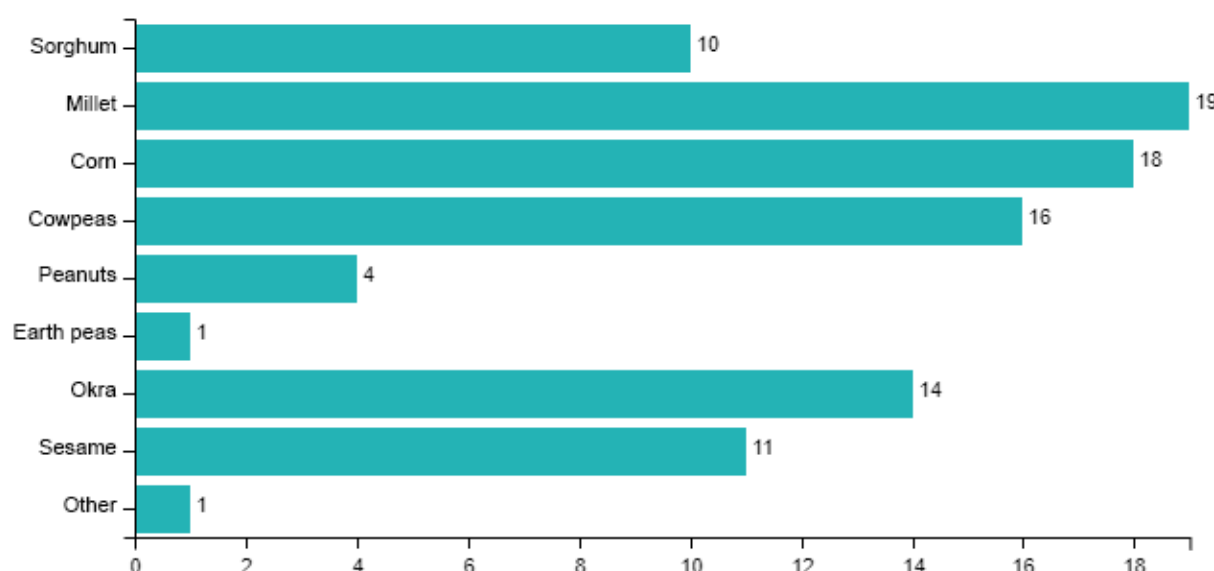


Figure 22: Crops cultivated by the households surveyed

■ Use of chemical fertilisers, pesticides and herbicides in fields

The socio-economic survey highlights the fact that 70% of respondents in agriculture use chemical fertilisers as nutrient supplements to increase crop yield and quality.

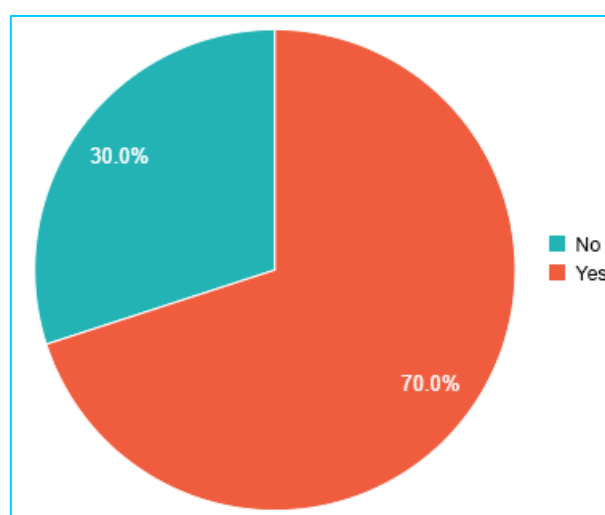


Figure 23: Use of chemical fertilisers by households

According to Figure 24, 85% of individuals with agriculture as their main activity use pesticides / herbicides in the fields.

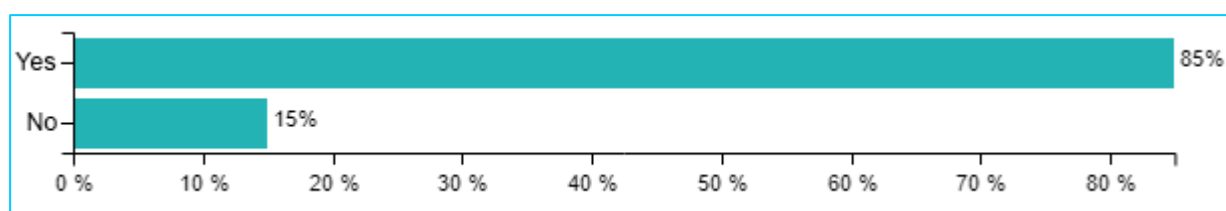


Figure 24: Household use of pesticides / herbicides

■ Crops for self-consumption

As cowpeas, millet / sorghum and market products are the most popular crops in terms of production, it seems therefore appropriate to analyse the self-consumption of these.

For cowpeas, 10 out of 16 households growing it consume 75 to 100%. As for millet / sorghum, 9 out of 19 households growing them consume 75 to 100% of the production. For market garden products, 7 out of 14 households consume 0 to 25% of the production.

The households surveyed have a preference for cowpeas in terms of self-consumption.

Table 42: Number of households per self-consumption proportion of crop

Self-consumed proportion	Cowpeas	Millet / Sorghum	Market gardening products
0% - 25%	1	0	7
25% - 50%	3	7	3
50% - 75%	2	3	0
75% - 100%	10	9	4

6.3.4.2. Livestock breeding

Livestock breeding is, after agriculture, the second source of income for the households surveyed (with construction). Table 43 shows that small ruminants (sheep and goats) and poultry (ducks, chickens, guinea fowl) are the most often owned animal species by the households; then come cattle and camels.

The socio-economic survey shows that it is small ruminants and poultry that are more owned by households. 50% of households own more than 10 ruminants and 45% of households own more than 10 poultry.

As for donkeys, 55% of households own 1 to 5 donkeys, while 45% of households do not.

Table 43: Proportion of households by quantity of the species owned

Number of animals	Cattle	Camels	Small ruminants (sheep and goats)	Poultry (ducks, chickens, guinea fowl)	Donkeys
None	25%	80%	25%	10%	45%
1 to 5	45%	0%	10%	25%	55%
6 to 10	20%	10%	15%	20%	0%
11 to 20	5%	5%	30%	20%	0%
More than 20	5%	5%	20%	25%	0%

Table 44 shows the proportion of households by quantity of the species sold in the last three months prior to the survey. It is clear that all the households surveyed did not sell any of their donkeys. Cattle and small ruminants are the most sold by households. 20% of the households sell their cattle and 45% of the households sell their small ruminants.

The sale of these animals permits different households to cope with certain expenses related to food, schooling for children, health care and various social events (birth, marriage, etc.).

Table 44: Proportion of households by quantity of species sold

Number of animals	Cattle	Camels	Small ruminants (sheep and goats)	Poultry (ducks, chickens, guinea fowl)	Donkeys
None	80%	95%	55%	85%	100%
1 to 5	20%	0%	25%	5%	0%
6 to 10	0%	0%	15%	5%	0%
11 to 20	0%	5%	5%	0%	0%
20+	0%	0%	0%	5%	0%

6.3.4.3. Mines, Careers, and Industry

Industry is very poorly developed in the municipality of Fada N'Gourma: the main industrial unit is the Société Cotonnière du Gourma (SOCOMA), which specialises in cotton ginning. Fada N'Gourma also has

small production or processing units in agri-food sector (Fada dairies, honey production units) and pre-packaged beverage water production units.

With regard to mineral resources, the Société d'Exploitation Minière d'Afrique de l'Ouest [West African Mining Corporation] (SEMAFO) officially launched construction on Friday, 31 March 2016 of the Boungou gold mine in Tapoa province. This mine, for which the lifespan is expected to last seven (7) years, will provide employment opportunities for young people in the region (approximately 735 direct and 476 indirect jobs) and promote the development of a local supply of goods and services. Similarly, the local development mining funds will certainly allow the region to grow.

There are also many gold panning sites throughout the region, with 24 sites currently in operation according to the Regional Board.

6.3.5. Status of the production support sectors

6.3.5.1. Transportation

A major road network crosses the municipality of Fada N'Gourma, from east to west and from north to south. This 179.1 km long network consists of:

- Paved roads: National 4 that connects Ouagadougou to Fada N'Gourma on the Niger border and National 18 that joins Ouagadougou - Fada N'Gourma - Pama;
- Developed trails: which facilitate access from the provinces of Gnagna, Komandjari and Koulpelogo to Fada N'Gourma, the capital of the region. National Road 18 connects Fada N'Gourma to Bogandé-Taparko; Regional Road 3 to link Gayéri and Regional Route 6, which connects Fada N'Gourma to Ouargaye in the Koulpelogo.

It should be noted that the increase in traffic to Togo's and Benin ports as a result of the Ivorian crisis in 2011 combined with numerous surcharges, has led to a sharp deterioration of the main roads, which have become difficult to drive on. This state of the road network is one of the concerns of the population, because of the difficulties encountered in the evacuation of the sick and the flow of different productions.

6.3.5.2. Energy

The main source of energy for almost the entire population of the municipality is firewood, used as fuel.

As far as electricity is concerned, due to weak service and limited household resources, only the city of Fada N'Gourma and the village of Bougi are supplied by the National Electricity Company of Burkina Faso (SONABEL). For example, other villages in the municipality generally use fluorescent flashlights or solar energy for their lighting.

In fact, the main source of lighting for the households surveyed, 50% of them, remains solar energy, as shown in Figure 25.

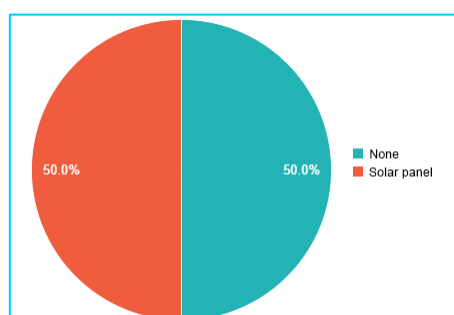


Figure 25: Main source of household lighting

6.3.5.3. Finance and financial institutions

In the study area, only 5% of the household heads surveyed had recourse to credit in the past year. This represents in numbers, 1 in 20 household heads surveyed. It should be noted that this household has had recourse to credit from groups / associations mainly to finance its agricultural activities, and that the loan is currently being repaid.

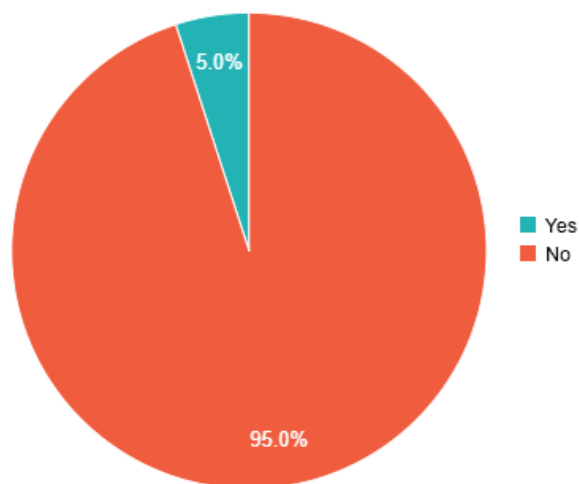


Figure 26: Households having recourse to credit

Of the household heads surveyed, 20% benefited from money transfers (relative in town or abroad) according to Figure 27.

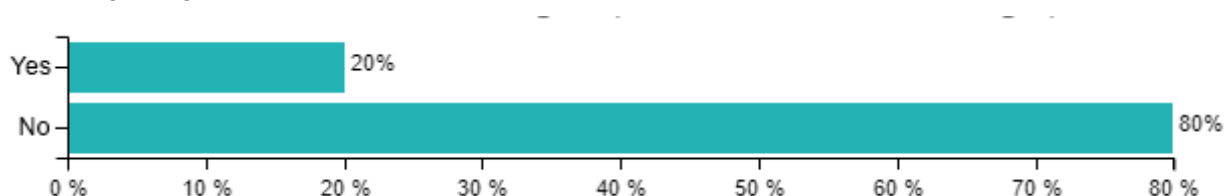


Figure 27: Transfer of money (relative to city or abroad) received by the household

As shown in Figure 28, the main expenditure items in the last six months of the households surveyed are expenditures for beverages and food and education for more than 50% of households. Health and housing / construction expenditures are the second largest expenditure items.

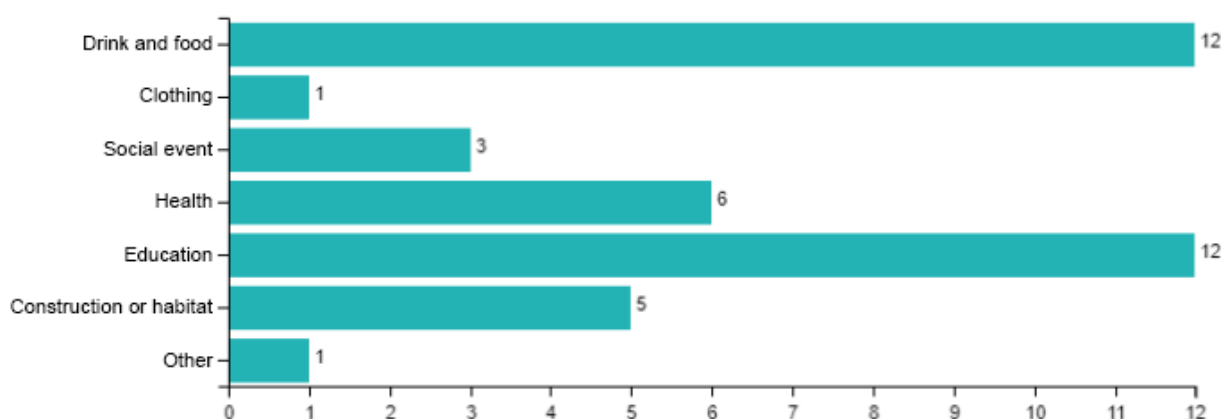


Figure 28: Main items of expenditure of affected households during the last six months

6.3.5.4. Media and telecommunications

The telephone coverage of the municipality is provided by the operators at the national level: ONATEL for fixed lines, TELMOB, TELECEL and ORANGE for mobile telephones. The diversification of the services offered facilitates communication and even cash transfers for different households. However, internet access remains low and internet cafes are scarce. Private access to the internet is mainly seen at the level of decentralised services and in some private companies: hotels and NGOs.

In terms of postal coverage, SONAPOST has offices in Fada N'Gourma, Bogande and Diawara, and a postal agency in Fada N'Gourma and Kantchari from which it covers as best as possible the needs of all the capitals of the provinces and departments.

In addition, the municipality has a private radio station, Taamba radio in Fada N'Gourma, whose coverage radius is 60 km. Another radio station was created as a result of investments related to the celebration of 11 December 2008 in Fada N'Gourma. In addition, the municipality has been covered by the TNB via satellite since 2005.

6.3.5.5. Security

The figure below shows that the sense of security is relative, as 45% of households surveyed do not feel safe (Figure 29). In addition, it should be noted that in terms of security, the population trusts the Koglweogo (50% of the heads of households surveyed) more than the police (15%) and the gendarmerie (35%) and therefore in the security forces.

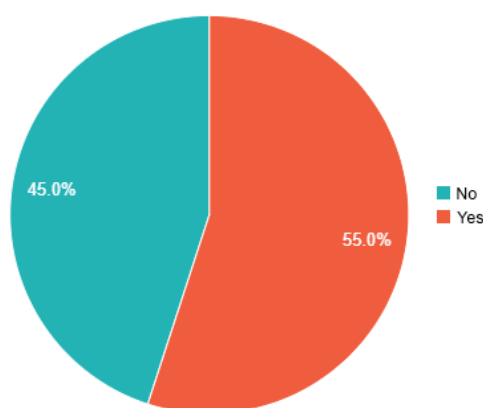


Figure 29: Proportion of the population feeling safe

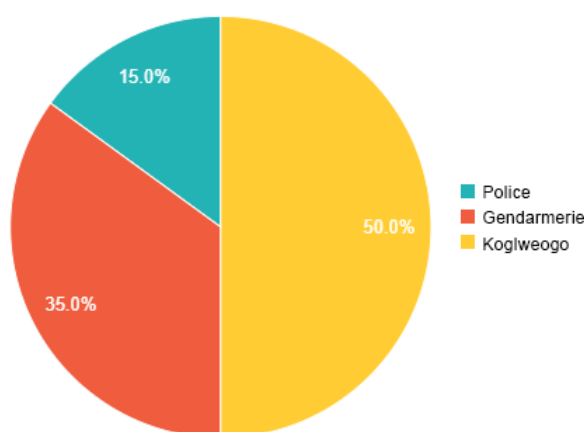


Figure 30: Level of confidence of heads of households surveyed in security institutions

6.3.6. Gender analysis

In general, women take care of all household chores: meals, housekeeping, child care, water chores, searching for firewood, maintenance of the cleanliness of the house, etc. These activities, which occupy

women throughout their daily lives, leave them little time to devote to economic activities. However, the raising of small ruminants and the sale of milk provide them with income for their personal needs and those of their children.

The concerns identified by women relate to conflicts that sometimes arise between farmers and herders, the lack of water points nearby, the lack of resources to carry out income-generating activities, illiteracy, weak decision-making power and lack of control over resources.

6.4. Identification and summary evaluation of potential impacts of the project

The identification and analysis of environmental impacts focused on the main phases of the project, the physical, biological and socio-economic activities of the environment, as well as the project's activities that may have a direct or indirect effect on the receptor environment. The impacts were then evaluated on the basis of the three criteria, which are the intensity, scope and the duration to determine their importance. This exercise revealed that in the preparatory and construction phase, 83% of the negative impacts were of average absolute importance, 4% of major absolute importance and 9% were positive impacts of major absolute importance. In the operating phase, this portrait is of 64% of negative impacts of average absolute importance, 15% of negative impacts of major absolute importance and 20% of positive impacts of major absolute importance.

The CHRU is a structured health project with a rather long lifespan. That is why, in terms of strategies to optimise the functionality of the institution socially, economically and ecologically, it is relevant that a substantial social and environmental management plan be developed and implemented rigorously to ensure better control of the environmental, occupational health and safety risks associated with this project.

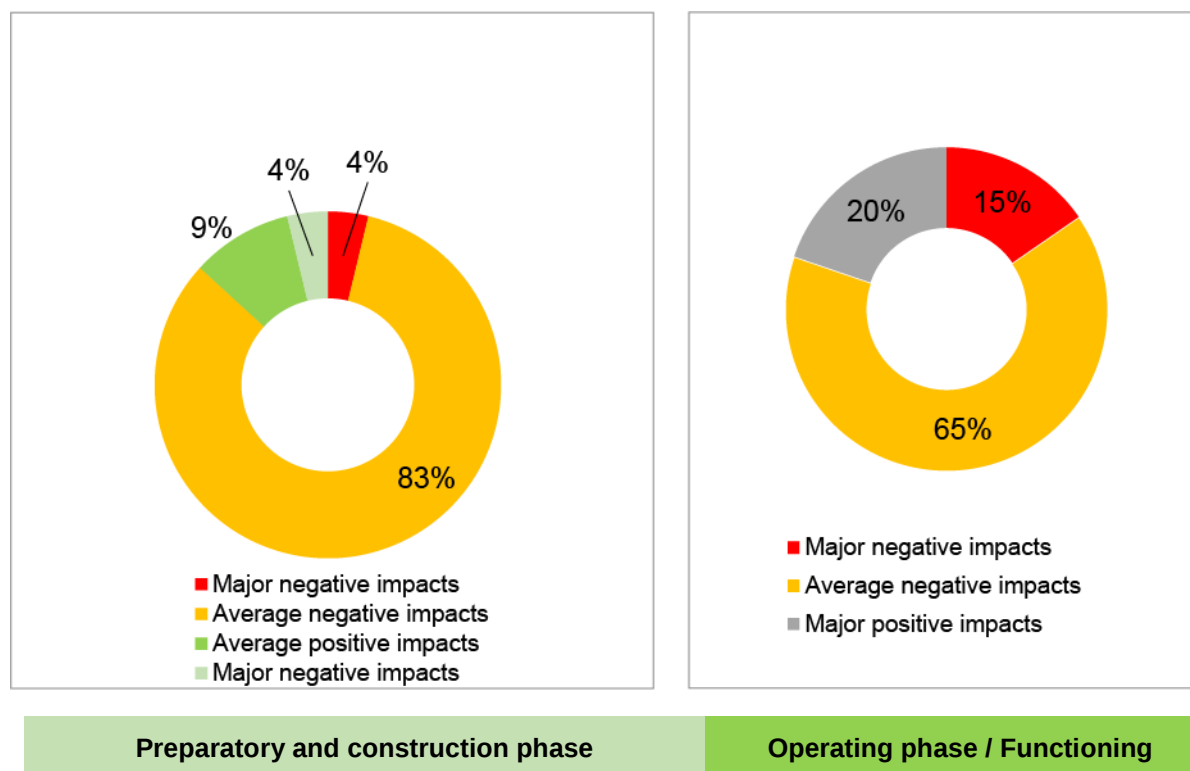


Figure 31: Summary evaluation of potential project impacts

Table 45: Evaluation of the potential impacts of the Project

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Preparatory and construction phase								
Impact 1	Traffic densification	Traffic	Negative	Strong	Local	Temporary	Major	Temporary traffic disruption due to increased traffic
Impact 2	Traffic densification	Health and safety	Negative	Strong	Local	Temporary	Average	Increased risks of accidents
Impact 3	Expropriation and release of right-of-way of the CHRU	Farm land	Negative	Strong	Local	Permanent	Average	Destruction and / or displacement of farm land
Impact 4	Expropriation and release of right-of-way of the CHRU	Employment	Negative	Strong	Local	Long	Average	Deprivation of access to the site for operation of quarries
Impact 5	Expropriation and release of right-of-way of the CHRU	Tourist cultural heritage	Negative	Strong	Local	Long	Average	Restriction of graves and blast furnaces
Impact 6	Expropriation and release of right-of-way of the CHRU	Land	Negative	Strong	Local	Long	Average	Loss of rights to land
Impact 7	Expropriation and release of right-of-way of the CHRU	Economic activities	Negative	Strong	Local	Long	Average	Loss of pasture land
Impact 8	Expropriation and release of right-of-way of the CHRU	Women's economic activities	Negative	Strong	Local	Long	Average	Loss of access to the NWFP
Impact 9	Expropriation and release of right-of-way of the CHRU	Quality of life and well-being	Negative	Strong	Local	Long	Average	Weakening of the livelihoods of residents due to restriction of access
Impact 10	Installation of basic living and construction site facilities	Air	Negative	Weak	Local	Short	Average	Air pollution due to the gases of motorised machinery
Impact 11	Installation of basic living and construction site facilities	Surface water	Negative	Weak	Local	Short	Average	Surface water pollution due to waste discharges
Impact 12	Installation of basic living and construction site facilities	Groundwater	Negative	Weak	Local	Short	Average	Groundwater pollution due to waste discharges

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 13	Installation of basic living and construction site facilities	Soil	Negative	Strong	Local	Short	Average	Breaking down the nature of the soil following compacting
Impact 14	Installation of basic living and construction site facilities	Vegetation	Negative	Weak	Local	Short	Average	The anthropogenic pressure of workers on local vegetation
Impact 15	Installation of basic living and construction site facilities	Landscape	Negative	Strong	Local	Short	Average	Proliferation of plastic bags and other waste
Impact 16	Installation of basic living and construction site facilities	Health and safety	Negative	Weak	Local	Short	Average	Risks of miscellaneous accidents
Impact 17	Installation of basic living and construction site facilities	Employment	Positive	Strong	Local	Short	Average	Improved income for residents by IGA due to the installation of the site
Impact 18	Deforestation and stripping of plant soil	Air	Negative	Average	Local	Short	Average	Air pollution due to the gases of motorised machinery
Impact 19	Deforestation and stripping of plant soil	Sound environment	Negative	Average	Local	Short	Average	Deterioration of the sound environment by the sound of heavy machinery
Impact 20	Deforestation and stripping of plant soil	Surface waters	Negative	Average	Local	Short	Average	Surface water pollution due to oil discharges from machinery
Impact 21	Deforestation and stripping of plant soil	Groundwater	Negative	Average	Local	Short	Average	Groundwater pollution due to oil discharges by machinery
Impact 22	Deforestation and stripping of plant soil	Soil	Negative	Average	Local	Short	Average	Breaking down the nature of the soil following compacting
Impact 23	Deforestation and stripping of plant soil	Vegetation	Negative	Strong	Local	Long	Average	Total destruction of vegetation on the site
Impact 24	Deforestation and stripping of plant soil	Landscape	Negative	Average	Local	Short	Average	Destruction of the forest landscape on the site
Impact 25	Recruitment of personnel for construction work	Employment	Positive	One time	Local	Short	Average	Employment creation for residents

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 26	Recruitment of personnel for construction work	Women's economic activities	Positive	One time	Local	Short	Average	Employment creation for women
Impact 27	Recruitment of personnel for construction work	Quality of life and well-being	Positive	One time	Local	Short	Average	Increase of the purchasing power of residents
Impact 28	Workforce presence	Health and safety	Negative	Strong	Local	Long	Average	Risks of STI and HIV / AIDS contamination from risky sexual behaviours of construction workers and the female population
Impact 29	Workforce presence	Women's Activities / Conditions	Negative	Strong	Local	Long	Average	Risks of violence against women and vulnerable people
Impact 30	Excavating the foundations	Health and safety	Negative	One time	Local	Short	Average	Risks of respiratory illnesses and accidents
Impact 31	Excavating the foundations	Employment	Positive	One time	Local	Short	Average	Employment creation in area of influence of the site
Impact 32	Excavating the foundations	Surface waters	Negative	Average	Local	Short	Average	Surface water pollution due to oil discharges from machinery
Impact 33	Excavating the foundations	Groundwater	Negative	Average	Local	Short	Average	Groundwater pollution due to oil discharges by machinery
Impact 34	Excavating the foundations	Soil	Negative	Average	Local	Short	Average	Breaking down the nature of the soil following compacting
Impact 35	Waste deposits from all comers and other waste	Landscape	Negative	One time	Local	Short	Average	Degradation of the living standard in the base camp
Impact 36	Waste deposits from all comers and other waste	Health and safety	Negative	One time	Local	Short	Average	Waste pollution
Impact 37	Movement of machinery	Health and safety	Negative	Average	Local	Short	Average	Health and safety risks to personnel and residents

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 38	Movement of machinery	Air	Negative	Average	Local	Short	Average	Air pollution (SEM)
Impact 39	Movement of machinery	Health and safety	Negative	Average	Local	Short	Average	Risks of miscellaneous accidents
Impact 40	Movement of machinery	Sound environment	Negative	Average	Local	Short	Minor	Deterioration of the sound environment by the sound of heavy machinery
Impact 41	Welding and thermal cutting	Air	Negative	Average	Local	Short	Average	Air pollution
Impact 42	Welding and thermal cutting	Health and safety	Negative	Average	Local	Short	Average	Deterioration of workers' health
Impact 43	Welding and thermal cutting	Sound environment	Negative	Average	Local	Short	Minor	Deterioration of the sound environment
Impact 44	Implementation of the VRD and installation of the equipment	Air	Negative	Average	Local	Short	Average	Air pollution (SEM)
Impact 45	Implementation of the VRD and installation of the equipment	Sound environment	Negative	Average	Local	Short	Average	Deterioration of the sound environment by the sound of heavy machinery
Impact 46	Implementation of the VRD and installation of the equipment	Soil	Negative	Average	Local	Long	Average	Modification of and deterioration of the structure and texture of the soil
Impact 47	Implementation of the VRD and installation of the equipment	Surface water	Negative	Average	Local	Long	Average	Disruption of the natural water drainage system
Impact 48	Implementation of the VRD and installation of the equipment	Landscape	Negative	Average	Local	Long	Average	Modification of appearance of the landscape
Impact 49	Implementation of VRDs and installation of equipment	Groundwater	Negative	Average	Local	Long	Average	Disruption of hydrological and hydrogeological dynamics
Impact 50	Operation of quarrying sites	Vegetation	Negative	Weak	Local	Long	Average	Loss of trees in quarrying areas
Impact 51	Operation of quarrying sites	Soil	Negative	Average	Local	Long	Average	

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 52	Operation of quarrying sites	Land	Negative	Average	Local	Long	Average	Exacerbation of land conflicts
Impact 53	Operation of quarrying sites	Surface waters	Negative	Average	Local	Long	Average	Disruption of hydrological and hydrogeological dynamics
Operation and Rehabilitation Phase								
Impact 54	Operation of the CHRU	Water	Negative	Average	Local	Long	Major	Soil pollution from waste coming from daily activities
Impact 55	Operation of the CHRU	Air	Negative	Average	Local	Long	Average	Air pollution connected with the incineration of biomedical waste
Impact 56	Operation of the CHRU	Soil	Negative	Average	Local	Long	Major	Soil pollution from waste coming from daily activities
Impact 57	Operation of the CHRU	Health and safety	Positive	Average	Local	Long	Major	Improvement of the provision of care
Impact 58	Operation of the CHRU	Economy	Positive	Average	Local	Long	Major	Optimizing business activities within the CHRU perimeter
Impact 59	Operation of the CHRU	Quality of life and well-being	Positive	Average	Local	Long	Major	Improving the quality of life of people in the CHRU's area of influence
Impact 60	Operation of the CHRU	Economic activities	Positive	Average	Local	Long	Major	Improvement of the incomes of residents
Impact 61	Operation of the CHRU	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 62	Operation of the CHRU	Women's economic activities	Positive	Average	Local	Long	Major	Improving women's incomes
Impact 63	Operation of the CHRU	Employment	Positive	Average	Local	Long	Major	Employment creation in area of influence of the site

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 64	Daily production of biomedical waste	Health and safety	Negative	Average	Local	Long	Major	Pollution from biomedical waste
Impact 65	Daily production of biomedical waste	Air	Negative	Average	Local	Long	Average	Pollution related to incineration (SEM)
Impact 66	Daily production of biomedical waste	Water	Negative	Average	Local	Long	Major	Solid pollution (waste) and liquids (wastewater with detergent residue)
Impact 67	Daily production of biomedical waste	Soil	Negative	Average	Local	Long	Major	Solid pollution (waste) and liquids (wastewater with detergent residue)
Impact 68	Management of DPC	Air	Negative	Average	Local	Long	Average	Pollution related to incineration (SEM)
Impact 69	Management of DPC	Landscape	Negative	Average	Local	Long	Major	DPC pollution
Impact 70	Supply (transport) of equipment and consumables	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 71	Operation of the relay electrical generating set and incinerator	Air	Negative	Average	Local	Long	Average	Pollution (SEM)
Impact 72	Operation of the relay electrical generating set and incinerator	Sound environment	Negative	Average	Local	Long	Major	Noise
Impact 73	Operation of the relay electrical generating set and incinerator	Health and safety	Negative	Average	Local	Long	Major	Risk of accidents
Impact 74	Maintenance of equipment Maintenance of the premises	Water	Negative	Average	Local	Long	Major	Various pollution
Impact 75	Maintenance of equipment Maintenance of the premises	Soil	Negative	Average	Local	Long	Major	Various pollution

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 76	Maintenance of equipment Maintenance of the premises	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 77	Supply (transport) of equipment and consumables	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 78	Oil leaks from engines in car parks	Water	Negative	Average	Local	Long	Average	Pollution of water resources
Impact 79	Oil leaks from engines in car parks	Soil	Negative	Average	Local	Long	Average	Soil pollution
Impact 80	Oil leaks from engines in car parks	Landscape	Negative	Average	Local	Long	Average	Landscape pollution
Impact 81	Oil leaks from engines in car parks	Health and safety	Negative	Average	Local	Long	Average	Various pollution
Impact 82	Heating and air conditioning	Electricity	Negative	Average	Local	Long	Average	Pressure on electrical resources / fire risk
Impact 83	Heating and air conditioning	Groundwater	Negative	Average	Local	Long	Average	Pressure on water resources
Impact 84	Heating and air conditioning	Surface waters	Negative	Average	Local	Long	Average	Pressure on water resources
Impact 85	Heating and air conditioning	Health and safety	Negative	Average	Local	Long	Average	Exacerbation of the risk of technological accidents
Impact 86	Heating and air conditioning	Air	Negative	Average	Local	Long	Average	Air pollution
Impact 87	Heating and air conditioning	Employment	Positive	Average	Local	Long	Average	Employment creation
Impact 88	Cleaning up green spaces and premises	Water	Negative	Average	Local	Long	Average	Water pollution
Impact 89	Cleaning up green spaces and premises	Health and safety	Negative	Average	Local	Long	Average	Chemical poisoning / skin irritation
Impact 90	Cleaning up green spaces and premises	Soil	Negative	Average	Local	Long	Average	Soil pollution

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 91	Cleaning up green spaces and premises	Vegetation	Positive	Average	Local	Long	Major	CO Deprivation
Impact 92	Cleaning up green spaces and premises	Landscape	Positive	Average	Local	Long	Major	Improved living standard
Impact 93	Cleaning up green spaces and premises	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 94	Cleaning up green spaces and premises	Economic activities	Positive	Average	Local	Long	Major	Improvement of the incomes of residents
Impact 95	Cleaning up green spaces and premises	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved living standard
Impact 96	Cleaning up green spaces and premises	Women's Activities / Conditions	Positive	Average	Local	Long	Major	Improving women's incomes
Impact 97	Cleaning up green spaces and premises	Quality of life and well-being	Positive	Average	Local	Long	Major	Increased purchasing power of residents
Impact 98	Cleaning work in high areas	Health and safety	Negative	Average	Local	Long	Average	Exacerbation of the risks of accidents
Impact 99	Cleaning work in high areas	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 100	Exercise of educational and research activities	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 101	Conducting educational and research work	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 102	Treatment of sewage and sludge	Air	Negative	Average	Local	Long	Average	Air pollution / olfactory nuisance
Impact 103	Treatment of sewage and sludge	Soil	Negative	Average	Local	Long	Average	Soil pollution

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 104	Treatment of sewage and sludge	Landscape	Negative	Average	Local	Long	Average	Landscape pollution
Impact 105	Treatment of sewage and sludge	Health and safety	Negative	Average	Local	Long	Average	Various pollution
Impact 106	Treatment of sewage and sludge	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge (Sludge management and draining)
Impact 107	Treatment of biological fluids and LBP	Surface waters	Negative	Average	Local	Long	Major	Water pollution
Impact 108	Treatment of biological fluids and LBP	Groundwater	Positive	Average	Local	Long	Major	Groundwater pollution
Impact 109	Treatment of biological fluids and LBP	Health and safety	Negative	Average	Local	Long	Major	Pollution by biological fluids and LBP
Impact 110	Treatment of biological fluids and LBP	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 111	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Air	Negative	Average	Local	Long	Average	Visual and olfactory disturbances
Impact 112	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Groundwater	Negative	Average	Local	Long	Major	Water pollution
Impact 113	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Surface waters	Negative	Average	Local	Long	Major	Water pollution
Impact 114	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Landscape	Negative	Average	Local	Long	Major	Visual and olfactory disturbances

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 115	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Health and safety	Negative	Average	Local	Long	Major	Visual and olfactory disturbances
Impact 116	Treatment of household waste, infectious waste, radioactive waste, biopsies and remains	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 117	Transport / movement of patients, transport of medicines and technical medical equipment	Sound environment	Negative	Average	Local	Short	Average	Deterioration of the sound environment by the sound of heavy machinery
Impact 118	Transport / movement of patients, transport of medicines and technical medical equipment	Traffic	Negative	Strong	Local	Temporary	Average	Temporary traffic disruption due to increased traffic
Impact 119	Transport / movement of patients, transport of medicines and technical medical equipment	Health and safety	Negative	Strong	Local	Temporary	Average	Exacerbation of the risks of accidents
Impact 120	Transport / movement of patients, transport of medicines and technical medical equipment	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 121	Biological, biochemical and radiological examinations	Groundwater	Negative	Average	Local	Long	Average	Various pollution
Impact 122	Biological, biochemical and radiological examinations	Surface waters	Negative	Average	Local	Long	Average	Various pollution

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 123	Biological, biochemical and radiological examinations	Health and safety	Negative	Strong	Local	Temporary	Average	Exacerbation of the risks of accidents
Impact 124	Biological, biochemical and radiological examinations	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 125	Storage and dispensation of medicines and technical medical material	Air	Negative	Average	Local	Long	Average	Various pollution
Impact 126	Storage and dispensation of medicines and technical medical material	Soil	Negative	Average	Local	Long	Average	Various pollution
Impact 127	Storage and dispensation of medicines and technical medical material	Health and safety	Negative	Average	Local	Long	Average	Various pollution
Impact 128	Storage and dispensation of medicines and technical medical material	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 129	Storage and dispensation of medicines and technical medical material	Educational and scientific activities	Positive	Average	Local	Long	Major	Improved scientific and educational knowledge
Impact 130	Miscellaneous maintenance (material and equipment)	Health and safety	Negative	Average	Local	Long	Average	Exacerbation of the risks of accidents
Impact 131	Miscellaneous maintenance (material and equipment)	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 132	Restoration (Cafeteria and kitchen)	Air	Negative	Average	Local	Long	Average	Various pollution
Impact 133	Restoration (Cafeteria and kitchen)	Groundwater	Negative	Average	Local	Long	Average	Various pollution

Impact no.	Sources of impacts	Affected component	Nature	Intensity	Scope	Duration	Importance	Impact Description
Impact 134	Restoration (Cafeteria and kitchen)	Surface waters	Negative	Average	Local	Long	Average	Various pollution
Impact 135	Restoration (Cafeteria and kitchen)	Soil	Negative	Average	Local	Long	Average	Various pollution
Impact 136	Restoration (Cafeteria and kitchen)	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 137	Restoration (Cafeteria and kitchen)	Women's activities conditions /	Positive	Average	Local	Long	Major	Employment creation
Impact 138	Restoration (Cafeteria and kitchen)	Quality of life and well-being	Positive	Average	Local	Long	Major	Employment creation
Impact 139	Patient visits and personnel movement	Traffic	Negative	Strong	Local	Temporary	Average	Temporary traffic disruption due to increased traffic
Impact 140	Patient visits and personnel movement	Health and safety	Negative	Strong	Local	Temporary	Average	Exacerbation of the risks of accidents
Impact 141	Patient visits and personnel movement	Employment	Positive	Average	Local	Long	Major	Employment creation
Impact 142	Patient visits and personnel movement	Economic activities	Positive	Average	Local	Long	Major	Improvement of the incomes of residents
Impact 143	Patient visits and personnel movement	Women's activities conditions /	Positive	Average	Local	Long	Major	Improving women's incomes
Impact 144	Patient visits and personnel movement	Quality of life and well-being	Positive	Average	Local	Long	Major	Increased purchasing power

6.5. Analysis of the potential impacts of the CHRU Construction Project

6.5.1. Impacts during the preparatory and construction phases of the CHRU

The environmental impacts during these two phases will be noticeable in relation to the physical, biological and socio-economic environments.

6.5.1.1. Physical and biological impacts during the preparatory and construction phases of the CHRU

■ Impacts on the sound environment

Table 46: Overview of the impact on the sound environment

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 19 Impact 40 Impact 43 Impact 45	Characteristic	Negative	Direct and indirect	Very short term	Local	Weak	Average	Probable and reversible
	Construction activities causing impacts	Noise disturbances (noise, warning signals, vibrations) from the construction site will come from vehicles and machinery (trucks, graders, diggers, shovels, jackhammers, etc.).						
	Comments on or description of the impacts	The use of construction equipment (concrete mixers, welding stations, compressors, generators, etc.), the use of construction materials, the movement of construction equipment and trucks to deliver construction materials, the construction of the various forms, and the excavations will inevitably cause noise nuisance to residents (Fulani camp) and workers on the site.						

Noise disturbances (noise, warning signals, vibrations) from the construction site will come from vehicles and machinery (trucks, graders, diggers, shovels, jackhammers, etc.). They will affect locally (interference, discomfort, hearing deficits, disturbance of rest, etc.) the construction workers and the populations of the localities neighbouring the site mentioned above.

In addition, the sounds of activities of cement mixers and crushing plants, compressors and jackhammers will affect the construction site personnel, but also residents. The impact of the work on the sound environment is negative and of medium importance.

Noise during the construction and operation phase could have localised impacts on the movements of animals that are important dispersal agents or pollinators of the flora. The tendency of these agents would be to protect themselves from nuisances (noise and vibration), which would eventually cause their migration to other localities.

This impact will be especially remarkable in the bush contrary to agglomeration or the initial state. The exploitation of secondary data from similar studies conducted in area suggests that sound pressure levels appear to be well above the norm. The circulation of the machines during the preparatory and construction phase of the CHRU could affect hearing (sleep disorder) and cause troublesome effects.

This impact is of a negative nature, from direct interaction, of low intensity, of a limited scope, because it is localised at the site and local dwellings and is of average duration (only lasting over the period of work). The result is of a minor and relatively small absolute importance.

■ Impacts on the surface water and ground-water resources

Table 47: Overview of the impact on water resources

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 11 Impact 12 Impact 20 Impact 21 Impact 32 Impact 33	Characteristic	Negative	Direct and indirect	Very short term	Local	Weak	Average	Probable and reversible
Impact 47 Impact 49 Impact 53	Comments on or description of impacts	Deforestation, stripping, earthmoving, embankments and rubbish, construction of drainage and equipment infrastructures.						
	Comments on or description of impacts	The risks of changes in the integrity of water bodies and contamination of surface water resources are high if precautions are not taken when carrying out these activities by the company and the Contracting Authority.						

Negative impacts

- Risks of pressure on surface or underground water resources during the work; the importance of the demand for water for performance of the work.
- Risks of contamination of the surface water resource by the drain oils from the engines of the machinery used for the work.

■ Impacts on the soil

Table 48: Overview of the impact on the soil

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 13 Impact 22 Impact 34 Impact 46 Impact 51	Characteristic	Negative	Direct and indirect	Very short term	Local	Minor	Weak	Probable and reversible
	Construction activities causing impacts	Deforestation, stripping, earthmoving, embankments and rubbish, extraction and transport of borrow material, deposit of dry materials						
	Comments on or description of the impacts	The earthmoving will result in large movements of quantities of land. The use of machinery and constructions, which require stable foundations, will occasionally alter the quality, texture and structure of the soils.						

Negative impacts

At the level of borrow pits and quarries, the probability of soils being destroyed in depth on all areas of the excavations is large. Borrow pits that are not filled in could give rise to areas of erosion. This negative impact is of average importance.

Soil pollution under the project comes mainly from two sources: solid waste pollution and pollution associated with the involuntary spillage of hydrocarbons or concrete. These impacts will occur at various levels. At the location level, uncontrolled dumping of concrete, uncontrolled discharges from empty pots and paint residues can contaminate soils. In fact, the machinery used to carry out the various works of such a project operate largely with fossil fuels. As a result, the supply of hydrocarbons will be routine and the possibility of accidental spills is not excluded. In addition, companies will carry out routine maintenance (engine draining, greasing,

washing, draining radiators, etc.) of the work equipment. These maintenance operations often lead to the spread of used oils that can seep into the soil. This poses a risk of soil pollution. The opening and operation of borrow pits will certainly cause soil settlement. Changes in the surface properties of the soil (loss of fertility, indirect impact on crops, decreased soil depth, structural changes) may also be observed during operations.

The installation of the site and the installation of the foundations (soil stripping along the right-of-way of the route) of the future road will result in soil stripping and will promote erosion in some areas. The hydromorphic soils in the project's area of influence will be preferred sites for the transfer of pollutants to ground-water. For example, fuel spills and some waste at the base camp or during transportation could cause soil pollution. During the preparatory and construction phase, these impacts would be relatively localised and would affect only area in the vicinity of the CHRU. The magnitude of these impacts is estimated to be low to high. Implementation of mitigation measures could prevent these impacts from occurring.

In fact, the movement of different machines and trucks during the construction phase should be mainly on existing roads where possible. This could reduce soil degradation and reduce permeability coefficients. The installation of the base camp and the storage area of the material must be made away from the hydromorphic soils. Arrangements must also be made to prevent the overloading of land transport vehicles. Strict compliance with the safety rules governing the management of hazardous products (fuel, etc.); the storage of these products must be subject to strict and particularly specific arrangements in order to minimise the risk of spills as much as possible.

Several different activities could act as a source of this impact. Possible sources include the following:

- Chemical pollutants (chemicals such as fuel, oils, detergents) that inadvertently or without protective measures enter streams or ground-water during handling or the construction phases;
- Heavy excavation followed by percolation of polluted water in borrow areas or ground-water supply basins.

Poor management of pollutants during the preparatory and construction phase of the CHRU would create a risk of chemical pollution in the short to medium term, resulting in medium-sized impacts on the study area. For example, water wells and operating wells near area could be exposed to dust. In addition, these water points could be flooded if the facilities do not take them into consideration which could hinder people's access to drinking water. Barriers to the natural flow of surface water can alter the flow patterns of waterways. Depending on the size and nature of these barriers, further erosion may occur and conduct the water to other destinations.

Potential sources of water pollution during construction activities are diverse. These include concrete spills, wastewater discharges from the base camp, solid waste, oil leaks, waste from the maintenance of machinery and other hazardous waste, and the use of pesticides for wood treatment. Because of the richness of the water table and tributaries in area which results in the presence of streams, such spills are likely to contaminate aquatic fauna of the rivers and even the water table, thus harm the health of the population.

Earthworks and excavation expose the soil and cause erosion and the risk of pollution from accidental spills of hydrocarbon products on the work site. In the event of rain, the runoff from the work is loaded with pollutants (mud, traces of hydrocarbons and derivatives, wastewater from the work loaded with pollutants); some of this contaminated water, by infiltrating into the soil, could affect the ground-water quality and this would lead to a change in the physical-chemical and microbiological characteristics of the water table .

Runoff water from the construction of the CHRU could affect surface water. This water could be loaded with suspended material during construction. Some accidental pollution is to be feared due to possible leaks of fuel or lubricant that could be caused by construction or transport equipment and this could be spilled on the ground, creating a potential risk of contamination from this runoff. During the period of the project, numerous by-products and waste products will be generated. These are: the packaging (packing bags, cable coils, etc.), the forms, the empty containers, of used or broken spare parts of the trucks and construction equipment that may or may not be removed.

The construction of the CHRU and the related VRD structures could increase waterproof surfaces and therefore increase runoff rates. These could come mainly from leaching and storm water loaded with suspended materials, oils and hydrocarbons. As a result, without adequate management, storm water can carry suspended particles and pollutants, and thus contaminate soil and ground-water by infiltration. Water is an important vector of pollution that needs to be managed effectively.

It can thus be concluded that the potential sources of pollution are relatively important not only in terms of quantity, but also, and above all, in terms of toxicity.

In summary, the impact of the CHRU construction project on the waters is negative in nature and is made directly, the intensity is average, given the size of the project and the sources of pollution, of medium duration, and of local (extended) scope. The result is an average absolute importance and an equally average relative importance.

■ Impacts on vegetation

Table 49: Overview of the impact on vegetation

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 14 Impact 23 Impact 50	Characteristic	Negative	Direct and indirect	Short term	Local	Average	Major	Probable and reversible
	Construction activities causing impacts	Deforestation, stripping, earthworks, embankments and excavations, materials that are brought and removed and demolition objects, extraction and transport of borrow materials, installation of structures.						
	Comments on or description of the impacts	Heavy disruption of agro-sylvo-pastoral ecosystems.						

Negative impacts

At the vegetation level, the following impacts will be observable supported by our transects and cross-observations in relation to data from the second national forest inventory.

- Loss of approximately 20,000 estimated natural trees and shrubs in the right-of-way of the CHRU of Fada N'Gourma;
- Loss of trees in material borrow areas and quarries;
- Some woody and herbaceous plants will be destroyed in the right-of-way of the borrow areas and quarries;
- Loss of wild fruit.

The use of the data from the second national forest inventory permits up to develop a portrait for the 20 hectares for the CHRU site, to which the 50 metres of easement in the vicinity would be added:

- Number of species recorded 77;
- A large volume of wood for the 20 hectares that will be clear cut;
- An important herbaceous floristic procession, formerly an important source of pasture for the local Fulani households;
- Species providing major food Non-Wood Forest Products (NWFPs);
- The total deterioration of an agro-sylvo-pastoral ecosystem consisting of the total loss of these 20 hectares of natural vegetation.

Table 50: Volume of standing timber by species in area of influence of Fada Hospital

Inventoried species	Breakdown of wood volume by class of use				Volume of standing timber any class (m3/ha)
	Firewood	Firewood	Wood of	Wood not	
	(m3/ha)	(m3/ha)	(m3/ha)	(m3/ha)	Any class
Acacia dudgeoni	0.49	0.0	0.0	0.0	0.49
Acacia macrostachya	0.11	0.0	0.0	0.0	0.11
Acacia seyal	0.00	0.0	0.0	0.0	0.00
Acacia sieberiana	0.02	0.0	0.0	0.0	0.02
Adansonia digitata	0.00	0.0	0.0	0.1	0.10
Afromosia laxiflora	0.01	0.0	0.0	0.0	0.01
Annona senegalensis	0.00	0.0	0.0	0.0	0.00
Anogeissus leiocarpus	0.79	0.1	0.0	0.0	0.86
Balanites aegyptiaca	0.04	0.0	0.3	0.0	0.35
Bombax costatum	0.01	0.1	0.5	0.0	0.58
Boscia senegalensis	0.03	0.0	0.0	0.0	0.03
Boswillia dalzielii	0.08	0.0	0.0	0.0	0.11
Bridelia ferruginea	0.02	0.0	0.0	0.0	0.02
Butyrospermum paradoxum	0.08	0.1	2.2	0.0	2.34
Cassia sieberiana	0.02	0.0	0.0	0.0	0.02
Cassia singueana	0.00	0.0	0.0	0.0	0.00
Combretum collinum	0.00	0.0	0.0	0.0	0.00
Combretum ghasalense	0.02	0.0	0.0	0.0	0.02
Combretum glutinosum	0.52	0.0	0.0	0.0	0.55
Combretum lamprocarpum	0.00	0.0	0.0	0.0	0.00
Combretum micranthum	0.19	0.0	0.0	0.0	0.19
Combretum molle	0.01	0.0	0.0	0.0	0.01
Combretum nigricans	1.73	0.0	0.0	0.0	1.76
Combretum velutinum	0.03	0.0	0.0	0.0	0.03
Commiphora pedunculata	0.00	0.0	0.0	0.0	0.00
Crossopteryx febrifuga	0.26	0.0	0.0	0.0	0.26
Dalbergia melanoxylon	0.02	0.0	0.0	0.0	0.02
Daniellia oliveri	0.22	0.0	0.0	0.0	0.25
Detarium microcarpum	0.02	0.0	0.6	0.0	0.64
Dichrostachys cinerea	0.01	0.0	0.0	0.0	0.01
Diospyros mespiliformis	0.09	0.0	0.0	0.0	0.09
Entada africana	0.19	0.1	0.0	0.0	0.29
Fadogia sp.	0.00	0.0	0.0	0.0	0.00
Feretia apodanthera	0.02	0.0	0.0	0.0	0.02
Ficus capensis	0.08	0.0	0.0	0.0	0.11
Ficus gnaphalocarpa	0.00	0.1	0.0	0.0	0.10
Gardenia erubescens	0.01	0.0	0.0	0.0	0.01
Gardenia ternifolia	0.00	0.0	0.0	0.0	0.00
Grewia bicolor	0.11	0.0	0.0	0.0	0.11
Grewia flavescens	0.00	0.0	0.0	0.0	0.00
Grewia mollis	0.02	0.0	0.0	0.0	0.02

Breakdown of wood volume by class of use					
Inventoried species					Volume of standing timber any class (m3/ha)
	Firewood	Firewood	Wood of	Wood not	Any class
	(m3/ha)	(m3/ha)	(m3/ha)	(m3/ha)	
Guiera senegalensis	0.01	0.0	0.0	0.0	0.01
Heeria insignis	0.00	0.0	0.0	0.0	0.00
Holarrhena floribunda	0.00	0.0	0.0	0.0	0.00
Khaya senegalensis	0.01	0.0	0.0	0.0	0.04
Lannea acida	0.00	0.0	0.0	0.9	0.95
Lannea microcarpa	0.04	0.0	1.1	0.0	1.09
Lannea velutina	0.10	0.0	0.0	0.0	0.10
Lonchocarpus laxiflorus	0.03	0.0	0.0	0.0	0.03
Maytenus senegalensis	0.03	0.0	0.0	0.0	0.03
Mitragyna inermis	0.02	0.0	0.0	0.0	0.02
Ostryoderris chevalieri	0.05	0.0	0.0	0.0	0.05
Parkia biglobosa	0.00	0.0	0.1	0.0	0.06
Pericopsis laxiflora	0.01	0.0	0.0	0.0	0.01
Piliostigma reticulatum	0.01	0.0	0.0	0.0	0.01
Piliostigma thonningii	0.06	0.0	0.0	0.0	0.06
Prosopis africana	0.32	0.2	0.0	0.0	0.54
Pseudocedrela kotschy	0.15	0.0	0.0	0.0	0.15
Pteleopsis suberosa	0.06	0.0	0.0	0.0	0.06
Pterocarpus erinaceus	0.90	0.4	0.0	0.0	1.33
Pterocarpus lucens	0.06	0.0	0.0	0.0	0.06
Sclerocarya birrea	0.00	0.0	0.3	0.0	0.35
Securidaca longepedunculata	0.00	0.0	0.0	0.0	0.00
Securinega virosa	0.00	0.0	0.0	0.0	0.00
Sterculia setigera	0.00	0.0	0.0	1.0	0.96
Stereospermum kunthianum	0.09	0.0	0.0	0.0	0.09
Strychnos spinosa	0.02	0.0	0.0	0.0	0.02
Swartzia magagascariensis	0.00	0.0	0.0	0.0	0.00
Tamarindus indica	0.01	0.0	0.1	0.0	0.12
Terminalia avicenioides	0.59	0.0	0.0	0.0	0.59
Terminalia glaucescens	0.17	0.0	0.0	0.0	0.17
Terminalia laxiflora	1.28	0.3	0.0	0.0	1.62
Terminalia macroptera	0.40	0.2	0.0	0.0	0.59
Vitex doniana	0.00	0.0	0.0	0.0	0.00
Ximenia americana	0.03	0.0	0.0	0.0	0.03
Ziziphus mauritiana	0.02	0.0	0.0	0.0	0.02
Ziziphus mucronata	0.01	0.0	0.0	0.0	0.01
Average in m3/ha	9.7	1.8	5.2	2.0	18.7
(all species)					
Accuracy in % (p=0.95)	10.5	42.6	19.9	23.7	9.7

Source: IFN2 Burkina Faso

■ Impacts on air

Table 51: Overview of the impact on air

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 10 Impact 18 Impact 38 Impact 41 Impact 44 Impact 55 Impact 65 Impact 68	Characteristic Construction activities causing impacts Comments on or description of the impacts	Negative Deforestation, stripping, earthworks, embankments and excavations, materials that are brought and removed and demolition objects, extraction and transport of borrow materials, deposit of materials, installation of structures, creation of roads and development, construction of drainage infrastructures and equipment. Air quality and noise climate are likely to be compromised mainly during stripping, earthmoving, material extraction, servicing and construction of various infrastructures and equipment on the site.	Direct and indirect	Short term	Local	Average	Weak	Probable and reversible

Negative impacts

- Air quality will be locally and temporarily affected by emissions of dust potentially loaded with heavy metals and exhaust gases (CO_x, NO_x, SO_x, HC, HAP, VOC, etc.) generated by the site, the movement of earthmoving equipment, supply trucks, civil engineering work, etc.
- Welding and thermal cutting also release a solid mixture of particles and gas, called welding smoke. The solid particles in welding smoke usually make the welding smoke visible. These solid particles and the welding dust consist of breathable and non-breathable dust, depending on its granulometry. Generally, measures must be taken against this production of dust because it is considered to be directly irritating.
- This pollution can cause respiratory illnesses (coughs, asthma attacks, bronchial irritations, choking sensations), eye problems (eye irritations) and olfactory nuisances especially in workers and residents in the CHRU's area of influence. In addition, the dust emitted will be deposited on roofs, inside homes and on food sold in outdoor stalls. The impact is negative and of average importance.
- All this will lead locally to the degradation of ambient air quality. This is an inconvenience for the residents. The impact is negative, direct and low-intensity. Its scope is local and of a one-time duration. The result is of a minor absolute and relatively small importance.

■ Impacts on the climate and landscape

Table 52: Overview of the impact on the landscape

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 15 Impact 24 Impact 35 Impact 48	Characteristic Construction activities causing impacts	Negative Deforestation, stripping, earthworks, embankments and rubbish, materials that are brought and removed and demolition objects, extraction and transport of borrow materials, deposit of materials, installation of structures, creation of roads and development, construction of drainage infrastructures and equipment.	Direct and indirect	Very short term	Local	Very weak	Weak	Probable and reversible

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
	Comments on or description of the impacts	The microclimate can be negatively impacted by deforestation and extraction of borrow materials. Apart from the site installation, material deposits and the use of civil engineering equipment, all other activities mentioned above can have negative impacts on the landscape.						

Negative impacts

- Disturbance of the landscape.

6.5.1.2. Social and economic impacts during the preparatory and construction phases of the CHRU

Table 53: Overview of the socio-economic impact

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 2 Impact 4 Impact 5 Impact 6 Impact 7 Impact 8	Characteristic	Positive and Negative	Direct and indirect	Medium term	Local and global	Average	Average	Probable and reversible
Impact 9 Impact 16 Impact 17 Impact 25 Impact 26 Impact 27 Impact 28 Impact 29 Impact 30 Impact 31 Impact 36 Impact 37 Impact 39 Impact 42	Construction activities causing impacts Comments on or description of the impacts	All activities planned in the project. - Deterioration of workers' health - Exacerbation of land conflicts - Pollution by the waste - Health and safety risks for the personnel and residents - Risks of respiratory illnesses and accidents - Risks of violence against women and vulnerable people - Risks of STI and HIV / AIDS from risky sexual behaviours of construction workers and the residents - Increased risks of accidents - Loss of rights to land - Loss of pasture land - Weakening of the livelihoods of residents due to restriction of access - Risks of miscellaneous accidents - Improved income for residents by IGAs due to the installation of the site - Employment creation for residents, in this case for young people and women in the area - Increased purchasing power of residents						

Positive impacts

- Creation of temporary jobs (labourers and workers, guards);
- Creation and development of small income-generating activities (small businesses);
- A one-time increase in cash flow due to the presence of construction workers.

The construction of the CHRU will involve a more or less large workforce composed of skilled and unskilled labour (middle and upper managers, labourers). In fact, the creation of jobs will take place at the level of the selected company, the work control office, the subcontracting companies, etc. More than a hundred workers will be mobilised during part of or during the full construction period. In addition to these jobs, there will be those created by the installation of small shops near the construction sites (sales of food and miscellaneous consumer goods). The planned investments take into consideration purchases of building materials and equipment to be installed as well as site development, building construction and equipment installation operations. Thus, the start-up of the project remains a business opportunity for construction, technical control and export-import companies.

All of these jobs will have a clear economic impact on household living standards (reducing poverty levels) and on the local economy in the form of consumption, taxes and savings.

Thus, this positive impact is of average importance.

Negative impacts

- Risks of lung disease to employees and student residents during the performance of the work;
- Risks of insecurity for the residents during civil engineering machinery traffic;
- Degradation of the living standard by the uncontrolled discharge of solid and liquid waste, not sufficiently treated, from construction sites.

■ Impact on farm land:

The implementation of the project will result in the economic displacement of landowners and farmers in the right-of-way of the CHRU site. This will result in a loss of wealth for landowners and a loss of sources of income for operators.

■ Negative impacts on the cultural heritage and archaeological remains of blast furnaces:

The project will result in encroachments, desecration and destruction of a number of cultural heritage properties in the right-of-way and in the immediate environment of the CHRU. Field investigations and interviews with the customary authorities of the area revealed that the site chosen for the establishment of the CHRU borders the sacred hill of Nalambou, the highest sanctuary for the customary ceremonies of rites of the Gulmu.

■ Impact on public domain and private trees:

The implementation of the construction project of the CHRU in Fada N'Gourma will result in the destruction of trees both private and in the public domain.

■ Impacts of public health

To the number of potential public health impacts, we can fear the following:

- Development of respiratory illnesses and various nuisances. Dust, smoke, volatile hydrocarbons and gases (COx, NOx, SOx, HC, HAP, VOCs, etc.) generated by vehicles and construction equipment traffic, stripping and earthmoving that can cause respiratory illnesses and nuisances (coughing, bronchial irritation, impaired lung function, asthma, etc.) among the site personnel and the populations of the localities neighbouring the CHRU site. The negative impact is of average importance;
- Risks of STI and HIV / AIDS and Hepatitis: Risky sexual behaviours between construction workers and the female population in the project area or from elsewhere can lead to contamination with certain illnesses STI and HIV / AIDS and Hepatitis, if adequate measures are not taken. This negative impact is of major importance;
- Risks of unwanted pregnancies: Risky sexual behaviours of construction workers with the female population in the communities in the project area could lead to unwanted pregnancies;

- A construction site where safety measures are not respected (lack of proper signage, speeding of construction equipment and vehicles, lack of protective kits, consumption of alcohol and / or drugs by workers, lack of safety measures in the base camp and parking of the machines), present significant risks of accidents (injuries, trauma, etc.). These risks affect both construction workers and the populations of the neighbouring localities;
- Vehicle and pedestrian traffic will be temporarily disrupted on traditional roads by deforestation, earthworks, implementation of the form layer, of the foundation, of the base, and rolling. Despite the progressive realization of the works to take into consideration the provision of service for the population, the rural fluidity will be disturbed.

This group of impacts is negative and is considered to be of average importance.

6.5.2. Impacts during the CHRU's operating phase

6.5.2.1. Physical and biological impacts during the operation

During the operation, the environmental impacts are as follows:

■ Impacts on surface water and ground-water resources

Table 54: Overview of the impact on water resources

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 54 Impact 66 Impact 74 Impact 78	Characteristic Construction activities causing impacts	Negative and positive Collecting and managing rainwater, wastewater and solid waste, water intakes and drinking water supply, site maintenance.	Direct and indirect	Medium and long term	Local	Weak	Weak	Probable and reversible
Impact 88	Comments on or description of the impacts	The risks of changes in the integrity of water bodies and contamination of surface water resources are high if precautions are not taken when carrying out these activities by the company and the Contracting Authority.						

Positive impacts

- Offer of an alternative resource for watering CHRU's green spaces after wastewater treatment.

Negative impacts

- Risks of surface water pollution from untreated wastewater and solid waste from anthropogenic activities at the site;
- Risks of a decrease in the surrounding surface water resources due to increased anthropogenic activities and maintenance work (residences, watering of green area and agricultural spaces, hydraulic laboratories, classrooms for courses, etc.);
- In the operation of CHRU, large quantities of water are consumed by personnel, patients, patient companions and trainees in public health schools for various needs. This could lead to a competitive use dynamic of the resource if GIRE good practice initiatives are not promoted for this purpose.

■ Impacts on flora and fauna

Table 55: Overview of the impact on the flora

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
	Characteristic	Positive and negative	Direct and indirect	Medium and long term	Local	Weak	Weak	Probable and reversible
Impact 50 Impact 91	Construction activities causing impacts	Collection and management of wastewater and solid waste from the CHRU.						
	Comments on or description of the impacts	The potential impacts may be noticeable in terms of the temporary disappearance of local flora and fauna as well as the degradation of threatened or rare species.						

Positive impacts

- Creating and managing green spaces within the CHRU, etc.

Negative impacts

- Risk of extinction of local flora, especially protected species (tamarind, shea).

■ Impacts on air

Table 56: Overview of the impact on air

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 55 Impact 65 Impact 68 Impact 71 Impact 86 Impact 102	Characteristic	Negative	Direct and indirect	Medium and long term	Local	Weak	Weak	Probable and reversible
	Construction activities causing impacts	Wastewater and solid waste collection and management, water intake and drinking water supply, use of roads and site maintenance, all activities related to the operation of the CHRU.						
Impact 111 Impact 125 Impact 132	Comments on or description of the impacts	Potential impacts include air quality, foul odour releases, noise pollution.						

Negative impacts

- During the operation of the CHRU, there will be a production of waste of various kinds with the presence of patients, patient companions and personnel. The vast majority of hospital solid waste consists of packaging (papers, cardboard, plastic bags and glasses) and biomedical waste (blades, dressings, compresses, cotton, syringes, etc.). Operating a hospital waste incinerator will produce air emissions. The main pollutants released will be dust, nitrogen oxides and carbon monoxide. Since measures to segregate medical waste should allow the incinerator to burn pathogenic and infectious waste only at the incinerator, metal emissions should be minimised.

- In operating mode, the CHRU could generate air emissions. These could include combustion products (e. g. carbon dioxide, nitrogen and sulphur oxides, and hydrocarbons). These products have a high potential for global warming (PRP). In addition, the CHRU can emit Volatile Organic Compounds (VOCs) in the context of refrigeration and air conditioning. These VOCs used as refrigerants deplete the ozone layer.
- This waste if not properly managed can have health effects. The absolute importance of the impact will be described as medium, long duration, medium intensity and of one-time in scope.

■ Impacts on the climate and landscape

Table 57: Overview of the impact on the landscape

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
Impact 69 Impact 80 Impact 92	Characteristic	Negative and positive	Direct and indirect	Medium and long term	Local	Weak	Weak	Probable and reversible
Impact 104 Impact 114	Construction activities causing impacts	Wastewater management, solid waste management, water intake and drinking water supply, site maintenance, conducting educational and research work.						
	Comments on or description of the impacts	The impacts that may occur as a result of these activities are mainly at the local (microclimate) level but also on the landscape.						

Positive impacts

- Improving aesthetics of the site by optimizing landscaping practices (maintenance of green spaces): The appearance of the CHRU site will be significantly improved by related developments (landscaping).

Negative impacts

- Deterioration of the landscape by the uncontrolled proliferation of infrastructures in the CHRU's area of influence: As in almost all the country's regional capitals, the completion of the CHRU and its implementation will lead to an uncontrolled proliferation of socio-economic infrastructures around the site, if adequate measures are not promoted.

6.5.2.2. Overview of the impact on socio-economic domain during the operation

Table 58: Overview of the impact on socio-economic domain during the operation

Impacts concerned	Assessment parameters	The nature of the impact	Interaction	Duration	Scope	Intensity	Absolute importance	Occurrence
51 impacts: Impact 57 to Impact 144	Characteristic	Negative and positive	Direct and indirect	Medium and long term	Local	Weak	Major	Probable and reversible
	Construction activities causing impacts	All activities related to the operation of the CHRU will have both positive and negative socio-economic impacts.						

Comments
on or
description of
the impacts

Some permanent jobs and some temporary jobs will be generated. Incomes for resident households will be increased as a result of the incentive for small commercial activities resulting from high demand due to the presence of health workers, the sick and visitors. Public health will be revitalised through the promotion of activities that enhance the hygiene and health of the living standard. The quality and way of life of local people will be improved in line with the opportunities that the CHRU will offer. There will be an improvement in health knowledge and practices in the region as action and educational research will be carried out within the CHRU.

However, there are fears of operational defects (on hygiene, lifestyle, the living standard, medical technology) of the upkeep and maintenance due to a lack of monitoring and control. Increased traffic and mismanagement of biomedical products could pose an accident, safety and public health risk to residents, patients, patient companions, visitors and health workers.

Positive impacts

- Creating permanent jobs within the CHRU;
- Training young people with expertise in public health;
- Improvement of the provision of care;
- Optimizing business activities within the CHRU's perimeter;
- Improving the quality of life of people in the CHRU's area of influence;
- Improved scientific and educational knowledge;
- Maintaining a healthy and hygienic living standard for CHRU students and personnel;
- Improved health indicators at the regional level.

In operating mode, for a long period of time and for a broad scope, the CHRU will contribute to the significant improvement of the provision of health care for many people. It is a vital positive impact on the human environment. For example, it would optimise the following components:

- Strengthening internal coordination and cross-sector collaboration;
- Strengthening regulation, control, standardization and the fight against corruption in the health sector;
- Strengthening dialogue with social partners;
- Coordinating community-based services, the pharmacopoeia and traditional medicine;
- Strengthening the provision of quality services for specific groups;
- Strengthening the fight against communicable and non-communicable illnesses;
- Strengthening hospital hygiene;
- Improved health information system at the community level through health;
- Strengthening the skills of health workers in the region;
- Strengthening the management of agents' careers;
- Strengthening the monitoring of private health training institutions;
- Strengthening mass communication and proximity in health;
- Strengthening curative and preventive maintenance of biomedical equipment;
- Improved availability of medications, reagents and labile blood products;
- Strengthening the production and dissemination of quality health information;
- Strengthening operational research on malnutrition and maternal deaths;
- Strengthening people's financial access to health services (implementation of free health care, universal health insurance, cost-sharing system, care for the indigent);
- Strengthening the efficient management of allocated financial resources.

Miscellaneous negative impacts

- Air pollution connected with the incineration of biomedical waste;
- Soil pollution from waste coming from daily activities;
- Increase in cardiovascular diseases;
- Pollution related to incineration (SEM);
- DPC pollution;
- Noise nuisances;
- Risk of accidents;
- Pressure on water resources;
- Exacerbation of the risks of technological accidents;
- Chemical poisoning / skin irritation.

7. Evaluation of the major risks associated with the construction of the CHRU

7.1. Evaluation of risks and hazards

In this section of the document, a portrait of risks and hazards related to the construction and operation of the CHRU is documented and developed.

This section is an integrated analysis of the potential risks and hazards arising from the ESIA of the CHRU associated with the construction of Fada University and the paving of NR 18. Therefore, it is attempted here to highlight the major risks related only to the cumulative dangers that will interact with this. Here are the two main actions, sources of danger and risks:

■ The crossing of the NR 18 by road users

Given the density and complexity of road traffic on the NR 18, which will be paved, the crossing by various users will be a potential source of danger.

■ Transport, storage, conservation or destruction of dangerous medical products

Table 59: Hazard identification matrix, causes and threats by the cause-and-effect method

	Environment (project site)	Work equipment	Labour (workers)	Methods	Dangerous substances
Dangers Or threats	Residents Pets	The machinery	BTP Unskilled labourers workers difficult residents	Driving and handling heavy construction equipment	Dangerous biomedical products
The causes	Non-compliance with the traffic code and the rules of conduct	Failure of the guidance system	Non- compliance with the traffic code and the rules of conduct; Non- compliance with safety instructions	Non- compliance with or lack of knowledge of safety instructions	Non-compliance with safety instructions
The effects	Increased risk of accidents	Accidents between trucks and vehicles and other machinery	Falling trailers; Collision between vehicles	Falling trucks; Harm to the health of workers and users	Various pollutions and accentuations of cardiovascular disease

Table 60: The interrelation matrix of risk-taking activities and receptor environments

		PHYSICAL ENVIRONMENT										BIO-LOGICAL ENVIRONMENT	SOCIO-ECONOMIC ENVIRONMENT				
		Air			Soil			Water									
Activities or aspects of the project of potential risk		Increased vehicle traffic	Emission into atmosphere	Dust development	Noise production	Land use planning	Waste production	Changes in soil use	Interference with the water table	Water consumption	Wastewater production	Vegetation	Fauna	Safety / Health HIV / AIDS	Residents	Relocation of people	Socio-economic landscape
THE SOURCES OF RISK	PRE-CONSTRUCTION AND CONSTRUCTION PHASE	Installation of the base camp (guard) on the site	x	x	x	x	x	x	-	-		-	-	x	x	x	-
		The movement of heavy machinery and trucks	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-
		Stripping of the soil and vegetation for pit and road rights-of-way	x	x	x	x	x	x	x	x	x	x	x	x	-	x	x
		Cutting the trees and stump removal			x	x	x	x					x	-	x	x	x

Activities or aspects of the project of potential risk	PHYSICAL ENVIRONMENT										BIO-LOGICAL ENVIRONMENT	SOCIO-ECONOMIC ENVIRONMENT				
	Air			Soil			Water									
	Increased vehicle traffic	Emission into atmosphere	Dust development	Noise production	Land use planning	Waste production	Changes in soil use	Interference with the water table	Water consumption	Wastewater production		Vegetation	Fauna	Safety / Health HIV / AIDS	Residents	Relocation of people
Crossing NR 18	x	x	x	x	x	x	x	-	-	-	x	x	x	x	x	x
Operation of the quarry and the use of the road																
Traffic of trucks and vehicles	x	x	x	x	x	x	x	x	x	x	x	-	x	x	x	-
CHRU wastewater management	x	x	x	x		x			x	x	x	x	x	-	-	-

		PHYSICAL ENVIRONMENT										BIO- LOGICAL ENVIRON- MENT	SOCIO-ECONOMIC ENVIRONMENT				
		Air		Soil				Water									
Activities or aspects of the project of potential risk		Increased vehicle traffic	Emission into atmosphere	Dust development	Noise production	Land use planning	Waste production	Changes in soil use	Interference with the water table	Water consumption	Wastewater production		Vegetation	Fauna	Safety / Health HIV / AIDS	Residents	Relocation of people
	Storage, conservation, use and destruction of hazardous biomedical products	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-

Analysis of the Table above allowed us to identify and highlight some of the potential unidentified risks as a result of the interaction between sources of hazards and receptor environments.

The crossing of the NR 18 by trucks and vehicles is the real source of accidental danger and risk. Road traffic would be heavy on the NR 18, and the frequency of the passing of vehicles would become more and more elevated. This situation would create:

- A risk of vehicle traffic jams on the NR 18 with corollaries of accidents between vehicles or trucks, between vehicles and motorcycles;
- Risks of accidents for residents frequenting this road including the wave of students of the Fada university campus and the communities bordering the site;
- Risks of accidents concerning domestic animals (donkeys, goats, cattle, etc.) that could cross the national road especially those that are adjacent to an international road;
- Risks of conflict between populations and project workers following the deaths of domestic animals;
- The risk of collisions between vehicles and two-wheeled vehicles;
- Risks of respiratory and eye disease for residents as a result of increased dust suspension and greenhouse gas emissions;
- A risk of accelerated deterioration of the NR 18.

■ Other dangers and risks

In operating mode, the CHRU could have a potential risk of public health degradation if the issue of hazardous pollutants from this facility is not properly mastered or controlled. To this group of hazards and risks, there should be added minor but not insignificant risks. In fact, these are:

- **Risks of tripping and slipping:** This is present during employee handling activities. Customers are also exposed to the risk of falling in the premises of the CHRU;
- **Risks of skin irritation:** Cleaning workers (housekeeping) may develop dermatitis caused by handling chemical cleaners;
- **Fire hazards:** Fires pose a risk to the safety of CHRU employees and patients. This risk is important to consider because the CHRU is a public institution. The development of a fire in this type of establishment can quickly turn into a disaster.

Table 61: Assessment of the importance of the risk

No.	Risk typology	Severity	Probability of occurrence	Criticality	Importance
1	Crossing National Road No. 18	5	5	55	Major (Unacceptable)
2	Wastewater management, conservation, use and destruction of CHRU biomedical products in connection with the functioning of the CHRU	5	3	35	Medium (critical)

Risk mapping provides a broader overview and panoramic view of the potential risks cited, failure factors, criticalities and corrective actions. Minor or acceptable risks will not be mapped.

Table 62: Mapping and assessing the potential risks of the CHRU construction project

Source of danger or threat	Potential risks	Causes or factors of failure	Consequences	Detectability measures for the risk	Criticality			Proposal for corrective action <u>Implementation manager: Ministry of Health / Fada N'Gourma City Hall</u>
					F	G	C	
Crossing Road No. 18	National The risk of vehicle traffic jams on NR 18; Risk of accidents concerning domestic animals (donkeys, goats, cattle, etc.); Risks of conflicts between the population and project workers.	- technical failures (bad or lack of maintenance); - operator or driver failures (fatigue; illness; stress); - failure to comply with speed limits and safety conditions; - security failures (lack of vigilance of security officers to secure the perimeter of activity); Failure to comply with safety guidelines and transport of chemicals in a secure manner)	Accident situation Injury and death of persons Death of animals	Check truck maintenance reports or records; Check the medical follow-up records of CHRU workers; Check operators' recycling reports; Control the operability of the communication plan among residents.	5	5	55	Have a safety and signage system at the NR 18 between the CHRU and the University of Fada; Put an alternating safety and signalling device supported by the security forces at the NR 18; Put speed bumps and signs at the entrance to major urban areas near the CHRU and the University of Fada; Strengthen the capacity of operators and drivers concerning aspects related to the Highway Code; Strengthen the maintenance system for trucks and equipment; Put in place a plan to raise awareness among residents.

Source of danger or threat	Potential risks	Causes or factors of failure	Consequences	Detectability measures for the risk	Criticality			Proposal for corrective action
					F	G	C	
Biomedical management and wastewater management	Risks of pollution and miscellaneous accidents	Failure to follow good practices for management of biomedical products	Pollution, intoxication, injury and death of persons	Check the early warning systems	5	3	35	Promote good practices for biomedical product management and wastewater management .

7.2. Mitigation measures and summary contingency plan

7.2.1. Multifaceted dangers and threats

The solution consists in implementing a local consultation framework, with a communication plan between the CHRU construction project and areas in the direct influence of the project in order to resolve potential crises. The social communication plan should inform neighbouring communities and the people who need to frequent the facility about the different aspects of the project; in this case, activities, different sources of failure and potential risks, corrective measures and the contingency plan, the various actors and their responsibilities in the implementation. The implementation of the communication plan is the responsibility of the Ministry of Health, the region and the city hall of Fada. Some actors will be recruited from among the most influential young people at the local level in terms of risk and hazard management strategies. Populations will be involved in an inclusive manner in the selection of youth representatives responsible for implementing the plan.

7.2.2. Accident and technological risks

This is mainly about the risk of crossing the NR 18, the management at the CHRU level of the issue of wastewater and biomedical products within this facility in operating mode. A draft of comprehensive emergency measures will be outlined in an introductory approach before submitting specific measures for each type of risk later in the section of complementary initiatives to be undertaken.

7.2.3. Highlights of the emergency plan

An appropriate emergency plan will be developed in a more formal way based on the progress of each phase of the project, all in order to act with diligence, assurance and speed in the event of a disaster. The Contractor responsible for activities of the construction phase will notably be in charge of developing an emergency measures plan to manage the risks he has identified in relation to the planned activities. In addition, the plan for emergency measures will be reviewed periodically and adapted for each phase of construction and operation. It will focus on the various activities of each phase and associated risks.

8. Mitigation and bonus measures

8.1. Preamble on the social and environmental measures

The negative and positive impacts of the Fada N'Gourma CHRU construction project, both in the construction and operation phase, have been widely argued in previous sections. This part looks at proposals for various measures to prevent, mitigate, repair or compensate for the project's negative impacts on the natural and human environment, and enhance positive impacts. All mitigation and bonus measures are provided in the Tables below.

Table 63: Portrait of social and environmental measures to be promoted

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
Development and implementation of a communication programme to inform local people of the work	Minimizing project inconvenience to local people	Act 1	Development of the Communication Plan: informing the population about the progress of the works, the useful measures to be taken and the traffic instructions by a town crier and in local radios
		Act 2	Implementation of the Communication Plan
Development of a detailed programme of social and environmental protection actions for the site	Minimizing the inconvenience of the construction site on the environment	Act 3	Development and application of Environmental and Social Protection Action Plans
Preservation of the socio-economic and income infrastructures of local populations	Minimizing the destruction of the socio-economic infrastructures and loss of income	Act 4	Respect for the boundaries of the useful right-of-way defined for the development of infrastructures of the project
		Act 5	Providing information and consultation to those affected by the work
		Act 6	Compensation and resettlement of persons affected by the project
Recruitment of local labour for work	Providing jobs and income for local people	Act 7	Information and posting of qualified job opportunities
		Act 8	Focus on the local workforce, especially for unskilled jobs, while respecting Burkina Faso's labour code
Preventing conflicts related to desecration and non-compliance with customs and natural resource removals for work	Respect and protect the cultural heritage of area; prevent the risk of conflict	Act 9	Promote awareness of construction personnel to respect local customs and customs
		Act 10	Identify and mark the two sites in the preparation phase of the work. Preparation of the necessary rites

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
		Act 11	Compensation of sacred sites in consultation with the managers of each sacred site
		Act 12	Prevent borrow areas from touching sacred sites
Establish appropriate safety rules and devices for construction workers, residents and users and promote good public health practices	Prevent and minimise uncontrolled parking and traffic accidents	Act 13	Implementation of a traffic plan for sections constructed for the movement of residents
		Act 14	Raise personnel and residents awareness in compliance with road safety guidelines
		Act 15	Provision of the workforce with protective equipment (safety shoes, gloves, dust masks, vests, etc.)
		Act 16	Regulation of equipment and vehicles traffic during entry and exit hours of neighbouring schools
		Act 17	Adequate signage of the construction site, the living area and the construction car park, the exits of borrow areas and the quarries
		Act 18	Parking of equipment and vehicles on the car park on site and in Fada N'Gourma
		Act 19	Prohibition and control of personnel to prevent working under the influence of alcohol or drugs
		Act 20	Monitoring security measures at the base camp
		Act 21	Construction of crossing points at accident sites on the NR 18
		Act 22	Putting in place adequate signage for each section
		Act 23	Strict prohibition of occupation of security strips
Protection of the health of construction site personnel, residents and NR 18 users	Give first aid before evacuation	Act 24	Implementation of a mini health / first aid unit
	Minimizing the risk of STI and HIV / AIDS and unwanted pregnancies	Act 25	Implementation of a programme to combat STI and HIV / AIDS / Hepatitis and unwanted pregnancies
		Act 26	Distribution of condoms to construction workers

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
	Minimizing air pollution, eye and respiratory illnesses	Act 15	Provision of the workforce with protective equipment (safety shoes, gloves, dust masks, vests, etc.)
		Act 27	Watering the right-of-way of the works and traffic lanes of vehicles and equipment crossing the inhabited areas
Protection of soil and water resources	Prevent soil and water resource degradation	Act 28	Rehabilitation or upgrading of borrow areas and quarries and promotion of good practices of Integrated Water Resources Management: - for the construction site installation, destroy all buildings and concrete areas not likely to be used in other forms, fill the ditches created, dispose of all construction site waste and derelicts vehicles and equipment; - for borrow pits, restore natural flows, give away the plant soil previously stored in cords during stripping, plant well-chosen species if necessary; - for depot areas, gradually give away the materials deposited in order to prevent disturbance of natural flows; - installation of sediment retention screens and other temporary control systems; - orientation of runoff to bypass the site of the work; - diversion of flows from neighbouring areas around the construction zone; - implementation of leak prevention systems (oils and greases for construction machinery) and cleaning practices to prevent contamination from runoff; - take all possible precautions when refuelling transport vehicles and heavy machinery at the work site to prevent possible spills
Protection of vegetation and wildlife	Minimizing vegetation destruction	Act 29	Prevent uncontrolled felling of trees due to carrying out work in the right-of-way of the CHRU and borrow areas
		Act 30	Parking construction equipment of the borrow sites and material depot areas in clearing areas

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
	Improve the plant environment of the project area	Act 31	Construction of tree alignment plantations around the CHRU, perform landscaping, and do some planting in order to compensate for destroyed vegetation in the site
Preservation of air quality	Minimise air pollution and the risk of eye and respiratory illnesses;	Act 32	Completion of reference measurements prior to start-up to serve as the basis for air quality monitoring activities
	Comply with air release standards	Act 33	Acquisition of dust masks for construction workers
		Act 27	Watering the right-of-way of the works, the traffic lanes of vehicles and construction equipment crossing inhabited areas
		Act 34	Monitoring air quality during CHRU construction and operation to enforce air pollutant emission standards
Protection against noise nuisances	Minimising noise pollution for residents	Act 35	Completion of reference measurements prior to start-up to serve as the basis for noise-monitoring activities
		Act 36	Monitoring noise levels during construction: World Bank residential standards will be applied, i.e. 55 dBA during the day and 45 dBA during the night
		Act 37	Placing construction equipment and material depot areas at least 300 m from inhabited areas and schools

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
			- the use of construction equipment provided with noise limitation systems; - the prohibition of vibration and noisy work at night; - the maintenance of motor vehicles; - the construction of temporary noise-cancelling screens around the parts of the site that are particularly noisy; - mandatory wearing of a helmet or noise-protection head gear for exposed personnel; - the construction of noise-protection enclosures for work requiring direct physical contact with the engines; the construction of noise-cancelling walls; - Sound-proofing of noisy equipment (compressors, electrical generator sets, etc.).
Protecting the living standard and well-being of the CHRU neighbouring populations	Minimise inconvenience related to restricting ad libitum access to the CHRU construction site	Act 38	Implementation of the Communication Plan
	Minimising the risk of flooding, wastewater management to protect resident	Act 39	Adequate sizing and construction of storm water drainage structures

Mitigation and bonus measures	Measurement objectives	Summary description of key activities to be carried out	
		Code	
	Leading people to adopt good environmental practices	Act 40	Achieving an environmental education for residents and the constructed sections users. - Emergency kits on site - Procedure for taking care of personnel at the construction site - Vaccination requirement for all site personnel - Requirement to sleep under a treated mosquito net - Implementation of a first aid team and trained for this purpose on the site - Set up a hygiene and sanitation awareness and monitoring team at the site - Put in place a mechanism to protect workers' financial protection (health insurance, registration with mutual or cost-sharing system) - Train all workers and personnel in safe risk management - Borehole for the benefit of the farming hamlets adjoining the site - Toilets for the benefit of the farming hamlets adjoining the site - Garbage collection system for the benefit of the farming hamlets adjacent to the site

Table 64: Environmental and Social Management Plan for the CHRU Construction Project - Preparatory and Construction Phase (Following)

Important activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Implementation of the Communication Plan	Field Audit Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	Environmental and Social Monitoring Committee	During the work	Dates of people's information concerning the project	Broadcasts of informational messages to the people about the project
Development and application of Environmental and Social Protection Action Plans	Activity Report File Verification Field Audit	Company	Environmental and Social Monitoring Committee	During the work	Availability of Environmental and Social Protection Action Plans	Effective application of environmental protection measures
Respect for the boundaries of the useful right-of-way defined for the development of the CHRU	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	Widths of rights-of- way	No additional PAP
Prevent desecration and destruction of sacred sites	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During work	No desecration of sacred places	Absence of conflicts related to sacred relationships
Work halted if archaeological remains are found to allow delimitation and investigation	Field Audit Activity Report	MDC Company Ministry of Health	Environmental and Social Monitoring Committee	Stripping Excavations	Work halted in case of archaeological discovery	Archaeological excavations
Implementation of a traffic plan in connection with the development of the CHRU	Traffic Map	Company	Environmental and Social Monitoring Committee	During the work	Traffic status	Traffic flow
Provision of the workforce with protective equipment (safety shoes, gloves, dust masks, vests, etc.)	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Personal Protection Equipment	Zero accident Zero illness

Important activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Regulation of machines and vehicles traffic	Field Audit	Company	Environmental and Social Monitoring Committee	Stripping Terracing Implementation of layers	No accidents	Zero accidents
Adequate signage of the construction site, the base and the construction car park, the exits of borrow areas and the quarries	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Traffic status No accidents	Traffic Flow Zero Accidents
Parking of machinery and vehicles on site in an orderly manner and away from areas of population influence	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During stops	Traffic status No accidents	Traffic Flow Zero Accidents
Prohibition and control of personnel to prevent working under the influence of alcohol or drugs	Status of personnel Field Audit	Company	Environmental and Social Monitoring Committee	During the work	No accidents	Zero accidents
Construction of car parks	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Parking areas No accidents	Zero accidents
Construction of fences for buildings near the CHRU (50 m)	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Existence of fences No accidents	Zero accidents
Construction of parking areas	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	Parking areas No accidents	Traffic Flow Zero Accidents
Construction of a car park or similar infrastructures in Fada N'Gourma	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	Parking areas	Zero accidents
Construction of crossing points, construction at crossing points on the NR 18	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	CHRU Crossing Areas	Zero accidents

Important activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Building a platform for the sales of miscellaneous products for the PAPs	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Existence of a market gardening platform	Operation of the platform
Putting in place adequate signage	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	No accidents	Zero accidents
Implementation of a mini health unit for first aid management at the CHRU site	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Existence of a mini health unit	Rapid first aid management
Implementation of the IEC programme against STI, HIV / AIDS and unwanted pregnancies, VBG	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	During the work	IEC Activities	Awareness Sessions Awareness Panels
Distribution of condoms to construction workers	Activity Report	Company	Environmental and Social Monitoring Committee	During the work	Distribution of condoms	Zero STI and HIV infections
Watering the right-of-way of the works, of the vehicle and equipment traffic lanes crossing inhabited areas	Field Audit Activity Report	Company	Environmental and Social Monitoring Committee	Stripping Terracing	No dust	Zero Respiratory infections Zero Accidents
Rehabilitation or upgrading of borrow areas and quarries and promoting good practices of Integrated Water Resources Management (GIRE: e. g. the principle of the water extractor and water polluter payers)	Checking the status of borrow areas	Company	Environmental and Social Monitoring Committee	During the work	State of material borrow areas	- 100% of refurbished and vegetated borrowing sites - GIRE action plan is available and implemented
Prevent uncontrolled felling of trees for work in useful right-of-way and borrow areas	Field Audit	Company	Environmental and Social Monitoring Committee	Deforestation	No uncontrolled slaughters	Works in useful right-of-way

Important activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Parking of equipment at the construction site, borrow sites and depot areas in clearing areas	Audit of the sites used	Company	Environmental and Social Monitoring Committee	During the work	State of sites for fixing materials and materials	Use of clearing areas
Construction of clearing plantations to replace the vegetation destroyed on the site	Field Audit	Company	Environmental Monitoring Committee	During the work	Tree alignment plantations	Effective existence of tree alignment plantations
Acquisition of dust masks for construction workers	Field Audit	Company	Environmental and Social Monitoring Committee	During the work	Dust masks	Zero respiratory infections
Monitoring air quality during CHRU construction to enforce air pollutant emission standards	Measurements in the field	MDC Company Ministry of Health	Environmental and Social Monitoring Committee	During the work	Compliance with air release standards	No respiratory and eye illnesses
Monitoring noise levels during construction: World Bank residential standards will be applied, i.e. 55 dBA during the day and 45 dBA during the night	Measurements in the field	MDC Company Ministry of Health	Environmental and Social Monitoring Committee	During the work	Compliance with noise standards in residential areas	Acceptable and bearable noise levels
Adequate sizing and construction of storm water drainage structures	Field Audit	Company	Environmental and Social Monitoring Committee	Performance of the work	Operation of the work	Proper operation of the work

Table 65: Environmental and Social Management Plan for the CHRU Construction Project - Operation phase

Important activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Prohibition of the uncontrolled occupation of the outskirts of the CHRU	Field Audit	City halls	Environmental and Social Monitoring Committee	Use	State of the surrounding area	No illegal installations
Construction of crossing points to the university of Fada N'Gourma	Field Audit	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	Environmental and Social Monitoring Committee	Use	Number of bypass roads built	Zero crossing-related accidents
Achieving environmental education for the CHRU site neighbouring populations	Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	Environmental and Social Monitoring Committee	Operation	Good environmental practices	Protecting area's environment

8.2. Mitigation and bonus measures

The Table above has provided all of the measures (broken down into actions) proposed to mitigate the negative impacts and enhance the positive impacts of the project. These measures, based on a range of activities, are feasible and economically effective both technically and financially. It is from this reference that the costs of all the proposed activities will be estimated, which will be discussed in the coming sections.

8.2.1. Development and implementation of a communication programme

This measure aims to minimise the project's inconvenience to local people through the provisions they themselves can take if they are informed of the progress of the work. It will also facilitate the release of the CHRU site's right-of-way for the work. Thus, the following activities are necessary:

Table 66: Communication plan activities

Act 1	Development of the Communication Plan: information of the population on the progress of the work, possible network interruptions, useful arrangements to be taken and traffic instructions by a public crier and local relays (CVD, advisors) and in the print and audio-visual press.
Act 2	Implementation of the Communication Plan during the work.

8.2.2. Development of a detailed programme of social and environmental protection actions in connection with the construction of the CHRU

The main objective of this measure is to minimise the inconveniences of the construction site on the environment. Thus, the company in charge of the work will be required to:

Table 67: Social and environmental protection activities

Act 3	Development and application of a detailed Environmental and Social Protection Actions Programme (PAPES) of the site. In fact, the Contractor is required to submit for approval of the Control Mission and to the BUNEE a PAPES within 28 days from the start of the work. At a minimum, this programme will include: • The organisation chart of the personnel assigned to its application; • The detailed plan for site facilities and material extraction sites, within 28 days from the start date of the work. This Plan must include at a minimum: – All the protection measures of the sites and their execution programmes; – The location and general map of the sites; – The solid and liquid waste management plan (including hydrocarbons); – The management plan for water extracted, with mention of the disruption of the usual collection of water by the population; – The description of methods of prevention and reduction of pollution, fires, and road accidents; – The description of health infrastructures and its access for the population in the event of an emergency; – The construction site's environmental protection and safety regulations; – The provisional plan for site development at the end of construction.
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	• A Plan to combat STI and HIV / AIDS. The outline of this plan will take into consideration at a minimum: – Characteristics of the risks and responses: ○ Sexually Transmitted Infections; ○ Incidences in the project area; ○ Individual Prevention Action. – HIV / AIDS Sensitization Programme; – 3 Responsibilities of the Responsible Body; – Implementation. • A Hygiene, Health and Safety Plan (PHSS); • Solid and liquid waste management plan of the construction site; • A plan to rehabilitate borrow sites and quarries.
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In addition, this activity will take into consideration the introduction of an internal regulation governing the behaviour of personnel at the site level.

8.2.3. Preservation of socio-economic infrastructures

Its objective is to minimise the destruction of the socio-economic infrastructures and the loss of income for local people. To do this, the following activities will be undertaken.

Table 68: Activities to protect socio-economic infrastructures

Act 4	Respect the useful right-of-way defined for the development of infrastructures of the project.
Act 5	Information and consultation with persons affected by the work according to the Stakeholder Engagement Plan (PEEP) of the developer.
Act 6	Compensation and resettlement of persons affected by the project. In general, in the project area, the land user and the landowner are often different. In fact, the lineage heads are responsible for distributing the rights to lineage land to lineage members, villagers and non-indigenous people. This allocation allows the operator and his rights holders to exploit the land almost indefinitely. Under these conditions, two categories of people are affected by the loss of agricultural land: the customary landowner who derives income from agricultural land loan only in the case of counterparties negotiated with the operators outside of the lineage and the operator who loses a source of income or livelihood. In the end, for crop losses, there are three main categories of PAP: • The customary owner who loses property; • The owner-operator who loses property and a livelihood or source of income; • The operator who loses a livelihood or source of income. All three categories of PAP benefit from compensation under the project. To mitigate these impacts, financial compensation and a Programme of Restoration of Livelihood (PRMS) are proposed. In accordance with the IFC's Performance Standard 5 compensation calculation methods are based on the principles of assessing losses in relation to the replacement costs of lost property.

Table 69: Typology and methods of compensating for property losses of the PAP

Typology of losses	Basic elements of the calculation	Compensation cost
Farm land with title of enjoyment	Area (m ² , ha): S Unit cost: CU Development cost: CA Land security fees (marking of boundaries, stamp fees, etc.): FSF	$(S \times CU) + CA + FSF$
Crops (annual harvest)	Average of a basket of staple crops with a weighting factor (wf) assigned to each crop:	$S \times RMS \times UC$ $\sum (RMS \times Cuxcp)$
Fruit and multi-purpose trees	Species: S Number of feet: Number Unit Scales used in similar projects in the project area less than a year old: US	$\sum \text{Number } f(E) \times BU$
Buildings and other constructed structures	Cost of replacing buildings Flat cash compensation rate for ancillary infrastructures	An estimate prepared by local companies according to the plans chosen for the types of houses to be built in compensation. (Cost estimates by a senior building technician)
Revenues (commercial and artisanal activities impacted)	SMIG Duration of disturbance in number of months: 3 months	$SMIG \times 3$
Other losses (cult or sacred sites, . . .)	Exceptional costs (CE) to be negotiated with the relevant PAP	CE (travel expenses)

8.2.4. Recruitment of local labour

It will provide temporary employment and income to local people, while contributing to the improvement of the local economy. As a result, the following activities will be carried out:

Table 70: Local labour recruitment activities

Act 7	Inform and display job opportunities (for example at the city halls concerned and the Eastern Regional Board) for the completion of the work.
Act 8	Focus on the local workforce, especially for unskilled jobs, while respecting Burkina Faso's labour code and taking gender into consideration.

8.2.5. Conflict prevention / regulation

The purpose of this measure is to prevent the risk of conflicts related to desecration and the non-respect of the habits and local customs and practices and the removal of natural resources for the work. Thus, the following activities are necessary:

Table 71: Conflict prevention and regulation activities.

Act 9	Sensitization of construction personnel regarding respecting the habits and local customs.
Act 11	Compensation of sacred sites according to the requirements of the PSR of the CHRU construction project.
Act 12	Prevent desecration and destruction of sacred sites or graves. Work stoppage in case of discovery of archaeological remains to allow investigations by experts. The delimitation of the site by barriers is the only procedure to be followed by the company before the intervention of the experts.

The presence, even temporarily, of the company's personnel in the project area will cause a socio-cultural mix, if the employees come from different countries (especially from the big cities of the country or abroad) and therefore with different cultures. This could lead to conflict but certainly socio-cultural mixing. It will be necessary, on the one hand, to inform the employees of the cultural habits of the populations of the project area and to make them aware of the need to respect the local culture and tradition. It will be necessary, on the other hand, to inform the residents of the difference and the probable diversity of cultures of arrivals and to sensitise them as well as the traditional authorities to the necessity of cohabitation during the works. Concerning conflicts that may result from the operation of borrow areas and the destruction of property (habitats, fields, pastures) of residents, the company must adopt an attitude of negotiation and consensus for compensation before any action.

In terms of the risk of a resurgence of farmers / breeder conflicts, it will be necessary and urgent to conduct information / awareness sessions, support agro-pastoral intensification and train leaders (municipal board, CVD, resource persons) in conflict prevention / management techniques.

8.2.6. Implementation of rules and security mechanisms

The objective of this measure is to prevent and minimise unlawful parking and traffic accidents. This requires the following activities.

Table 72: Activities for implementation of security mechanisms

Act 13	The company has an adequate traffic plan in place for the construction of the CHRU.
Act 14	Sensitization of the personnel and residents concerning the road safety guidelines.
Act 15	Provision of the workforce with personal protective equipment (safety shoes, gloves, dust masks, vests, etc.) in accordance with standard specifications concerning the international plan and encouraging the workforce to use them.
Act 16	Regulating machines and vehicles traffic.
Act 17	Adequate signage of the construction site (signs, beacons, fluorescent ribbons) visible day and night, the base camp and the construction car park, exits from borrow areas and quarries. Obstacles and excavations will be identified by security perimeters marked by highly visible fluorescent panels and / or ribbons.
Act 18	Parking of equipment and vehicles on the construction site in an orderly manner and away from areas of influence of the population. Prohibition and control of personnel to prevent work under the influence of alcohol or drugs.
Act 19	Equipment of the base camp for safety measures The base camp will be developed so that all storm water is drained to the storm water disposal system near the site. As for wastewater, it will be drained to a septic tank constructed for this purpose. The base camp premises will be equipped with all the recommended amenities for the

	proper operation of the site. For this purpose, the buildings will be ventilated, secure, equipped with different networks (telephone, drinking water, fire, etc.) and equipment.
Act 20	Construction of car parks to avoid unsafe parking near the CHRU and accidents during preparation and construction.
Act 21	Construction of fences for buildings near the construction site (notably the University of Fada N'Gourma).
Act 22	Construction of parking sites for large motorised vehicles to avoid illegal parking and the risk of accidents.
Act 23	Construction of a car park or similar infrastructures in Fada N'Gourma to allow large carriers and other vehicles to be able to park and avoid stops on the roadway.
	Construction of crossing points on the NR 18 to minimise the risk of accidents for the passage of users to the hospital or from the hospital to neighbouring centres of activities (especially towards the University of Fada N'Gourma).
	Building a platform for the sales of miscellaneous products or other IGA of the men and women affected by the project.
	Establishment of adequate signage on the NR 18 near the University of Fada and the CHRU to minimise the risk of accidents.
	Strict prohibition of occupation of security strips.

8.2.7. Protection of public health

The objectives for protecting the health of construction workers, the residents and CHRU users are:

- Give first aid on site in case of accidents or illnesses before evacuation to a suitable health centre;
- Minimise air pollution, eye and respiratory illnesses.

Activities to be carried out to achieve these goals are as follows:

Table 73: Public health protection activities

Act 24	Implementation of a mini-health unit or a first aid care system in case of accidents or illnesses before transfer to a specialised centre.
Act 25	Implementation of a programme to combat STI an HIV / AIDS and unwanted pregnancies for construction workers and populations bordering the CHRU's areas of influence. This programme will take into consideration • Information-Education-Communications (IEC) (posting, film screening, information meetings, sensitisation, etc.), • Voluntary screening. The equidistance placement of three (03) user awareness panels along the section under construction.
Act 26a	Distribution of condoms to construction site personnel.
Act 26b	Provision of the workforce with personal protective equipment (safety shoes, gloves, dust masks, vests, etc.) and encouraging them to use them.

Act 27	Watering the rights of way of works and the lanes of vehicles and machines crossing inhabited areas at least once a day in dry period.
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The project manager must insist, by good information and awareness of workers and other site personnel, that pollution of water, soil and air, the source of many diseases, is avoided.

They must avoid disseminating the solid, liquid, industrial and domestic waste they would be required to produce.

The spread of sexually transmitted infections (STI) and / or acquired immunodeficiency syndrome (AIDS) will be linked in the study area to the already effective presence of these illnesses in the field, probably in addition to the presence and the movements of infected and uninfected employees and students.

In fact, executives and employees of the company, far from their families, may be tempted, as a distraction, to engage in random sex.

A sustained campaign to raise awareness among workers, students and / or residents to the dangers they may pose in the transmission and spread of STI / AIDS, must be conducted by the developer in collaboration with the technical services and NGOs specializing in these issues. The use of condoms during unsafe sex should be made more accessible.

These different sensitizations will be made through campaigns in the field using information, education and communication (IEC) techniques and through the display of the guidelines at the base camp, and spots with images showing the consequences of the disease, advice on the use of the condom and their disposal after use.

8.2.8. Measures to mitigate impacts related to the use of energy resources

Measures to reduce pressure on energy resources will be implemented. This involves:

- Using reflective glass facades with integrated photovoltaic cells;
- Using well-insulated building materials to minimise heat transfer;
- Using presence detectors for night lighting;
- Using low energy light bulbs;
- Using high performance refrigerators and cold rooms;
- Using Variable Speed Air Conditioning (DRV) systems;

DRV air conditioning systems with variable speed refrigerant can transport the calories / frigories of an outdoor unit to several indoor units by regulating the refrigerant flow rate used by each indoor unit and needed to treat a room to be air conditioned. DRV systems simplify the installation of multiple indoor units on a single outdoor unit and are characterised by high energy efficiency.

8.2.9. Protection of the soil, water and landscape

The main objective is to prevent soil degradation. Thus, the following activity has been considered.

Table 74: Protection of the soil, water and landscape activities

Act 28	Rehabilitation or upgrading of materials of borrow areas and quarries: the Contractor will develop a management and restoration plan for the borrow sites and quarries operated, including promoting good management practices integrated water resources: • Levelling the ground; • The filling of the main excavations with stripping materials; • Stockpiling excess materials and plant soil;
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| | <ul style="list-style-type: none"> • The planting of fast-growing clearing trees adapted to the climatic and edaphic context of area for compensation purposes; • The development of some excavations in pastoral ponds at the request of local populations and easily accessible to herds and safe for the residents. It will take into consideration, a possible embankment to enhance and stabilise the walls, the waterproofing of the bottom and walls by possible contribution of fine materials, the settlement to reduce the porosity, the planting of ligneous species around the excavation and unpalatable by livestock to minimise erosion; • Removing waste to avoid silting streams and disrupting water quality. |
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The problem of the sustainability of water resources is crucial in the study area given the severity of the dry season and the water conservation and management strategy of water bodies (natural or artificial). The principle is to avoid as much as possible, conflicts of use between the companies in charge of conducting the works and the local populations that use the water resource in the water bodies and streams required for its supply.

The companies must make all necessary arrangements to avoid the depletion of resources in their water supply sites for the work. In fact, water extraction from adjoining rivers and bodies of water must be compatible with the water needs of the residents.

To do this, it is imperative that companies assess all of their water needs, identify potential sources in the study area and assess the capacity of these sources to meet their water needs in compatibility with other existing or planned activities in area.

The companies will then have to share their needs with local authorities responsible for water resource management. Depending on availability of these resources and their usual evolutionary trends over time, they will be able to negotiate with the companies the quota to be extracted, according to the seasons and the uses of the neighbouring populations. Once this quota has been stopped, the specification must be strictly respected by the company.

The company must make arrangements and ensure that, during mechanised work, extraction materials, discarded materials (during cutting and embankment work) and waste from materials and products used are not drained by runoff to load, fill and clog water bodies and streams.

To do this, permanent and rigorous monitoring of the site must be carried out during the work by the Contracting Authority and the Contractor.

In the same way, the overflow materials deposited along the internal circulation lanes being created and in the rights-of-way of the projected equipment, must be spread out and compacted gradually, in order to limit residual deposits of these.

With regard to aspects related to the pollution of surface water, ground-water, bodies of water, floodplains and soils, actions to avoid contact of hydrocarbons with the surface or underground layers of soil should be promoted.

This requires the company to build concrete storage sites for liquid products, fuel disposal and distribution products, and lubricants. It will also have to install oil and fat drain bins at the company's base camp.

The contracting authority, under the supervision of the Contractor, must ensure that the company recovers and transports the draining products to approved processing, recovery or upgrading plants.

For all these actions, the company will need to be made aware of the start-up of the project. Regulatory measures with sanctions clauses against offenders should be clearly stated and made available to companies as a remedy for non-compliance after these campaigns.

With regard to erosion and soil degradation control measures, this would mainly involve remediation activities to prevent erosion and soil subsidence, to improve the modification of the texture of the soil caused by compaction due to construction machinery traffic, the installation of construction sites, the opening of borrow pits and in particular mechanised work (earthworks, etc.). These activities will include:

- For the construction site installation, destroying all buildings and concrete areas not likely to be used in other forms, filling in the ditches created, disposing of all the construction site waste and derelict vehicles and equipment;
- For borrow pits, restore natural flows, treat the plant soil previously stored in strips during stripping, planting well-chosen species, if necessary;
- For depot areas, gradually giving away the materials deposited in order to avoid disturbance of natural flows.

No surface water is within the immediate scope of influence of the CHRU construction site. Nevertheless, control measures are recommended and are put in place, if necessary, to prevent rainwater runoff from picking up sediment and / or oil or diesel oil and contaminating ground-water. The measures that are commonly taken during construction to control the loading of flows include:

- The installation of sediment retention screens and other temporary control systems;
- The orientation of runoff to bypass the site of the work;
- The diversion of flows from neighbouring areas around the construction zone;
- Implementation of leak prevention systems (oils and greases of construction equipment) and cleaning practices to prevent contamination from runoff;
- The taking of all possible precautions when refuelling transport vehicles and heavy machinery at the work site to avoid possible spills.

8.2.10. Protection of vegetation and wildlife

This measure aims to:

- Minimise vegetation destruction;
- Improve the vegetation environment of the project area.

The activities to be undertaken in this context are as follows.

Table 75: Activities of protection of vegetation and wildlife

Act 29	Avoiding uncontrolled felling of trees by carrying out work in the right-of-way.
Act 30	Parking of equipment at the construction site, borrow sites and material depot areas in the clearing areas.
Act 31	Construction of planting sites in compensation for vegetation to be destroyed on the site.

For vegetation, the company must minimise destruction by making a wise choice and use of the site installation sites, borrow areas with authorization of the Contractor. Deforestation and clearing should be minimised by keeping trees whenever possible.

In order to replace felled trees, companies need to plant vegetation in the clearing areas as compensation.

It is also desirable for the developer for the construction and management of the CHRU to set up nurseries or to reinforce existing ones that will include, in addition to destroyed species if they can be easily planted, other fast-growing species found locally or exogenous from the CHRU. Thus, trees introduced according to a structured space occupancy plan, coupled with innovative landscaping, will improve and integrate the landscape of the site into its original environment.

8.2.11. Preservation of air quality

This measure aims to minimise air pollution and the risk of eye and respiratory illnesses.

To do this, the following activities will be conducted.

Table 76: Activities for preservation of air quality

Act 32	Completion of reference measurements prior to start-up to serve as the basis for air quality monitoring activities.
Act 33	Acquisition of dust masks for construction workers.
Act 34	Watering the right-of-way of the works, the traffic lanes of vehicles and construction equipment crossing the inhabited areas.
Act 35	Monitoring air quality during CHRU construction to enforce air pollutant emission standards.

8.2.12. Protection against noise nuisances

The main objectives of this measure are to:

- Decrease speed: A 20 km/hr speed decrease leads to a decrease in noise levels of between 1.4 and 1.8 dB(A) in the 90-130 km/hr range and between 1.9 and 2.8 dB(A) in the 50-90 km/hr range. It must be accompanied by specific developments signalling the change of area (entrance to a populated area exit from a populated area) and requiring trucks to slow down at the entrance of the populated areas;
- Traffic volume and traffic times: Arrangements must be made for the frequency of vehicles during the construction and operation phase. A traffic restriction on trucks could significantly reduce noise pollution. There should also be a prohibition of travel at certain times;
- The technical inspection service for vehicles and rolling stock of the Ministry of Transport must check the filtering elements of vehicles and construction equipment during the works, and during the operation of the zone, of the vehicles in circulation.

The following activities will be implemented:

Table 77: Activities for protection against noise pollution

Act 37	Monitoring noise levels during construction: World Bank residential standards will be applied, i.e. 55 dBA during the day and 45 dBA during the night.
	Parking of equipment at the construction site and material depot areas at least 300 m from inhabited areas and schools.

The application of good construction site behaviour will help to reduce noise during the construction phase. The Contractor should require all of these subcontractors to respect the following commitments:

- The use of construction equipment with noise limitation systems;
- The prohibition of vibration and noisy work at night;
- The maintenance of motor vehicles;
- The construction of temporary noise-cancelling screens around the parts of the site that are particularly noisy.

Measures for reduction of noise include:

- Mandatory wearing of a helmet or noise-protection head gear for exposed personnel;
- The construction of noise-protection enclosures for work requiring direct physical contact with the engines;
- The construction of noise barriers;
- Sound-proofing of noisy equipment (compressors, electrical generator sets, etc.).

8.2.13. Protecting the living standard and people's well-being

The objectives of this measure are:

- Minimizing inconvenience related to restricting ad libitum access to the site chosen for the construction of infrastructures;
- Minimizing conflict issues of competitive use of the site;
- Getting people to adopt good environmental practices.

For this we recommend the following activities.

Table 78: Activities to protect the living standard and the well-being of people

Act 38	Implementation of the Communication Plan on the CHRU construction project under a Stakeholder Engagement Plan. Implementation of up vigils and barriers to regulate the crossing of NR 18 adjacent to the CHRU.
Act 39	Sizing and properly building storm water drainage structures in the CHRU right-of-way.
Act 40	Conducting environmental education for residents and users of NR 18 and the CHRU.

8.2.14. Secure disposal of Biomedical Waste (DBM)

This measure is intended to ensure:

- An environment with no waste in reach of the patients;
- An exhaustive collection of DBM;
- A secure elimination of the DBM.

Table 79: Secure DBM disposal activities

Act 24 to 25	Implementation of DBM management and disposal procedures.
	Sizing and properly building the storage structures for DBM, incinerators and ash burial pits.
	Installing dumps at all biological liquid generating points.
	Acquisition and installation of DBM-specific bins.
	IEC CCC stickers for patients.
	Spreading awareness messages via loudspeakers.

8.2.15. Secure provision of care

The main focus will be on a system of quality and safety of patient care. For this purpose, the following actions must be taken:

Table 80: Care provision activities

Act 24 to 25	Implementation of a quality care assurance system.
	Development of procedures for the implementation of the quality assurance and certification system.
	Implementation of a cell / monitoring service for quality assurance procedures.
	Implementation of a continuing training mechanism.

8.2.16. Secure supply management

This will consist of putting in place an effective system for the management of the supply chain.

Table 81: Supply management activity

Act 24 to 25	Implementation of a quality care assurance system.
	Development of procedures for the implementation of the quality assurance and certification system.
	Implementation of a cell / monitoring service for quality assurance procedures.
	Implementation of a continuing education mechanism.

8.2.17. Monitoring

This will involve setting up a health monitoring and alert system taking into consideration the following dimensions:

- Monitoring the side effects of health products;
- Monitoring the side effects of medical procedures;
- The collection and handling of complaints with a patient feedback mechanism.

In terms of actions, these will include:

Table 82: Monitoring activities

Act 24 to 25	Implementation of a pharmaco-monitoring system.
	Implementation of a haemo-monitoring system.
	Implementation of a material-monitoring system.
	Implementation of a reacto-monitoring system.
	Implementation of a bio-monitoring, medico-monitoring system.
	Implementation of a medico-monitoring system.
	Implementation of an accountability system.

9. Environmental and Social Management Plan (ESMP)

As the potential impacts of the project are analysed, we propose an Environmental and Social Management Plan (ESMP) of the CHRU construction project. It is a plan to implement measures to mitigate negative impacts and enhance positive impacts.

In this section we will focus on potential impacts, mitigation or bonus measures, activities to be carried out as part of these measures, responsibilities, monitoring or follow-up measures, the implementation period performance indicators and performance targets. The objective is to ensure that the project complies with Burkina Faso's social and environmental policy and the IFC's safeguard policies.

9.1. Programme to implement mitigation, compensation and impact enhancement measures

9.1.1. Responsibilities in implementing the ESMP

The effective implementation of the measures proposed in the ESMP requires a clear definition of the responsibilities of the various actors involved in the implementation of the project.

■ Prime Contractor

Since the project was initiated by the Ministry of Health, it was obligated to respect Burkina Faso's social and environmental policy and environmental procedures and guidelines, and those of international financial companies. Thus, the Ministry of Health has a responsibility to enforce the measures contained in the ESMP and to report the results achieved. It will carry out this activity in parallel with the BUNEE, which will be responsible for enforcing national environmental protection regulations. They will be assisted in the execution of this task by the Control Mission (MDC) which will evolve, on the site, alongside the company and ensure the implementation of all measures.

Memorandums of understanding linking key players in the construction of the CHRU will be developed by the Ministry of Health. The people must be informed of the support measures that will be implemented.

■ Control Mission

The Control Mission (MDC) is required to monitor the company's compliance with social and environmental practices prescribed by the contract, as well as compliance with social and environmental work with respect to the specifications. The social and environmental specifications of the contract, the Environmental and Social Protection Action Plans (PAPES) of the company's construction site approved by the MDC and the Project ESMP will be the reference documents of environmental monitoring. Thus, the MDC will make a full-time Environmentalist Expert available to ensure the implementation of the measures on the site.

■ Company responsible for the work

The company responsible for the work is obligated to comply with the terms of the contract containing in particular the environmental specifications. It will recruit a competent manager (environmentalist) responsible for managing the social and environmental aspects of its contract. The company must draft through its environmentalist the Environmental and Social Protection Action Plans (PAPES) of the site approved by the MDC. These plans must include at least one:

- General plan indicating the different areas of settlement planned;
- Hygiene plan, health plan (taking into consideration STI and HIV / AIDS) and site safety;
- Water Management Plan;
- Solid and liquid waste management plan;
- Borrow site and quarry management plan;
- Evacuation plan for the construction site and the base camp;
- Risk prevention plan.

Thus, the social and environmental specifications of the contract, the PAPES of the company's construction site approved by the MDC and the Environmental Monitoring Committee (EMC), will be the reference documents to be implemented during the work by the company. The company will be monitored by the MDC for the implementation of all these social and environmental aspects.

■ **The Local Authorities: Fada N'Gourma City Hall and Eastern Regional Board**

In collaboration with the Ministry of Health, the city hall of Fada N'Gourma and the Regional Board of the East will be responsible for informing all local residents of the progress of work and their duration so that they take all the useful provisions to minimise the inconvenience on their activities.

■ **Environmental and Social Monitoring Committee**

Given the large number of stakeholders and the complexity of the tasks to be managed by the various partners, it would be desirable for the environmental monitoring activities of the site to be carried out under the coordination of a Social Environmental Monitoring Committee (CSES). This CSES will have as its mission:

- To participate in the evaluation and approval of the PAPES of the site proposed by the company;
- To ensure application of the measures contained in the social and environmental specifications of the contract, the PAPES of the company's construction site and the ESMP of the project;
- To collect grievances, complaints and suggestions from persons affected by the implementation of the project;
- To make proposals for periodic updates or improvements to proposed environmental measures as the project's execution environment changes;
- To approve compliance with the company's work and practices with environmental specifications to be implemented at the provisional and final receipt of the work;
- To develop specific reports on activities carried out covering its period of intervention on the site.

Without the creation of this committee, the functions and roles listed above could be entrusted to an already existing structure at the local level that could fully carry out this role.

In general, the public should be encouraged to report to the Committee, through the municipal councillors, any adverse environmental action related to the completion of the work.

It would be desirable for the committee secretariat to be provided by the Ministry of Health.

■ **The BUNEE**

The technical environmental services at the Fada N'Gourma level have expertise on natural resources and living standard management issues. However, in terms of monitoring compliance with environmental assessment procedures, it is recognised that Burkina Faso has basic environmental legislation and it is the BUNEE that is the applicable guarantor of this environmental regulation. In reference to Order no. 20W-029/MECV/SG/ BUNEE concerning Missions, Organisation and Operation of the National Office of Environmental Assessments and Special Waste Management, BUNEE experts have expertise in ESIA and ESMP implementation controls. As a result, BUNEE will be involved at all stages in the implementation of this CHRU construction project.

■ **Civil society, technical services and ministries in charge of transport and infrastructures**

The implementation of environmental measures could require the expertise of other structures, technical services or resource persons. For this purpose:

- The support of municipal, customary and spiritual authorities and opinion leaders will be necessary in mobilizing the population for the information and sensitisation sessions. These various authorities will also make their contributions to facilitate the release of the right-of-way of the CHRU. They will also promote social cohesion between project managers, site personnel and local populations to avoid conflict;

- Technical services or other service providers specializing in PAP expropriation and resettlement activities will be requested;
- The Ministries responsible for transport and infrastructures, through their awareness sessions, will reduce the overloads that cause road damage and traffic accidents. The risks and inconveniences arising from the theft of road signs will also need to be addressed through these sessions;
- Other technical services, NGOs and service providers deemed necessary may also be requested when implementing the site's environmental monitoring and surveillance activities.

9.1.2. Procedure for the implementation of the measures

Table 83: Environmental and Social Management Plan for the CHRU Construction Project. Preparatory and construction phase

Important activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Development of the Communication Plan: informing the population about the progress of the works, the useful measures to be taken and the traffic instructions by a town crier and in local radio programmes	Communication Plan Activity Report Field Audit	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	Environmental and Social Monitoring Committee (CSES)	Before the release of the right-of-way	- Number of forums for expression - Number of radio broadcasts - Number of Theatre-Forums	Effective availability of a Communication Plan
Information and consultation for persons affected by the work	Field Audit Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	CSES	Before the release of the right-of-way	% of PAP informed and consulted	100% of PAP informed and consulted
Compensation and resettlement of persons affected by the project prior to the start of work (Financial compensation) Programme for Restoration of Livelihood (PRMS)	Field Audit Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	CSES	Before the release of the right-of-way	- Number of PAP compensated and resettled - Amount allocated, Number of beneficiaries, a plan for the implementation of the PRMS is available	100% of PAP compensated and resettled

Important activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Information and posting of job opportunities for performance of work	Field Audit Activity Report	Company	CSES	Before the work begins	Number of posters for job opportunities	Recruitment of labour due to information and posters
Focus on the local workforce for unskilled jobs, while respecting Burkina Faso's labour code and taking gender into consideration	Field Audit Activity Report	Company	CSES	During recruitment	- Number of local jobs - % percentage of positions held by women	80% of the locally recruited workforce At least 10% of unskilled positions are held by women
Sensitization of site personnel in relation to respect for local customs and customs	Field Audit Activity Report	Company	CSES	Before the release of the right-of-way	Number of sessions to raise awareness of respect for customs	Absence of conflict due to non-compliance with customs
Sensitization in relation to the rights of women and other vulnerable people among construction workers	Field Audit Activity Report	Company	CSES	Before and during the work	Number of sensitisation sessions on respect for the rights of women and other vulnerable persons	Zero cases of violence occurring against women and other vulnerable people
Performance of a sacrifice at sacred sites (Sacred Tree and Sacred Hill)	Field Audit Activity Report	Company	CSES	Before the release of the right-of-way	Performance of a sacrifice at sacred sites (Sacred Tree and Sacred Hill)	Sacrifices made

Important activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Sensitization of personnel, people and students of neighbouring schools regarding road safety instructions	Field Audit Activity Report	Company	CSES	Before the release of the right-of-way	Number of sensitisation sessions	Effective application of Safety Guidelines
Basic equipment of the site for safety measurements	Field Audit	Company	CSES	Installation of construction site	Number of PPE provided	Zero accidents
Completion of reference measurements prior to start-up to serve as the basis for air quality monitoring activities	Activity Report	Studies Office	CSES	Before the work begins	Existence of a reference base	Effective availability of a reference base
Completion of reference measurements prior to start-up of the work to serve as the basis for noise-monitoring activities	Activity Report	Studies Office	CSES	Before the work begins	Existence of a reference base	Effective availability of a reference base
Parking of equipment at the construction site and material depot areas at least 300 m from inhabited areas and schools	Checking the position of the depot areas	Company	CSES	Installation of construction site	Number of control missions	Positioned at least 300 m from habitats and schools
Plan and minimise rural mobility at CHRU NR 18 crossing areas	Field Audit	Ministry of Health, Fada City Hall, Regional Office of Health, Eastern Regional Board	CSES	Before the release of the right-of-way	Number of control missions	Disturbances to the population minimised

Table 84: Environmental and social management plan of the construction project of the CHRU Preparatory and Construction Phase (Continuation)

Activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Implementation of the Communication Plan	Field Audit Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	CSES	During the work	- Number of forums for expression - Number of radio broadcasts - Number of Theatre-Forums	Broadcasts of informational messages to the people about the project
Development and application of Environmental and Social Protection Action Plans	Activity Report File Verification Field Audit	Company	CSES	During the work	Level of execution of Environmental and Social Protection Action Plans	Effective application of environmental protection measures
Respect for the boundaries of the useful right-of-way defined for the development of the CHRU	Field Audit	Company	CSES	During the work	Number of follow-up and control missions	No additional PAP
Avoid desecration and destruction of sacred sites	Field Audit Activity Report	Company	CSES	During the work	Number of follow-up and control missions	Absence of conflicts related to sacred relationships
Work halted if archaeological remains are found to allow delimitation and investigation	Field Audit Activity Report	MDC Company, Ministry of Health	CSES	Stripping Terracing	Number of follow-up and control missions	Archaeological excavations

Activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Implementation of a traffic plan in connection with the NR 18 development and the construction of the CHRU	Traffic Map	Company	CSES	During the work	Traffic plan execution rates related to the NR 18 development and the construction of the CHRU	Traffic flow
Provision of the workforce with protective equipment (safety shoes, gloves, dust masks, vests, etc.)	Field Audit Activity Report	Company	CSES	During the work	% of site personnel with PPE	Zero accidents Zero illness
Regulation of equipment and vehicles traffic	Field audit	Company	CSES	Stripping Terracing Implementation of layers	Number of follow-up and control missions	Zero accidents
Adequate signage of the construction site, the base and the construction car park, the exits of borrow areas and the quarries	Field Audit Activity Report	Company	CSES	During the work	Number of follow-up and control missions	Traffic flow Zero accidents
Parking of machinery and vehicles on site in an orderly manner and away from areas of population influence	Field Audit Activity Report	Company	CSES	During stops	Number of follow-up and control missions	Traffic flow Zero accidents
Prohibition and control of personnel to prevent working under the influence of alcohol or drugs	Personnel status Field audit	Company	CSES	During the work	Number of follow-up and control missions	Zero accidents

Activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Construction of car parks	Field Audit Activity Report	Company	CSES	During the work	Number of follow-up and control missions	Zero accidents
Construction of fences for buildings near the CHRU (50 m)	Field Audit Activity Report	Company	CSES	During the work	Number of follow-up and control missions	Zero accidents
Construction of parking areas	Field Audit	Company	CSES	During the work	Parking areas No accidents	Traffic flow Zero accidents
Construction of a car park or related infrastructures in Fada N'Gourma	Field Audit	Company	CSES	During the work	Parking areas	Zero accidents
Construction of crossing points, construction at crossing points on NR 18	Field Audit	Company	CSES	During the work	Accident rate related to passage on NR 18	Zero accidents
Completion of a platform for the sales activities of miscellaneous women products for the PAP	Field Audit Activity Report	Company	CSES	During the work	Income level of the PAP	Operation of the platform
Putting in place adequate signage	Field Audit	Company	CSES	During work	No accidents	Zero accidents
Implementation of a mini health unit for first aid management before transfer	Field Audit Activity Report	Company	CSES	During the work	Rate of rapid first aid management	Rapid first aid management

Activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Implementation of the IEC programme against STI, HIV / AIDS and unwanted pregnancies	Field Audit Activity Report	Company	CSES	During the work	Number of IEC activities	Awareness Sessions Awareness Panels
Distribution of condoms to construction workers	Activity Report	Company	CSES	During work	Quantity of condoms distributed	Zero STI and HIV infections
Watering the right-of-way of the works, of traffic and equipment lanes crossing inhabited areas	Field Audit Activity Report	Company	CSES	Stripping Terracing	No dust	Zero Respiratory Infection Zero accidents
Rehabilitation or upgrading of borrow areas and quarries and promoting good practices of Integrated Water Resources Management (GIRE: e. g. the principle of the water extractor and water polluter payers)	Checking the status of borrow areas	Company	CSES	During the work	State of material borrow areas	- 100% of refurbished and vegetated borrowing sites - A GIRE action plan is available and implemented
Avoid uncontrolled felling of trees	Field Audit	Company	CSES	Deforestation	No uncontrolled slaughters	Works in useful right-of-way
Parking of equipment at the construction site, borrow sites and depot areas in clearing areas	Audit of the sites used	Company	CSES	During the work	State of sites for fixing materials and materials	Use of clearing areas

Activities to be carried out	Monitoring and surveillance programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Construction of clearing plantations to replace the vegetation destroyed on the site	Field Audit	Company	CSES	During the work	Tree alignment plantations	Effective existence of tree alignment plantations
Acquisition of dust masks for construction workers	Field Audit	Company	CSES	During the work	Dust masks	Zero respiratory infection
Monitoring air quality during CHRU construction to enforce air pollutant emission standards	Measurements in the field	MDC Company, Ministry of Health	CSES	During the work	Compliance with air release standards	No respiratory and eye illnesses
Monitoring noise levels during construction: World Bank residential standards will be applied, i.e. 55 dBA during the day and 45 dBA during the night	Measures in the field	MDC Company, Ministry of Health	CSES	During the work	Compliance with noise standards in residential areas	Acceptable and bearable noise levels
Adequate sizing and construction of storm water drainage structures	Field Audit	Company	CSES	Performance of the work	Operation of the work	Proper operation of the work

Table 85: Environmental and Social Management Plan for the CHRU Construction Project. Operation phase

Activities to be carried out	Surveillance and monitoring programme	Responsible Party		Implementation period	Performance indicators	Performance target
		Execution	Control			
Prohibition of the uncontrolled occupation of the surroundings of the CHRU by various activities	Field Audit	Fada City Hall	CSES	Operation	State of the surrounding area	No illegal installations
Construction of crossing points to Fada University	In the field	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	CSES	Operation	Number of bypass roads built	Watering but also other strategic resources
Achieving environmental education for the CHRU site neighbouring populations	Activity Report	Ministry of Health, Fada City Hall, Regional Directorate of Health, Eastern Regional Board	CSES	Operation	Good environmental practices	Protecting area's environment

9.2. Environment monitoring and surveillance programme

The main objective of the monitoring and surveillance programme is to ensure that the Ministry of Health meets its environmental protection commitments and obligations throughout the project and that mitigation measures positive impacts are actually implemented during the work.

9.2.1. Organisation and responsibilities for environmental monitoring and surveillance

Environmental monitoring is the responsibility of the Ministry of Health in collaboration with the Studies Office responsible for the control mission (MDC) and the BUNEE.

An Environmental and Social Monitoring Committee (CSES) will be set up to monitor the implementation of proposed environmental measures and work in general. It could be composed as follows:

- Two (02) representatives of the Ministry of Health;
- From the MDC environmentalist;
- From the company's environmentalist;
- From one (01) BUNEE representative;
- From one (01) representative of the city hall of Fada N'Gourma;
- From one (01) representative of the Eastern Regional Board;
- PAP representatives.

9.2.2. Environmental monitoring and planning activities

Monitoring will consist of measuring and assessing the effectiveness of the ESMP after work on certain social and environmental components and implementing corrective measures, if necessary. It also falls under the prerogatives of the Ministry of Health, which will ensure its implementation in collaboration with BUNEE in conjunction with local stakeholders at the local level.

→ Follow-up activities are expected to take place annually for 5 years.

9.2.3. Indicators

■ Environmental monitoring indicators

Monitoring indicators will provide information on the implementation of the measures recommended in the ESMP. These indicators were presented in previous sections of this document. They will focus on aspects related to water quality, noise, air quality, flora and fauna, the quality of life of the PAP, health, hygiene and safety.

For environmental monitoring activities of the work, the following sheets will be used:

- Environmental inspection sheet of the work;
- Environmental inspection sheet of the base camp and fixed facilities;
- Environmental inspection sheet of borrow areas and quarries.

These cards can be modified or adapted by the Ministry of Health according to the realities in the field.

■ Social and environmental monitoring indicators

The focus of the follow-up will be:

- The spread of STI and HIV / AIDS and unwanted pregnancies;
- Tree plantations;
- Illegal waste discharges;
- The uncontrolled occupations of the environment;

- Malaria crises in populations bordering borrow areas and drainage structures;
- The development of economic activities;
- The living conditions of the compensated and resettled PAP.

For each component, the indicators, frequencies and methodology to be used are included in the Table below.

Table 86: Environmental Monitoring Indicators of the CHRU construction project

Component	Indicators	Frequency	Methodology	Operator / partners
Air quality	Discharges of pollutants into air	Two (02) times per year for two (02) years from the end of the work	Qualitative and quantitative measures of pollution discharges in air	Ministry of Health
Noise nuisances	Noise level when crossing residential areas	Two (02) times per year for two (02) years from the end of the work	Measurements of noise levels when crossing residential areas	Ministry of Health
Spread of HIV / AIDS infections	Number of new STI and HIV / AIDS cases in the Project's area of influence	Once (01) per year for two (02) years from the end of the work and the implementation of the CHRU	Collecting and processing data recorded by the Health Services of area	Health districts of area
Tree plantings	Species, number, density, diameter	Two (times) per year from the planting dates	Sampling on reforestation areas (borrow areas and quarries)	Landscape sections of Fada N'Gourma City Hall, Eastern Region Environmental Technical Services
Illegal waste discharges	Number of depot areas, waste-covered area along the project's area of influence	Two (02) times per year for two (02) years from the end of the work	Collection to be carried out by a technician in the Project's area of influence	Fada N'Gourma City Hall
Illegal environmental occupations of the CHRU	Number of homes and socio-economic infrastructures in the right-of-way of the CHRU	Two (02) times per year for two (02) years from the end of the work	Collection to be made by an agent. Direct counting of installations by type	Road sections of Fada N'Gourma's City Hall

Component	Indicators	Frequency	Methodology	Operator / partners
Illegal parking	Number and types of vehicles illegally parked on the edges of roadways	Two (02) times per year for two (02) years from the release	Direct collection through field visits	Police services
Malaria crises	Incidence of malaria crises treated in health centres in children under 5 years of age in areas bordering borrow pits and drainage works	Two (02) times per year for two (02) years from the end of the work	Collecting and processing data recorded by the Health Services of area	Health districts of area
Development of economic activities	Number and types of economic activities created along axes, amount of taxes collected by the city halls concerned	Two (02) times per year for two (02) years from the release	Collecting and processing the data recorded by the City Halls concerned	Tax services and the city hall of Fada N'Gourma
The living conditions of the compensated and resettled PAP	Number of PAP with improved standard of living	Two (02) times per year for two (02) years from the date of compensation and resettlement	Data collection and processing	External Expertise

9.2.4. Capacity building

The process of building the capacity of actors for the implementation of social and environmental measures will take the form of training and will focus on social and environmental management.

Environmental monitoring and surveillance operations, the conducting of property assessment and appraisal work, the organisation of sensitisation meetings, the monitoring of the implementation of accompanying measures and the follow-up of the breakdown of environmental activities of the construction site, etc.

The actors involved are:

- Ministry of Health officials;
- Members of the local commission of the monitoring committee in charge of social and environmental monitoring and surveillance;
- The agents of the construction companies responsible for the enforcement of social and environmental measures.

9.2.5. Complementary initiatives

Expropriations will be carried out as part of the construction of the CHRU. Thus, the Ministry of Health will integrate the identified PAP and work to implement a PSR or RAP in connection with the deterioration of their livelihoods.

In particular, the Ministry of Health will ensure that financial compensation is provided in accordance with international standards. Experience shows that all PAP rarely have the skills to manage large capital over the long term and invest in a sustainable manner. This lack of skills often opens the door to opportunistic behaviour, new stressors within families and the community, but also to cyclical claims of compensation against the project when compensation is fully spent.

The environmental safeguard principles of the International Finance Corporation thus stress that cash allowances must be avoided and if they are chosen by PAP, they must be:

- Supported by training on capital management;
- Be the subject of a self-empowerment project with regard to the project;
- Delivered in several annuities.

In terms of the restoration of livelihoods, the Ministry of Health will pay particular attention to annual monitoring of the socio-economic and vulnerability profile of PAP.

The project for which the ESIA is in question here is a university-based hospital in the Eastern Region. The project in its operational phase will produce large quantities of biomedical waste. In accordance with national and international environmental legal and regulatory instruments, it is necessary for a management plan for this waste to be developed to support efficiency in the implementation of this ESMP. For this reason, it is suggested that complementary initiatives be undertaken in this document by developing a biomedical waste management plan for this future establishment.

The data concerning biophysical parameters (air, water, noise, soil) in this study were based on measurements taken from other ESIA's in the city of Fada N'Gourma. To serve as a reference base for monitoring these parameters in the context of the construction project of the CHRU of Fada N'Gourma, it is also important that further studies be initiated for this purpose.

9.3. Project costs of proposed environmental measures

Table 87: Project costs of proposed environmental measures

Activities to be implemented	Responsible Party	Cost in CFA francs
Development of the Communication Plan: informing the population about the progress of the works, the useful measures to be taken and the traffic instructions by a town crier and in local radio programmes	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	6,000,000
Providing information and consultation to those affected by the work	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	5,000,000
Compensation and resettlement of persons affected by the project (Financial compensation)	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	60,000,000
Programme for Restoration of Livelihood (PRMS)		
Information and posting of job opportunities for performance of work	Company	15,000,000

Activities to be implemented	Responsible Party	Cost in CFA francs
Focus on the local workforce, especially for unskilled jobs, while respecting Burkina Faso's labour code and taking gender into consideration	Company	15,000,000
Sensitization of site personnel in relation to respect for local customs	Company	15,000,000
Sensitization in relation to the rights of women and other vulnerable people among construction workers	Company	15,000,000
Performance of a sacrifice at sacred sites (Sacred Tree and Sacred Hill)	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	300,000
Sensitisation of personnel, populations and students of the schools along the river in relation to respecting road safety instructions	Company	15,000,000
Basic equipment of the site for safety measurements	Company	15,000,000
Completion of reference measurements prior to start-up to serve as the basis for air quality monitoring activities	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	25,000,000
Completion of reference measurements prior to start-up to serve as the basis for noise-monitoring activities	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	25,000,000
Parking of equipment at the construction site and material depot areas at least 300 m from inhabited areas and schools	Company	15,000,000
Plan and minimise rural mobility at CHRU NR 18 crossing areas	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	15,000,000
Implementation of the Communication Plan	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	25,000,000
Development and application of Environmental and Social Protection Action Plans	Company	15,000,000
Respect for the boundaries of the useful right-of-way defined for the development of the CHRU	Company	15,000,000
Prevent desecration and destruction of sacred sites	Company	15,000,000
Work halted if archaeological remains are found to allow delimitation and investigation	Ministry of Health, Fada City Hall, Regional Directorate of Health, Fada Regional Board	5,000,000
Implementation of a traffic plan in connection with the development	Company	15,000,000

Activities to be implemented	Responsible Party	Cost in CFA francs
Provision of the workforce with protective equipment (safety shoes, gloves, dust masks, vests, etc.)	Company	15,000,000
Regulation of machines and vehicles traffic	Company	15,000,000
Adequate signage of the construction site, the living area and the construction car park, the exits of borrow areas and the quarries	Company	15,000,000
Parking of machinery and vehicles on site in an orderly manner and away from areas of population influence	Company	15,000,000
Prohibition and control of personnel to prevent working under the influence of alcohol or drugs	Company	15,000,000
Construction of car parks	Company	15,000,000
Construction of fences for buildings near the CHRU (50 m)	Company	15,000,000
Construction of parking areas	Company	15,000,000
Construction of a car park in Fada	Company	15,000,000
Construction of crossing points, construction of shelters at crossing points, construction of bypasses	Company	15,000,000
Building a platform for the sales of miscellaneous products for PAP	Ministry of Health	45,000,000
Putting in place adequate signage for NR 18	Company	15,000,000
Implementation of a mini health unit for first aid management before transfer	Company	15,000,000
Implementation of the IEC programme against STI, HIV / AIDS and unwanted pregnancies	Company	15,000,000
Distribution of condoms to construction workers	Company	15,000,000
Watering the right-of-way of the works and traffic lanes of vehicles and equipment crossing the inhabited areas	Company	15,000,000
Rehabilitation or upgrading of borrow areas and quarries and promoting good practices of Integrated Water Resources Management (GIRE: e. g. the principle of the water extractor and water polluter payers)	Company	15,000,000
Avoid uncontrolled felling of trees by carrying out work in useful right-of-way and borrow areas	Company	15,000,000
Fixing construction equipment, borrowing sites and depots in clearing areas	Company	15,000,000

Activities to be implemented	Responsible Party	Cost in CFA francs
Development of cleared plantations following the destruction of the site's vegetation	Company	15,000,000
Acquisition of dust masks for construction workers	Company	15,000,000
Monitoring air quality during construction work in the Project's area of influence	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	
Monitoring noise levels during construction: World Bank residential standards will be applied, i.e. 55 dBA during the day and 45 dBA during the night	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	25,000,000
Adequate sizing and construction of storm water drainage structures	Company	15,000,000
Prohibition of the uncontrolled occupation of the outskirts of the CHRU	City halls	5,000,000
Construction of crossing points, construction of shelters at crossing points, construction of bypasses	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	45,000,000
Achieving environmental education for residents and users in the Project's area of influence	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	20,000,000
Expert, Environmental and Social Management Training, Environmental Monitoring and Monitoring Operations, Conducting Property Assessment and Assessment Work, Organizing Awareness Meetings, Monitoring the Implementation of Measures accompanying, monitoring of the counting of environmental activities of construction sites, etc. , ongoing road site visit on social and environmental management.	Ministry of Health, Fada N'Gourma City Hall, Regional Directorate of Health, Eastern Regional Board	25,000,000
Environmental monitoring missions	Ministry of Health	35,000,000
Operation of the Environmental Monitoring Committee	Ministry of Health	25,000,000
Unexpected (10%)		19,500,000
Total		214,500,000

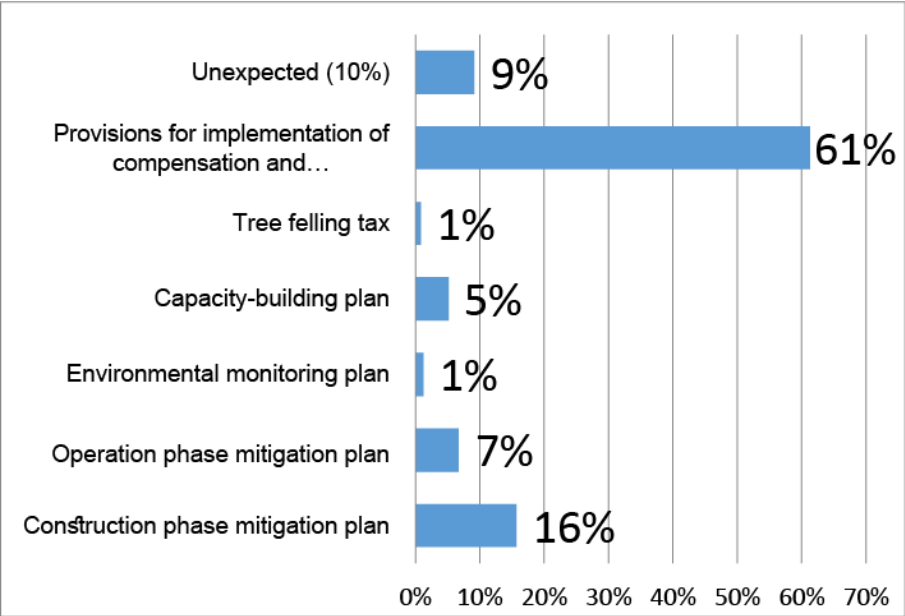


Figure 32: Structuring the cost of the Fada CHRU 's ESMP

10. Information and public consultations

According to the IFC's Performance Standard 1, for the Assessment and Management of Risks and Environmental and Social Impacts, stakeholder engagement is the basis for a strong, constructive and reactive relationship essential to good management of social and environmental impacts of a project. Thus, disclosure of relevant project information helps affected communities and other stakeholders to understand the risks, impacts and opportunities resulting from the project.

In fact, advance information and public involvement are essential conditions to ensure stakeholder involvement in the project. In this regard, Article 12 of Decree No. 2015- 1187/PRES-TRANS/PM/Merh/MATD/MME/MS/MARHASA/MRA/MICA/MHU/MIDT/MCT of 22 October 2015 on the conditions and procedures for the implementation and validation of the strategic environmental assessment, study and environmental and social impact statement states that any initiator of policies, projects, programmes, works, developments, activities or any other initiative that could have significant impacts on the environment shall inform the local administrative authority and the public by any appropriate means of the location of the proposed project for the completion of the strategic environmental assessment, and the study or the environmental and social impact statement.

In addition, Article 16 of the same decree specifies that the public is informed of the completion of the strategic environmental assessment, study or environmental and social impact statement and participates in it in collaboration with the relevant administrative district and the territorial community concerned.

As part of this study, the team met with institutional stakeholders as well as residents of the project area. These meetings, conducted in the form of individual interviews, or focus groups or large assemblies, were intended to provide relevant information about the project and its implications, and to gather the opinions, concerns and suggestions of different stakeholders.

Although overall, the project is favourably received by the various stakeholders, they have identified some concerns related to the completion of the infrastructure.

Table 88: Concerns related to the project

Phases	Targets	Activities	Actors in the Work	Method	Tools Utilised	Results	Comments / Suggestions
Preparatory and field phase	Representatives of the Ministry of Health Actors of local authorities (Regional Board, Mayor, SG, State Agent, etc.)	Project information Availability and status of the land	Consultant / Actors of local authorities (Regional Board, Mayor, SG, State Agent, etc.)	- Introducing the TOR and methodology and time table - Exchanges and discussions	Proposed methodology for performance of the study; Terms of reference of the mission	- Harmonised understanding of the TOR - Methodology adopted - Forecasted work schedule set	✓ Length of the process which leads to doubt that the project will be implemented; ✓ Risk of illegal occupations and conflicts; ✓ Feasibility of the project because of method of realisation (PPP); ✓ Ensure regular communication with actors in the field and give them information on the progress of the project; ✓ Set the stage, set up an intermediation committee and involve local customary authorities; provide compensation to the landowners concerned; ✓ Implementation of the project by the State itself or through PTF funding agreements.
	Representatives of the Ministry of Health	Information concerning the project Institutional anchorage	Consultant / Representatives of the Ministry of Health	- Introducing the TOR and methodology and time table - Exchanges and discussions	- Introducing the TOR and methodology and time table - Exchanges and discussions	Harmonised understanding of the TOR - Methodology adopted - Forecasted work schedule set	✓ Length of the process that leads to doubt that the project will be implemented; ✓ Risks of occupation of the ground by squatters; ✓ Communicate with all actors

Phases	Targets	Activities	Actors in the Work	Method	Tools Utilised	Results	Comments / Suggestions
							✓ Visit the site and ask for the involvement of the city hall to resolve any possible issues
	Governor, decentralised technical services	Information about the project and its implications; Support of administration	Consultant / Governor, decentralised technical services	- Introducing the TOR and methodology and time table - Exchanges and discussions	- Introducing the TOR and methodology and time table - Exchanges and discussions	Harmonised understanding of the TOR - Methodology adopted - Forecasted work schedule set	✓ Management of the social and environmental impacts that will be created ✓ Ensure the current status of the site with the city hall ✓ Involve the relevant services for proper impact management
	Residents	Information concerning the project Loss of property Conflict prevention and management	Consultant / Residents	- Introducing the TOR and methodology and time table - Exchanges and discussions	- Introducing the TOR and methodology and time table - Exchanges and discussions	Harmonised understanding of the TOR - Methodology adopted - Forecasted work schedule set	Concerns were raised in relation to project-related nuisances / deprivations / losses and fair compensation mechanisms
	The royal palace of Fada						

The study will be made available to the public for possible comments in accordance with national regulations. Copies will be deposited in the designated premises and in collaboration with the city hall of Fada N'Gourma). The purpose of this distribution is to:

- Validate the ESIA with local authorities;
- Identify residual conflicts arising from the project and find a solution to them;
- Identify responsibilities in each compartment of the ESIA.

BUNEE officials will be asked for the public restitution of the interim report by the Consultant so that all observations and remarks can be included in the final report. After this process, the competent services and the public survey will issue the statement concerning issuing reasoned opinions on the environmental feasibility of the project.

11. Conclusion and recommendations

This impact study report shows that the Fada CHRU construction project is perfectly feasible in relation to the social and environmental plan.

Two arguments support this assertion:

- The project will take place on land of about twenty hectares belonging to the State of Burkina Faso represented by the Ministry of Health. This land was granted to the Ministry of Health, as a gift, by the city hall of Fada N'Gourma after having made necessary arrangements to compensate all stakeholders with rights to the site.
- The positive impacts far outweigh the negative impacts, the most important of which will be the subject of achievable mitigation measures at reasonable costs. In fact, the implementation of the environmental and social management plan requires funding of **214,500,000 CFA francs**, about **0.62 %** the total cost of new investments in the CHRU construction project, which is **34,765,742,775 CFA francs**.

The implementation of certain mitigation measures will provide opportunities to improve public health provision at the regional level, the creation of new technical platforms in relation to care. These technical platforms will also be used to support training and research in the field through the university vocation of the infrastructure.

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Annex 1: List of resource people met

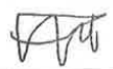
LISTE DES PERSONNES RESSOURCES RENCONTREES

N°	NOM ET PRENOM (S)	Sexe	Profession/structure	Contact	Signature
01	M ^r Gamba Lucien	M	DA - CHR - Fada	70243876	
02	ZOANE Mady	F	DAF - CDR FG	70348825	
03	DIABOUGA Alina	F	DSCL-CHR-Fada	70356439	
04	NIKIEMA Romuald	M	DAEEVCE-est	71603571	
05	Belele P. Smoussa	M	Protocole Mairie	70380576	
06	Kabane Kassoum	M	Secrétaire général Mairie	7183287	
07	Lamkoandé T. Celestin	F	Agent demandeur Mairie	70265001	
08	Zongo Paripougouini	F	PCR-Est	70285414	
09	Sialle Aly	M	Le vice président du CRE	52105353	
10	HARO Ylliasse	M	Chargé de communication	70110933	
11	ZABDA S. Amédée	M	Service du cadastre	70072552	
12	ZONGO Bis Selwendé	F	T/S Aménagement	78092271	
13	BELEMILGA I.W. Rolland	M	chef cadastre de l'Est	70778537	
20	Londo Casimir	H	RDTF - Gourma	78810225	
21	LOUARI Jean-Claude	M	EPC FADA	70220070	
22	OUERMOGO Arouna	M	Mairie - Fada	78-24-79-19	

Annex 2: Focus Group - Population neighbouring the site

LISTE DE PRESENCE/ FOCUS GROUP

Commune : Fada Cible : Populations riveraines du site
 Date : 30/05/2019 Lieu : Palambeu

N°	NOM ET PRENOM (S)	Sexe	Profession/structure	Contact	Signature
01	VONCI Ninja	M	chef de gare exploitant du site		
02	NABA Mopagnin	M	Agriculteur/ Fils propriétaire terrien	70438776	
03	NABA Amoungia	M	Agriculteur Fils propriétaire terrien	71138648	
04	SONDE Amadou	M	Riverain du site	70759990	
05	BANDE Sambo	M	Habitant riverain du site	71140424	
06	SONDE Belko	M	Habitant riverain du site	70943260	
07	BANDE Hamba	M	Habitant riverain du site	70626865	
08	BANDE Sabou	M	riverain du site	72642326	
09	SONDE Adou	M	riverain du site		
10	BANDE Yoli	M	riverain du site		
11	BANDE Karim	M	riverain du site	61697873	
12	DIALLO Hamadou	M	riverain du site	75941550	
13	BANDE Bouréma	M	riverain du site	72149164	
14	BANDE Abdoulaye	M	riverain du site	52802784	

Annex 3: Focus Group - Women from the Fulani Camp

LISTE DE PRESENCE/ FOCUS GROUP

Commune : Fadala Cible : femmes campement paulh
 Date : 20/05/2018 Lieu : Nalambou

N°	NOM ET PRENOM (S)	Sexe	Profession/structure	Contact	Signature
	Bando Djendou	F	éleveuse	63832581	
	LIDO Fatimata	F	ménagère		
	B Souda Djana	F	ménagère		
	BANDE mariama	F	ménagère	62246195	
	Bani Kambo	F	ménagère		
	Boli maimeuma	F	ménagère		
	Diallo Djemila	F	ménagère		
	LIDO madina	F	ménagère		
	LIDO Djemila	F	ménagère		
	LIDO madina	F	ménagère		

Annex 4: CHRU site assignment order

MINISTERE DE L'ECONOMIE
ET DES FINANCES

BURKINA FASO

SECRETARIAT GENERAL

UNITE - PROGRES - JUSTICE

DIRECTION GENERALE DES IMPOTS

DIRECTION DES AFFAIRES
DOMANIALES ET FONCIERES

Arrêté n°2014- 286 /MEF/SG/DG/D
portant affectation au Ministère de la Santé d
terrain d'une superficie de 20 ha 10 a 26 ca enviro
sis hors lotissement dans la commune de Fa
N'Gourma

LE MINISTRE DE L'ECONOMIE ET DES FINANCES,

- Vu la Constitution ;
- Vu le décret n°2012-1038/PRES du 31 décembre 2012 portant nomination du Premier Ministre ;
- Vu le décret n° 2013-002/PRES/PM du 02 janvier 2013 portant composition du Gouvernement ;
- Vu la loi n°034-2012/AN du 02 juillet 2012 portant réorganisation agraire et foncière au Burkina Faso ;
- Vu la loi n°020/96/ADP du 10 juillet 1996 portant institution d'une taxe de jouissance pour l'occupation et la jouissance des terres du domaine foncier national appartenant à l'Etat ;
- Vu le décret n° 2014-481/PRES/PM/MATD/MEF/MHU du 03 juin 2014 déterminant les conditions et les modalités d'application de la loi 034-2012 /AN du 02 juillet 2012 portant réorganisation agraire et foncière au Burkina Faso ;
- Vu la demande du Ministère de la Santé en date du 17 avril 2014 ;

Sur note du Directeur Général des Impôts,

ARRETE:

33/08/2014
11
45
Recette (Dir. Gourma)

ARTICLE 1: Il est affecté au Ministère de la Santé un terrain d'une superficie de 20 ha 10 a 26 ca environ sis hors lotissement dans la commune de Fada N'Gourma, Province du Gourma, pour les besoins du Centre Hospitalier Régional de Fada N'Gourma.

Ledit terrain est limité:

- au Nord par un terrain vague ;
 - au Sud par un terrain vague ;
 - à l'Est par un terrain vague ;
 - et à l'Ouest par un terrain vague ;
- tel au surplus qu'il figure au croquis ci-annexé.

ARTICLE 2: La présente affectation, à publier au livre foncier de la Province du Gourma de la circonscription foncière de Fada N'Gourma par les soins du Receveur des Domaines et de la Publicité Foncière du Gourma, sera inscrite au registre des terrains prévu par l'article 373 du décret n° 2014-481/PRES/PM/MATD/MEF/MHU du 03 juin 2014 déterminant les conditions et les modalités d'application de la loi n°034-2012/AN du 02 juillet 2012 portant réorganisation agraire et foncière au Burkina Faso.

ARTICLE 3: Le présent arrêté sera enregistré, publié et communiqué partout où besoin sera.

Ouagadougou, le 13/08/2014



Lucien Marie Noël BEMBAMBA.
Commandeur de l'Ordre National

Ampliations:

- 1 - MEF
- 2 - DGI
- 1-STCF de l'Est
- 1 - DGAIE
- 1 -DGUTF
- 1 -HC du Gourma
- 1 -Mairie de Fada N'Gourma
- 1 -Ministère de la Santé
- 5 -Dossier
- 1 - J O

Annex 5: Report of Assignment of the CHRU site

Ministère de l'Economie et des Finances

BURKINA FASO
Unité- Progrès- Justice

Secrétariat Général

Direction Générale des Impôts

Direction Régionale des Impôts de l'Est

Direction Provinciale des Impôts du Gourma

Recette des Domaines et de la Publicité
Foncière du Gourma

N°2014- 42/MEF/SG/DGI/DRI-E/DPI-GRM/RDPF-GRM

PROCES-VERBAL DE PALABRE

(Article 184 du décret n° 97-054/PRES/PM/MEF du 06/ 02/1997 portant conditions et modalités d'application de la loi portant Réforme Agraire et Foncière au Burkina Faso)

Pour la constatation de l'accord des exploitants et dépositaires des coutumes s'y rapportant d'un terrain d'une superficie de 20ha 10a 26ca sis hors lotissement à Fada province du GOURMA, demandé par le Centre Hospitalier Régional de Fada, en vue de construire un centre de santé.

Le Directeur Général s'est fait représenté par Monsieur ZOURE Dramane.

L'an deux mille quatorze et le jeudi 14 mars, s'est tenue à Fada commune de Fada N'Gourma, la palabre pour la constatation de l'accord des exploitants et dépositaires des coutumes d'un terrain d'une superficie de 20ha 10a 26ca sis en zone hors lotissement dans la même localité.

Ledit terrain est limité :

- Au nord par un terrain vague
- Au sud par un terrain vague
- A l'Est par la RR 18
- A l'ouest par un terrain vague

Etaient présents :

- Le représentant du maire LANKOANDE Celestin
- Le représentant du service des domaines : ZOUNGRANA Oumarsou
- Le superficière coté est : YONLI Nindia CNDB n°B 2712635 du 17/03/2010
- Le superficière coté sud-ouest : BANDE Hamma CNIB n°B 2601541 du 03/05/2010

Direction Provinciale des Impôts du Gourma

- le superficiaire coté nord-ouest : NABA Alasane CNRB n° B5918644 du 04/11/10
- Les notables du village : YONLE A Tambado CNRB n° B 2700911 du 10/05/11
- le conseillé : TANDAMBA Daouda CNRB n° B1097723 du 01/10/2008
- Le demandeur : Centre Hospitalier Régional de Fouda (CH-R Fouda).

Le représentant du service des Domaines a informé les participants à la palabre que le demandeur a introduit un dossier de demande de terrain auprès de service des Domaines en vue d'y édifier un...Centre...Régional...de...Santé..... Il a précisé aux coutumiers qu'en cas d'accord les droits ainsi cédés sont définitifs c'est à dire irrévocables.

Les parties prenantes ont ensuite procédé à la visite du terrain, ce qui a permis le repérage des limites de l'espace sollicité ; les avis et les observations suivants ont été recueillis :

- Superficiaires : Nous sommes très contents de voir se réaliser un centre où nous pouvons nous faire soigner. Toutes nos familles respectives, par un vœu, vous saluent et vous donnent volontiers leur terrain. Nous souhaiter la réalisation dans les délais le meilleur.
- Notables : Nous nous réjouissons qu'un grand centre se réalise chez nous pour le bonheur de tous. Nous rassurons l'administration de notre soutien dans la réalisation de ces infrastructures.
- Représentant du maire : Nous sommes très enchantés par le projet. Nous souhaitons vivement la réalisation dans les délais les meilleurs ces infrastructures sanitaires. Nous nous engageons toujours dans la résolution des problèmes de santé.
- Représentant du DG du CHR Fouda : Au nom de Monsieur le Directeur général du CHR-Fouda, Au nom de tous les bénéficiaires et de mon propre, Nous remercions les superficiaires pour leur vive élève de l'intérêt général. En effet, le futur CHR sera un service public de santé. Sa mission sera l'amélioration de la santé des populations.

En foi de quoi, le présent procès-verbal a été dressé pour servir et valoir ce que de droit.

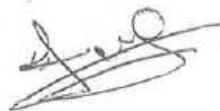
Ont signé :

Superficiaires

YONLI Nindia (Côté Est)

BANDE Hamma (Côté Ouest)

Demandeur



ZOURE Dramane

Représentant du maire



Notable



YONLI A Tamboulo

NABA Alansane



Conseiller



TANDAMBA Saoudou

Représentant du service des
domaines

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Annex 6: Environmental clauses to be included in the DAO of the CHRU

The present clauses are intended to help the persons in charge of the preparation of the bidding documents or contracts for execution of the construction work of the CHRU of Fada so that they can integrate in these documents prescriptions permitting the optimisation of the protection of the environment and the socio-economic environment. They also relate to security provisions relating to measures for prevention against hazards and risks.

The clauses apply to all activities of the project that may be a source of social and environmental nuisances. However, it remains true that not all cases can be considered and that the proposed clauses should serve as a guide and do not replace the recommendations of the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP) of the construction project of the Fada Hospital.

1. ENVIRONMENTAL AND SOCIAL IMPACTS IN THE BIDS

The bidder must submit in its bid:

- a plan for carrying out activities;
- measures that will be taken to protect the environment;
- rehabilitation work and a methodological presentation describing how it intends to avoid the negative effects of minimizing the unavoidable effects.

In addition, bidders must submit, at the time of submission of their bid, the final Programme for Environmental and Social Management, including the Environmental Protection Plan (PPE) and the Safety and Health and Hygiene Plan (PHSS) according to the international standards of SAS 18001: 2007, which is essentially inspired by the measures recommended in the ESMP of the construction project of the Fada CHRU.

2. ENVIRONMENTAL ASPECTS IN THE SPECIAL REQUIREMENTS SPECIFICATIONS (CPS)

2.1. General obligations

The holder of the construction contract for the construction project of the CHRU of Fada must respect and apply the existing laws and regulations on the environment and in force in Burkina Faso. In the day-to-day organisation of its work, it must take all appropriate measures to minimise damage to the environment, by applying the requirements of the contract and ensuring that its personnel members, individuals in charge of those and its local employees, respect them and apply them as well.

2.2. Execution programme

Within sixty days of notification of award of the contract, the Contractor responsible for the construction of the CHRU must establish and submit for approval to the representative of the Ministry of Health of Burkina Faso a definitive detailed social and environmental management programme (including the EMP (or environmental management plan of the site) and PHSS), including the following information:

- the executive personnel organisation chart with clear identification of the person responsible for the social and environmental management of the project;
- a site management plan that includes:
 - * a site waste management plan (type of waste planned, collection method, mode and place of storage, mode and disposal location);
 - * a water management plan (mode and source of supply, flows used, discharges, etc.), the treatment system for waste water at construction sites, the location of the discharge and the type of control planned, etc.
 - * a land use plan.
- a general description of the methods proposed by the Contractor to reduce the impacts on the physical and biological environment of each phase of work;
- a general description of the measures proposed by the Holder to improve positive socio-economic impacts and avoid negative impacts.

2.3. Plans of the Contract Holder

In the process of executing the contract, the Contract Holder establishes and submits the following documents for approval of the control mission (consulting engineer) and to the Ministry of Health of Burkina Faso:

- **One month before the installation of construction sites and storage areas:**
 - the location of the land that will be used;
 - a list of agreements made with the current owners and users of these areas and evidence that these users may have found similar areas to continue their activities;
 - A detailed review of the various sites;
 - an environmental policy;
 - a health, hygiene and safety policy;
 - a general plan showing the different areas of the site, the planned developments and a description of the planned developments;
 - a detailed site environmental protection plan for the base camp, before construction begins;
 - amended waste management plan;
 - description of measures to prevent and combat pollution and accidents such as soil pollution, groundwater and surface water, fires and bushfires, construction accidents, etc. ;
 - the description of the planned health infrastructure and its organisation;
 - a list of measures planned to ensure a supply of food (meat, fish, etc.) and wood to workers, and those planned to encourage the purchase of local products from the project area, with the exception of hunting meat;
 - the plan to redevelop areas at the end of the work;
 - articles of the site regulations dealing with respect for the environment, waste, actions planned in the event of an accident, obligations in relation to operation of vehicles, of repair and maintenance of vehicles.
- **One month before the phase of tree cutting:**
 - a plan for cuttings and the planned use of felled trees, with aim of minimizing as much as possible these cuttings;
 - a work plan with the relevant technical services responsible for this component.
- **Monthly:**
 - An update on the level of safety on the site and the measures implemented to keep the site at a high level;
 - An account of the preventive measures put in place on the construction sites.
- **At the end of the work:**
 - The evaluation document of the work that has been done with the indications of the environmental improvements that have been made.

2.4. Safety on the construction sites

The Holder will be subject to the specific health and safety standards defined by Burkina Faso regulations. It will organise a current and emergency medical service at the base camp, adapted to the personnel of its workforce. In addition, it will have on its team a safety coordinator who will ensure maximum safety on the site and in the base camp for both workers and the public and other people in contact with the site. Companies will also have to submit a copy of their insurance, especially for dependent workers in the event of serious or fatal accidents. All employees will be required to sign a code of conduct clearly stating the behaviours to be prohibited, such as sexual contact with minors.

2.5. Safeguarding local properties

Under the control of the consulting engineer, the Contractor must clean up and dispose of any form of pollution due to its activities at its own expense, and compensate those who have suffered the effects of this pollution.

2.6. Barriers to traffic circulation

The Contractor must permanently maintain the circulation and access of the local residents during the works. The concerned residents are those whose habitat existed before award of the contract was notified. The maintenance of the work sites in operation during the night will be conditional on authorisation of the work inspector. If the Contractor has received authorisation or the order to carry out work during the night, it will undertake to carry this out, so as not to cause disturbance to the inhabitants and establishments neighbouring the site. The lighting method must be subject to approval of the Consulting Engineer. The Contractor will ensure that no excavation or trenches remain open at night between 6 p. m. and 6 a. m. without proper signage accepted by the Consulting Engineer. The Contractor must implement a speed limit for all vehicles travelling on public roads, in the corridor and in the right-of-way.

2.7. Work log

In addition, the work log will include all records of missing persons or incidents that have had a significant impact on the environment or an accident or incident with the population and the specific corrective measures.

2.8. Guarantee obligations

The Contractor for this agreement is required for the duration of the project guarantee period, to carry out the routine maintenance of the works performed and to remedy the negative impacts that may be observed. Environmental aspects, such as vegetation recovery, stream flow recovery and recovery of the water system of the waterways, agricultural land reclamation, are also covered by this one-year guarantee period.

2.9. Sanctions and penalties

Under the provisions of the Special Administrative Terms and Conditions, non-compliance with social and environmental clauses is a reason that could lead to sanctions and / or penalties. In addition, a company that is guilty of repeated non-application of environmental clauses may be subject to more severe penalties of up to its exclusion (for a period of five years) from the right to bid.

2.10. Receipt of the work (partial receipt - final receipt)

Under the contractual provisions, non-compliance with these clauses in the context of the implementation of the construction project of the CHRU of Fada, the refusal to sign the report of provisional or final receipt of the work leads to the blocking of the retention of the performance guarantee.

The execution of each environmental measure must be the subject of a partial receipt. The obligations of the contract holder run until the final receipt of the work, which will be acquired only after complete execution of the environmental improvement work envisaged in the contract, and after noting the recovery of the vegetation and / or planting.

2.11. Notification

Any infringement of the requirements duly notified to the company by the control must be corrected. The resumption of the work or additional work resulting from the non-respect of the clauses is the responsibility of the Contractor.

3. ENVIRONMENTAL ASPECTS IN THE CPTP

3.1. Installation of construction site

The Contractor will propose to the control mission (consulting engineer) the location of its site facilities and will present within one month, from the date of notification of the start of work, a protection plan for the environment of the site including:

- a construction site waste management plan (type of waste planned, collection method, mode and place of storage, method and place of storage, method and place of disposal, etc.);
- a water management plan (method and source of supply, flows used, discharges), the treatment system planned for waste and industrial water of the construction sites, the place of discharge and the type of control planned;

- a comprehensive management plan for the operation and rehabilitation of the borrow pits (actions against erosion, flood and landslides, planned redevelopment).

Depot areas should be chosen so as not to interfere with the normal flow of water and should be protected against erosion. The Contractor must obtain approval of the controller for the deposit areas. The surface to be discovered must be limited to a strict minimum and quality trees must be preserved and protected.

3.2. Implementation of the work

The importance of the installations is determined by the volume and nature of the work to be done, the number of workers, the number and the type of machinery. The site installation plan must take into consideration the following arrangements and protective measures: (i) the site to be chosen must be located at a distance of at least 500 m from water points, and far enough away from homes to avoid nuisances; (ii) the site must be chosen so as to limit the felling of trees, the destruction of homes, shops, businesses, workshops, agricultural areas or market gardening; (iii) the site must be chosen outside sensitive areas; (iv) storage or handling areas for hazardous, toxic, flammable or polluting products must be developed to provide effective protection of the soil and subsoil; (v) at the end of the work, the Contractor shall return all of the areas to their original state, in particular the removal of any remaining materials, the removal of waste material, the smoothing and levelling of the construction site, the disassembly and removal of installations.

3.3. Internal regulation

An internal regulation of the installation of the site must specifically mention:

- safety rules (vehicle speed limited to 80 km/hr in open country and 40 km/hr in built-up areas);
- the prohibition of hunting, the consumption of hunting meat, the misuse of firewood;
- the prohibition of the transport of bush meat by construction equipment;
- respect for the habits and customs of the population and human relations in general;
- measures to minimise the risk of STD and AIDS infection.

Information and awareness sessions are to be held regularly and the regulation is to be displayed visibly in the various facilities.

3.4. Equipment

Office and housing areas should be provided with sanitary facilities (toilets, septic tanks, wells, washbasins and showers) according to the number of workers and workers present at the sites. Water tanks must be installed in sufficient quantity and quality and adapted to the needs.

3.5. Start-up meeting

During the site visit with the company responsible for carrying out the work, the BUNEE representatives must be present, in addition to the experts from the "Environment" Department of the Ministry of Health of Burkina Faso.

The authorities, the regional and local technical services and the population must be informed about the nature of the work that will be carried out and this will be the place to collect any observations from them. The information on the work must specify their routes and locations likely to be affected by the work and their duration. Details will be given to the populations who will be made aware of the possible travel cases and the terms of compensation. No matter what justifications are mentioned, no activity can start on the ground before the payment of the expropriation compensation. At the end of this meeting, the company will, if necessary, set the date of a joint review visit with the local agents of the Nature Conservation, for the identification of the protected plant species found in the right-of-way of the works and the determination of the solutions relating thereto.

3.6. Employment of local labour

The Contractor is required to hire (apart from its technical personnel) as much labour as possible from the villages along the river and area where the work is being carried out. Failing to find qualified personnel on site, it is permitted to hire labour from outside the project area. Child labour is certainly prohibited. To reinforce this positive impact of job creation for locals, the company will need to adopt a communication and exchange strategy with communities and local authorities to find the best ways to recruit local personnel. This strategy should focus on:

- with equal qualifications and for unskilled jobs, the recruitment priority will be given to workers who are nationals of the communities concerned by the CHRU construction project;
- for qualified jobs, recruitment will be done according to the required administrative and regulatory procedures, and under the responsibility and requirements of the developer.

3.7. Protection of construction workers

The Contractor must equip his workers with necessary and adapted safety equipment, including individual or collective protective equipment.

3.8. The company's internal briefing note

The company must issue an internal information note to make workers aware of the following topics:

- sensitisation of the workers to the respect of the habits and customs of the people of area where the works are carried out;
- sensitisation of workers and subcontractors on the risks of STD and AIDS infection.

3.9. Demolition work on workshops and various infrastructures

The Contractor must inform and sensitise the concerned populations before any house demolition activity, as part of the construction of the Fada CHRU, in order to define and agree upon the compensation terms. He must make sure that the compensation is actually fixed and paid to the rightful owners before any demolition, in agreement with the consulting engineer of the project.

3.10. Protection of the environment from noise

The contractor is required to limit construction noise likely to seriously inconvenience residents, either by an excessively long period or by its extension outside normal working hours. All operations that may be sources of noise must be agreed upon with the consulting engineer before being started, with a view to minimising the inconvenience to residents.

3.11. Protection against exhaust gases and hydrocarbons

Depots and other storage facilities for fuel, lubricants or hydrocarbons, as well as the contractor's equipment maintenance facilities, must comply with the requirements for these types of installations.

3.12. Protection from solid residue

The Contractor is required to take all the necessary measures to prevent the building sites, roads, shoulders and sidewalks from being soiled by sludge, excavations or materials resulting from the work. In the event of demolitions of existing structures, measures will be taken by the Contractor to prevent the raising and spread of dust.

3.13. Protection of surface water and ground-water

The Contractor shall avoid any spillage or discharge of sewage, sludge, hydrocarbons, and pollutants of any kind into surface water or ground-water, sewers, drainage ditches or into the river.

3.14. Waste management

Receptacles for receiving waste are to be installed near the various places of activity. These receptacles are to be emptied periodically and waste is to be deposited in an appropriate, waterproof container, which will need to be drained regularly. The location of the containers must not cause any particular nuisance on the surrounding environment. The maintenance and washing areas of the machines must be concreted and provided with a sump for recovering oils and greases. This maintenance area must have a slope towards the sump and towards the interior of the platform in order to avoid the flow of the polluting products towards the unprotected soil. Used oils are to be stored in barrels to be stored in a secure place while waiting for their recovery for other uses. Used oil filters and batteries are to be stored in watertight containers and disposed on in an authorised landfill.

3.15. Burning of waste

The Contractor is asked to identify, from the start of the construction sites, buyers for this waste among residents (fodder for livestock, timber, firewood, etc.). It is strictly forbidden to burn cut-up vegetable waste on site, especially in the Sahelian zone to avoid risks of the spread of brush fires.

3.16. Signage of the work

The company must put up signage in accordance with the drawings and indications provided and implement work-in-progress signage (flag-holders, panels, reflectorised bands) for obstacles, materials and equipment throughout the construction phase of the CHRU.

3.17. Loading and transporting materials and equipment

When transporting materials and equipment to the site, the Contractor must:

- take the necessary measures to limit the speed of vehicles;
- ensure that trucks and construction equipment keep a maximum speed of 40 km/hr, especially when crossing villages and towns;
- load trucks in order to avoid material loss during transport.

3.18. Removal of the construction site and termination of work

The site must provide adequate drainage of water over its entire area. At the end of the work, the Contractor will carry out all the work necessary for the restoration of the site. The Contractor must disassemble all is equipment, machinery and materials. It will not be able to abandon any equipment or material on the site or in the surroundings after the equipment has been removed; a report of the site being restored must be prepared and attached to the report of the receipt of the work.

4. REPORTING SYSTEM TO BE IMPLEMENTED

4.1. Environment Protection Plan (PPE)

This plan covers the construction activities, the setting up and the operation of the facilities for monitoring and coordination of works, upkeep or maintenance, and the production of materials (borrows). The objectives of this plan are to:

- Limit, mitigate negative impacts and compensate for irreversible impacts on the site of activities under the direct responsibility and control of the company;
- Provide adequate and effective responses to incidents concerning the components of the biophysical environment.

- Facilitate the dialogue between the Contractor and the company regarding the topics related to the management of the Project environment;
- Provide the information required to the Contractor regarding environmental aspects as a result of the work of the company.

Also, this plan will provide details on:

- the responsibility of the members of the company in application of the measures;
- the environmental approach on the construction site in relation to risk management;
- the procedures for the implementation of environmental measures (operational procedures, means / control plan).

The PPE will be provided with a daily registration document called: the worksite environment journal. This document highlights potential environmental issues and proposed measures to mitigate them. It recalls the methods of application of each measure as well as the daily care. It is the journal of the site, in view of the biophysical environment, but also, it is the report card and provides information on the evolution of measurements and impacts.

4.2. Hygiene, Health and Safety Plan (PHSS)

Through this plan, the company will agree to take precautions to ensure hygiene, health and safety at the work site. For this purpose, it will put in place a general concept integrating the effective involvement of its personnel in the management of the risks related to the execution of this work. This document is developed to serve as the basis for the Health, Safety and Hygiene component. This is essentially summed up in actions of:

- Prevention;
- Training;
- "Zero accidents" safety results;
- Promoting respect for safety as a priority in the workplace and even outside of it.

This plan must provide details on:

- the responsibility of the members of the company in the management of hygiene, health and safety on the site;
- the resolution of conflicts between the safety objectives and those of the work;
- the performance evaluation;
- the mechanism for managing health, safety and hygiene aspects;
- personnel training and the implementation of PPE / EPPs;
- methods and means of monitoring and controlling performance;
- the safety procedures;
- the mechanism for management of conflicts between workers.

The PHSS must be equipped with a registration form: a notebook of the incidents. This booklet will keep all incidents up to date (work accidents: burns, cuts, poisoning, fires, etc.) that occur during each project activity. It is the daily journal of the site. This document will enable the company to determine the factors, periods and frequencies of risks associated with its activity. It also permits the identification of additional and / or corrective measures. The PPE and the PHSS must trace the grievances of the ESMP by giving more details on the means deployed by the company to take charge of the environmental and social measures, in order to mitigate and compensate the negative impacts on the one hand and on the other hand to improve positive impacts. To be effective application documents, the company must in their development take into consideration the requirements based on environmental management systems (ISO 14001), quality management systems (ISO 9001) and health, safety at work management systems (OHSAS 18001). Therefore, in each document, there must be easily identifiable:

- mechanisms for registration of health / safety incidents and environmental accidents;
- mechanisms for performance evaluation, real-time identification of residual impacts and non-compliance in application of measures;
- a detailed non-compliance management procedure.

4.3. Monthly environmental report

At the end of each month, the Environmentalist will make available a report describing all the efforts made by the company in terms of support and measures. It will describe activities carried out in this direction, actors involved, the relevance of activity, the results obtained and the perspectives. Apart from all these concerns necessary for better management of the environmental aspects attributable to the project, the company needs to develop environmental policy and hygiene, health and safety policy. As an electrical equipment construction company, these policies must influence all of these activities and provide major guidance for achievement of the company's objectives.