ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

WORKING DRAFT 1

FOR THE

CASHEW NUT PROCESSING PLANT IN KANKAN, GUINEA REPUBLIC

BY

Diaoune Agro Industrie .sarl

PREPARED BY:

RF Richflood

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LIST OF ABBREVIATIONS AND ACRONYMS

AFI	Association of Food Industries
AIDS	Acquired Immune Deficiency Syndrome
Al	Aluminium
ALARP	As Low As Reasonably Practicable
AOI	Area of Influence
APHA	American Public Health Association
AQS	Air Quality Standards
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BAT	Best Available Technology
BGEEE	Bureau Guinéen des Etudes et Evaluation Environnemental
BOD	Biological Oxygen Demand
Br	Bromine
Ca^{2+}	Calcium
CEPC	Cashew Export and Promotion Council
CEPCI	Cashew Export Promotion Council of India
Cl-	Chloride
CNS	Cashew Nut Shell
CNSL	Cashew Nut Shell Liquid
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
Co	Cobalt
CRO	Complaint Resolution Official
cT	Tropical-Continental
DFC	Development Finance Corporation
DO	Dissolved Oxygen
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EHS	Environment, Health and Safety
EPA	Environmental Protection Agency
ESIA	Environmental & Social Impact Assessment

ESMP	Environmental & Social Management Plan
ESMS	Environmental and Social Management System
E&S	Environmental and Social
Fe^{2+}/Fe^{3+}	Iron
GBVH	Gender-Based Violence and Harassment
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GIS	Geographical Information System
GPN	Good Practice Note
GPS	Global Positioning Sysytem
GW	Groundwater
H&S	Health and Safety
HSE	Health Safety and Environment
HIV	Human Immunodeficiency Virus
IA	Impact Assessment
IFC	International Finance Corporation
ILO	International Labour Organisation
IOP	Internal Operation Plan
ITCZ	Inter-Tropical Convergence Zone
K^+	Potassium
LWP	Large White Pieces
Mg	Magnesium
Mn	Manganese
MSDS	Material Safety Data Sheets
mT	Tropical-Maritime
MV	Means of Verification
Ni	Nickel
NOx	Nitrogen Oxides
NO_2-	Nitrite
NO_3-	Nitrate
OHS	Occupational Health and Safety

OSHA	Occupational Safety and Health Administration
PACs	Project-Affected Communities
PAP	Project Affected Persons
Pb^{2+}	Lead
PO_4^2	Phosphate
PPE	Personal Protective Equipment
QMS	Quality Management System
PS	Performance Standard
RAP	Resettlement Action Plan
RCIA	Rapid Cumulative Impact Assessment
RCN	Raw Cashew Nut
SCC	Species of Conservation Concern
SEP	Stakeholder Engagement Plan
SOGICO	Societe de Gestion Immobilière et de Construction
SO_2	Sulphur Dioxide
SS	Soil Sample
SSP	Scorched Small Pieces
SP	Scorched Pieces
SRTM	Shuttle Radar Topography Mission
STD	Sexually Transmitted Disease
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UN	United Nations
UNECE	United Nations Economic Commission for Europe
WB	White Butts
WBG	World Bank Group
WHO	World Health Organization
WMP	Waste Management Plan
WS	White Splits
WSP	White Small Pieces
WW	White Whole

WWTP	Wastewater Treatment Plant
Zn	Zinc

UNITS OF MEASUREMENTS

%	Percentage
<	Less Than
≤	Less Than/Equal to
>	Greater Than
≥	Greater Than/Equal to
°C	Degree Celsius
G	Grammes
g/l	Grammes per litre
kg	Kilogramme
Km	Kilometer
m	Metre
mg/l	Milligramme per litre
µg/m^3	Microgramme per metre cubic
°C	Degrees Celcius
S	Second

CHAPTER ONE
INTRODUCTION

1.1 Background

This report presents the Environmental and Social Management Plan (ESMP) developed for the Cashew-nut Processing facility in Kankan, Republic of Guinea by Diaoune Agro-Industrie Sarl (DAI). An environmental and Social Management Plan (ESMP) is essentially a management tool that outlines management strategies for safety, health and environmental stewardship in the implementation of a development project. ESMP states in specific terms how the commitments of the project owner will be implemented to ensure sound environmental practice. The ESMP ensures that these recommendations are translated into practical management actions which can be adequately resourced and integrated into the Project phases and activities.

This ESMP is designed in line with DAI's Health, Safety and Environment (HSE) policy and in accordance with ISO 14001 Environmental Management System (EMS) specifications. The ESMP for this project shall be a "living document" which shall be reviewed periodically with the incorporation of various mitigation measures for the associated impacts and shall form the basis for the actual project implementation. Elements of this plan will be incorporated into the overall Environmental and Social Management System (ESMS) of the project that will be used to deliver the Project's HSE regulatory compliance objectives and other related commitments.

The ESMP assures that the mitigation measures developed for reducing the effects of adverse impacts to *As Low As Reasonably Practicable (ALARP)* are adequate. It also ensures that the enhancement measures developed for the beneficial impacts are implemented and maintained throughout the project lifecycle. Compliance with the legal standards on safety and environment is regarded as the minimum requirement and must be satisfied during all phases of the Project development.

1.2 Objectives of the ESMP

The main aim of the ESMP is to ensure that various adverse impacts associated with the project are mitigated and positive impacts are enhanced. It is developed to ensure that all identified impacts during all stages of the projects are handled by the most efficient and cost-effective methods. Having the ESMP in place ensures a systematic approach to bringing environmental and social considerations into decision making and day-to-day operations. It establishes a framework for tracking, evaluating and communicating environmental and social performance and helps ensure that environmental and social risks and liabilities are identified, minimised and managed.

Specifically, the ESMP is designed to:

- Ensure progressive reduction of the impacts of the project activities on the biophysical, socio-economic and health environment with the ultimate aim of eliminating them;
- Ensure that all mitigation and enhancement measures developed for the elimination or minimization of the adverse project impacts and the beneficial impacts respectively are fully implemented;
- Provide part of the basis and standards needed for the overall planning, monitoring, auditing and reviewing of environmental and socio-economic performance throughout the project's life cycle.
- Establish clear procedures and methodologies for incorporating environmental management requirements including stakeholder engagement in the implementation of the project and allsub-project activities;
- Ensure the project is carried out in accordance with the national and international regulatory frameworks such as Guinea, DFC, World Bank/IFC, and AfDB guidelines among others;
- Provide a strategy for the integration of social and environmental consideration at all stages of the project planning, design, execution and operation of various sub-projects;
- Provide guidelines to appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social impacts of the project and sub-projects;
- Identify modalities for estimating and budgeting the costs for the implementation of the Environmental Management Plan for the projects.
- Determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMP;

1.3 Scope of the ESMP

The ESMP has been developed to meet international standards on environmental and social management performance, specifically those set out by the U.S. International Development Finance Corporation (DFC), IFC/World Bank, and Guinea among others. This ESMP will be incorporated into the Environmental and Social Management System (ESMS) of the company. The ESMP is intended to cover all the activities of the project. Provision will be made for updating the outline ESMP once the detailed project design is complete and for adapting the ESMP to relevant project stages as part of the overall EMS.

In addition to the mitigation and enhancement measures developed for the project, this ESMP also includes the desired outcomes; performance indicators; targets or acceptance criteria; and timing for

actions and responsibilities. DAI will have principal responsibility for all measures outlined in the ESMP but may delegate responsibility to its contractors, where appropriate. In cases where other individuals or organizations have responsibility for mitigation measures, this is indicated in the ESMP.

1.4 Methodology of ESMP

The ESMP is based on the assessment study carried out for the project. The ESMP consists of a set of mitigation, monitoring and institutional measures to be implemented during operations of the project to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed for the implementation of these measures.

1.5 DAI's Organisation of ESMP Compliance

Diaoune Agro-Industrie Sarl is committed to providing resources essential for the implementation of the ESMP, such resources include the appropriate human resources and specialized skills. DAI will have dedicated personnel competent based on appropriate education, training, and experience that will manage and oversee the HSE aspects of project activities.

The key personnel required for the implementation of the ESMP as well as their responsibilities are described below:

1. DAI management shall be primarily responsible for ensuring that environmental commitments are met throughout the project phases.
2. Supervision of subcontractor activities will be conducted by the DAI's General Manager and the Operations Manager. This will be accomplished through management controls over strategic project aspects and interaction with subcontractor staff. The DAI organisation will be staffed at a level to allow for continuous effective supervision of subcontractor activities and work products.
3. The site Manager shall be designated to be responsible for all site activities, and shall report to the Managing Director/General Manager.
4. The HSE manager shall be responsible for coordinating and reporting all environmental issues as contained in the ESMP, such as ensuring that emergency, procurement and construction contractors comply with all HSE and statutory requirements.
5. The DAI Project Management shall retain the primary responsibility of ensuring that environmental commitments are met throughout the life cycle of this project.
6. The Health Safety and Environment (HSE) manager and Public Relations (PR) manager shall be responsible for all environmental and socio-economics-related matters. This is to ensure

compliance with regulatory standards as well as DAI HSE policies and standards. The HSE and Public Affairs (PR) Units shall for effectiveness, work closely with the site Sectional heads/Managers, to ensure compliance with international best practices as well as DAI environmental commitment and operating procedures. The DAI's management through the DAI HSE and Public Relations Manager shall be responsible for implementing the mitigation measures for the environmental impacts of the cashew-nut processing project. This shall be within the scope of DAI HSE policy and regulatory requirements as well as standard industry practice.

Furthermore, DAI management shall establish a schedule for responsibility matrix and training on matters relating to the environment. Environmental issues shall be a line responsibility for which all levels of personnel are accountable. Top management shall ensure that all environmental considerations are integrated into project execution. Likewise, to ensure that the mitigation measures would be implemented as required, responsibilities shall be apportioned to each proffered measure. Figure 1.1 below provides the DAI organogram.

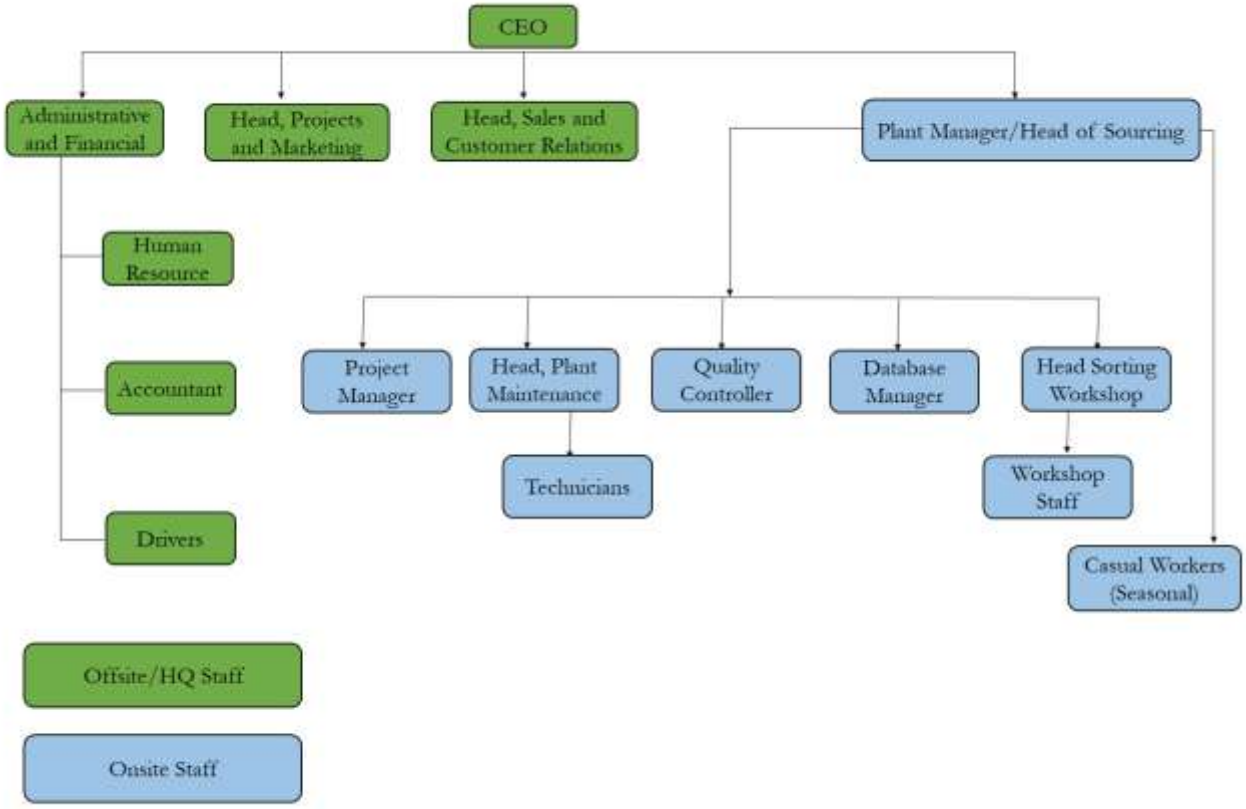


Figure 1.1: Organization Chart of Diaoune Agro-Industrie SarlARL

Source: DAI SARL Business Plan Report

1.6 Policy, Legal and Institutional Framework

1.6.1 Guinean Institutional Context

The food production industry activities in Guinea are regulated by the Ministry of Agriculture and Livestock. The ministry is dedicated to national food security through collective intelligence and engineering. The Decree D/2016/123/PRG/SGG of April 20, 2016, guides the activities of the Ministry of Agriculture and Livestock.

The responsibilities of the Ministry of Agriculture and Livestock include but are not limited to the following:

- To design and develop legislation and regulations that guide agricultural matters and to ensure their application,
- To design, develop, implement and ensure the monitoring and evaluation of national agricultural development strategies,
- To promote the private sector in the development of agricultural production sectors,
- To design and implement agricultural development programs and projects and to monitor them,
- To ensure the establishment of hydro-agricultural infrastructure, rural buildings and agricultural tracks,
- To design and define lines of applied research in rural development and food security,
- To promote technology transfer, agricultural advice, supervision, support for rural women and the structuring of the rural world,
- To contribute to the achievement of food security,
- To design the agricultural map,
- To create a database on the agricultural sector,
- To support the emergence of a dynamic private sector for the production, supply and local distribution of agricultural inputs and equipment,
- To stimulate the development of agro-industrial and export crops,
- To ensure the maintenance of agricultural statistics,
- To strengthen the information and communication system at the level of actors in the agricultural sector,
- To ensure the protection of plants, information, awareness and education of the population on the subject,
- To ensure the rational management of natural resources in terms of land tenure security and soil fertility,

- To participate in the implementation of the regional economic integration policy,
- To participate in the establishment and strengthening of credit and savings structures adapted and accessible to producers and operators in the rural world,
- To put in place mechanisms for resolving farmer-herder conflicts,
- To participate in meetings, symposiums, conferences, seminars and sub-regional and international negotiations dealing with issues relating to the areas of competence of the Ministry,
- To take into account the environmental dimension in the programs and projects of the sector;
- To promote gender and equity in the activities of the sector.

1.6.2 Ministries relevant to the project

Environmental affairs are the responsibility of the Minister of Environment and Sustainable Development (Ministère de l'environnement et du développement durable). Other relevant ministries of the current Government of Guinea are:

- Ministry for Town & Country Planning, (Ministre de la ville et de l'aménagement du territoire);
- Ministry for Youth and Youth Employment (Ministre de la Jeunesse et de l'Emploi des Jeunes);
- Ministry for Industry and Small and Medium Enterprises (Ministre de l'Industrie et des Petites et Moyennes Entreprises);
- Ministry for Technical Education, Professional Training, Employment and Work (Ministre de l'Enseignement Technique, de la Formation Professionnelle, de l'Emploi et du Travail);
- Ministry for Territorial Administration and De-centralisation (Ministre de l'Administration du Territoire et de la Décentralisation);
- Ministry for Culture, Arts and Cultural Heritage (Ministre de la Culture, et du patrimoine historique);
- Ministry for Health (Ministre de la Santé);
- Ministry for Spatial Planning (Ministre du Plan);
- Ministry for Social Affairs, Women's Promotion and Childhood (Ministre de l'action sociale de la Promotion féminine et de l'Enfance); and
- Ministry for Transport (Ministre des Transports).

1.7 Guinean Regulatory Framework relevant to the Project

1.7.1 The Environment Code

The Environment Code or the Code for the protection and development of the environment (Ordinance No. 045/PRG/87 of 28 May 1987, as amended by Ordinance No. 022/PRG/89 of 10 March 1989 on the code of protection and enhancement of the environment) establishes the administrative and legal framework enabling the Guinean State to deliver on its constitutional obligation to provide for a clean and healthy environment to every person in Guinea.

The Environment Code is the cornerstone of environmental protection and enhancement in Guinea. It sets out the fundamental legal principles to be complied with to ensure the protection of environmental resources and the human environment. Article 73 of the Title IV of the code relates to the legal regime of classified installations for environmental protection and establishes the administrative and financial requirements applicable to classified facilities.

Article 82 of Title V of the code sets out that a project proponent must submit an environmental impact study to the relevant regulatory authority for projects, structures or installations that may, by their size or the nature of their activities, have an impact on the environment. Article 83 provides for a Decree to establish a list of activities that require an environmental impact study and the content, methodology and procedure to follow in relation to the environmental impact study: Decree n°199/PRG/SGG/89 of 18 November 1989.

1.7.2 Regulations on Environmental and Social Impact Assessment

Presidential Decree No.199/PRG/SGG/89 of 18 novembre 1989, made under Article 82 and 83 of the Environmental Code (Code de l'Environnement) (Décret présidentiel 199/PRG/SGG/89 du 18 novembre 1989 portant Codification des études d'impact sur l'environnement, pris conformément à l'article 82 et 83 du Code de l'environnement), sets out the projects requiring an environmental impact assessment (EIA) study.

1.7.3 The Classified Installations for Environmental Protection

Presidential Decree n°200/PRG/SGG/89 of 8 November 1989 (promulgated under Article 73 of the Environmental Code) relating to the legal regime of classified installations for environmental protection establishes the administrative and financial regime applicable to classified facilities.

Classified facilities are facilities that, due to the nature of their activities or the actual volume of activities, require special authorization under Guinean law on the environment. Order n°93/800/PRG/SGG of 22 October 1993 lays down the technical nomenclature of classified

installations for environmental protection and lists all industrial activities under the Presidential Decree 200/PRG/SGG/89 and for which an integrated permit is required. This order sets for each industrial activity threshold that reflect the level of potential damage resulting from the activity and from which different requirements apply. Industrial sites are classified as sites of class I or class II according to the level of damage to the environment.

Article 2 of Presidential Decree n°200/PRG/SGG/89 requires the owner or operator of a classified installation to present its request for environmental authorization at the same time as the request for a building permit. In accordance with Article R221-1 of the Urban Code (Law L/98 No 17/98 of the 13 July 1998), a building permit must be obtained before the construction of any building. However, this permission can only be obtained after obtaining environmental authorization for a classified facility.

1.8 Regulatory Framework on Land

In Guinea, the land law has several objectives:

- To exercise control over the development process using permissions development/building permits, this must be obtained from the local planning authorities before development can take place. In most cases, a building permit can only be achieved if the government made a favourable decision for the Project under the Environmental Impact Assessment process.
- To protect the environment through conditions, agreements, etc. related to environmental protection in a grant of development permission, via, for example, the need to obtain an environmental permit (also called authorization for classified installations) before production can begin.

1.8.1 Land and Estate Code (Code Domanial et Foncier)

Ordinance n°O/92/019 of 30 March 1992 establishes the Land and Domanial Code. The Land and Domanial Code deals primarily with property registered and details the registration process with titles, leases and deeds. It defines two procedures for land registration:

- Through the land plan: it is an administrative document, and not a title in itself, which is kept at the municipal level in the cities and in the community for rural development in rural areas.
- Through the registration of land ownership: this leads to the issuance of a freehold. The document will be kept in the service of conservation of land title.

The 1992 Guinea Land Code (Code Foncier et Domanial) introduced an elaborate land privatization and registration system – at least on paper. The code affirms state ownership of vacant land and grants individuals the right to own land. Land ownership is established through land registration. In practice,

these procedures of land registration have not been fully implemented in rural areas, where customary rights (« droits coutumiers ») predominate; in the absence of formal private property, the land is essentially a state property.

1.9 Forestry Code

Guinea's Forestry Code, 1999 (Loi L/99/013/AN portant Code Forestier), governs the country's forests. The Code also establishes guides for the protection of the national forests and the management of its key resources. The Code recognizes the need to engage the rural population in a participatory management process for both classified and community forests, and the right for communities to manage forests through local forest associations. It devolves control of the forest to the country's elected rural councils, supported by forestry service representatives. The Code recognizes the need for forest management plans (plans d'aménagement) to be prepared in collaboration with the local population, and calls for the transformation of forest service agents from enforcers to advisors

1.10 Urban Planning Code

Law L/98 n° 017/98 of 13 July 1998 adopting and promulgating the Law on Planning Code of the Republic of Guinea (also known as the Urban Planning Code) sets out the responsibilities of the Guinean State in the management and development of the country. This control is exercised by the Minister of Urban Planning who drafts the National Planning Scheme (Schéma National d'Aménagement du Territoire - SNAT), and the Regional Development Plans (Plan de Développement et d'Aménagement Régional - PDAR) that provide to different levels of government the tools to influence urban development.

In addition to the Urban Planning Code, the Government of Guinea issued the Declaration of Rural Land Policy (Decree D / 2001/037/PRG), which aims to promote rural economic and social development by guaranteeing property rights and rules favourable to agricultural development in rural areas, improving the sustainable management of resources and allowing the development of a market for transparent and fair land. This decree is the strategic framework for the management of rural land.

1.11.1 Local Government Code

At a local level, the Local Government Code ("Code des Collectivités Locales"), relating to the devolution of powers from central government, defines the powers, duties, and active fields as well as the limits of community action in local communities.

This Code sets out the roles and responsibilities of local communities in the management of land use. As such, the municipality must give an opinion before any project investment and before any

occupation / land use. Local communities share responsibility for the management of land use with the state.

1.12 Specific Environmental Legislation

1.12.1 Biodiversity

Regulation on the protection of species is defined in the Code for the Protection of Wildlife and Hunting Regulations (Law L/97/038/AN of 9 December 1997 adopting and promulgating the Code of protection of wildlife and rules for hunting). This Code sets out the legal framework for the protection, conservation and management of wildlife and flora, and their habitats; and provides for the recognition of the right to hunt. It also describes certain rules concerning hunting and aims to promote the sustainable use of species and ensure their sustainability for the satisfaction of human needs. This Code and its interaction with the ESIA legislation is currently the cornerstone of the protection and enhancement of biodiversity in Guinea.

1.12.2 Wildlife

Wildlife Code (Loi L/99/038/AN), enacted in 1998, which sets out the policy on the protection of wildlife and their habitats as well as the regulation of hunting of unprotected species; the Environmental Protection Law (Code de la Protection et de la Mise en Valeur de L'environnement, Ordonnances N°045/PRG/87 et N°022/PRG/89), which seeks to combine protection of the environment with sustainable development of natural resources; and the Decentralization Law (Loi Portant Code des Collectivités Locales en République de Guinée), which defines the legal regime and rights of local collectives. Guinea is a signatory to several international agreements on environmental practices and policies.

The Code is supported by a National Policy on flora and fauna, setting conservation goals and an action plan for their conservation, rehabilitation and development. In addition, the Code states that certain species of flora and fauna are a national resource that must be protected. It lists species that must be fully protected or partially protected. In addition, there are several policy actions in favour of biodiversity, including:

- National Action Plan for the Environment;
- National Forestry Action Plan;
- Mangrove Forest Management Plan;
- Scholarship Program in the energy sector; and
- National Program for Sustainable Human Development.

1.12.3 Air emissions

The following Guinean Standard defines the air emission limits: NG 09-01- 011:2012 / CNQ: 2004 relating to new standards for air pollutant emissions (Norme Guinéenne NG 09-01-011:2012 / CNQ: 2004 sur la Pollution Atmosphérique– Rejet).

These texts are applicable to any new and existing fixed or mobile installation that emits atmospheric emissions (including vehicles).

The texts require that anyone that operates or intends to build a facility that emits air pollutants shall provide the competent authority with the following information:

• the nature and quantity of emissions;

• location and height of the point of discharge; and

• other characteristics of the discharge, needed to estimate emissions.

In addition, limit for air quality standards are set. These are summarized in Table 1.1.

Table 1.1: Air quality standards: Guinean directives

Pollutants	Guinean Limits	Statistical definitions
SO_2	50 µg/m^3	Yearly average
	125 µg/m^3	Daily average
NO_2	40 µg/m^3	Yearly average
	200 µg/m^3	Hourly average
PM_{10}	80 µg/m^3	Yearly average
	260 µg/m^3	Daily average
$PM_{2.5}$	65 µg/m^3	Yearly average

Table 1.2: Emission limits for stationary combustion units: Guinean directives

	Guinean standards (draft)	
Pollutants	**Heavy Fuel**	**Diesel (DO)**
CO	650 mg/Nm^3	450 mg/ Nm^3

	Guinean standards (draft)	
Pollutants	**Heavy Fuel**	**Diesel (DO)**
NO_X	300 mg/ Nm^3	165 mg/Nm^3
SO_2	2,000 mg/ Nm^3	-
Dust / Particulate Matter (PM)	50 mg/ Nm^3	50 mg/ Nm^3

1.12.4 Noise emissions

Guinea currently does not have any specific national standards and procedures for the regulation of noise. However, there is a Ministerial Order on noise regulation (Arrêté Ministériel fixant la réglementation du bruit en République de Guinée) currently under development. At this stage of the Project, only a draft of the national regulation on noise is available.

The Ministerial Order on noise regulation (Arrêté Ministériel fixant la réglementation du bruit en République de Guinée) defines different noise levels for specific period of the day and type of areas, as detailed in Table 1.3.

The Guinean regulation recalls the IFC noise limits for night time, 45 dB(A) for residential areas and 70 dB(A) for industrial areas. For day time, instead, it establishes a more stringent limit of 50 dB(A), and also defines an additional sensitive time period between 13:00 and 15:00, for which a 5 dB(A) lower threshold is recommended (45 dB(A)).

Table 1.3 Ambient noise levels: proposed Guinean standards

Period	**Maximum Ambient Noise Level 1-hour Leq [dB(A)]**		
	Guinean standards		
	Class 1 Residential area	**Class 2 Commercial area**	**Class 3 Industrial area**
6:00 – 13:00	50	55	70
13:00 – 15:00	45	50	
15:00 – 22:00	50	55	
22:00 - 6:00	45	50	

1.12.5 Water

The Water Code (Code de l'Eau) (Law L/94/005/CRTN of the 14 February 1994) establishes a system of water use rights and sets the overall framework for managing water resources. The Code states that a concession is granted by decree for permanent water uses, such as supplying potable water to towns

and villages, hydropower, agricultural, industrial or other developments, requiring investments whose amortization period exceeds 10 years. The Code states that any use of water resources must comply with the guidelines of the development plan of the watershed containing these resources. The Code also addresses the prevention of the harmful effects of waters and the protection of water quality.

The Code addresses groundwater issues, and more specifically the measures governing the exploration, exploitation and protection of groundwater sources. The arrangements for establishing protection perimeters, defining water resource safeguard areas and issuing drilling permits are determined by the National Directorate for Hydraulics (Direction Nationale de l'Hydraulique- DNH).

In addition, there are a Ministerial Order on wastewater discharges (Projet d'arrêté Ministériel fixant les conditions de rejets des eaux usées) and a Guinean Standards: NG 09-01-010:2012 / CNQ:2004 relating to new standards for waste water discharges (Norme Guinéenne NG 09-01-010:2012 / CNQ:2004 Rejet des Eaux Usées).

The requirements are the following:

- Some discharges such as liquid effluent causing stagnation, nuisances to the neighborhood, and pollution of surface water, groundwater or marine water are completely forbidden.
- Treated effluent discharged into a receiving environment, must comply with the specified values.

An authorization order from the Minister for the Environment and Sustainable Development as well as the Directorate responsible for Classified Installations will set the maximum daily discharge flow rate. When the authorized maximum daily rate exceeds 1/10th of the nominal flow of the river or if it is greater than 100 m^3/day, the authorization order will also set a limit on the monthly average daily flow and an instant limit.

The operators of classified installations, who are authorized to discharge substances mentioned above, must send annual reports to the Ministry for the Environment and Sustainable Development summarizing:

- discharge flow rates; and
- discharge concentrations.

The wastewater discharged into the natural environment must comply with the limits described in Table 1.4, depending on the maximum daily flow allowed.

Table 1.4: Effluent quality parameters before discharge in the environment

Parameters	Guinean limits for wastewater discharge
pH	5.5-9
Temperature	<30°C
COD	<200 mg/L if the daily flow rate is ≤30 L/day <100 mg/L if the daily flow rate is >30 L/day
TSS	<15 mg/L (specific limit for the mining industry)
Biochemical Oxygen Demand (BOD)5	<200 mg/L if the daily flow rate is ≤100 kg/day <100 mg/L if the daily flow rate is >100 kg/day
Total nitrogen	<30 mg/L as monthly average concentration if the daily flow rate is ≥50g/day A different value can be fixed by the operating permit
Total Phosphorus	<10 mg/L as monthly average concentration if the daily flow rate is ≥15kg/day A different value can be fixed by the operating permit
Total hydrocarbon	15 mg/L if the daily flow rate is ≥150g/day

1.12.6 Waste Management

General requirements for waste management are set by the Guinean Code de l'Environnement (Art 58 to 67). Waste has to be treated adequately to avoid any risk for the environment or for human health. Disposal of waste to fresh water or marine water is forbidden without prior authorization by the environmental authorities.

The Bamako convention on the Ban of the Import into Africa and the Control of Transboundary Movements and Management of Hazardous Wastes within Africa is dated 30 January 1991. It is a treaty of African nations prohibiting the import into Africa of any hazardous (including radioactive) waste. The convention came into force in 1998. Guinea, as Member of the African Union, has signed the Convention.

The convention constitutes an important stage of the construction is a treaty in terms of environmental protection. In line with the Basel Convention of the 22 March 1989, its principal objective is to limit the circulation of dangerous wastes on the African territory. The Bamako convention uses a format and language similar to that of the Basel convention, but it is much stronger in prohibiting all imports of hazardous waste and it does not make exceptions on certain hazardous wastes (like those for

radioactive materials) made by the Basel convention.To summarize, the convention has the following purposes:

- prohibit the import of all hazardous and radioactive wastes into the African continent for any reason;
- minimize and control transboundary movements of hazardous wastes within the African continent;
- prohibit all ocean and inland water dumping or incineration of hazardous wastes;
- ensure that disposal of wastes is conducted in an “environmentally sound manner"; and
- establish the precautionary principle.

1.13 Specific Social Legislations

Additional Guinean regulations exist regarding the issues of hiring and training workers, as well as health and safety at work:

- Law N°L/2014/072/CNT of 10 January 2014 repealing and replacing the Labor Code of 28 July of 1988 (Ordonnance n° 003/prg/ sgg/ 88 du 28 janvier 1988 portant institution du code du travail). Provisions of regulatory texts adopted in application of the 1988 ordinance that do not conflict with the new Labor Code are not repealed ;
- law of 14 February 1994 establishing a Code of Social Security Act; and
- the Public Health Code of 19 June 1997 and its application Decree.

1.13.1 The Labour Code

Law N°L/2014/072/CNT of 10 January 2014 is the main source of legislation governing employment practices and labor relations in Guinea. This Code applies to all private sector employees. It prohibits forced or compulsory labor. It establishes the rules of recruitment and termination of employment; the rules relating to working conditions, including wages, maximum hours worked and overtime; the employee benefits such as paid leave and retirement. The Code also defines the requirements for the employees’ health and safety.

1.13.2 Workers health and safety

The primary document in Guinea that addresses protection of worker health and safety is the Law N°L/2014/072/CNT of 10 January 2014 repealing the Labor Code of 1988. The Code includes the following relevant articles:

- the employer must follow all useful measures to protect the health and safety of its employees;

- all heads of establishments must organize practical training in safety and hygiene;
- the Minister of Labor determines, via Orders, all work that must not be performed by women, apprentices and workers under 18 years of age (Order 1392);
- the Hygiene and Safety Plan must be communicated to the work inspector before work begins;
- all employment candidates must undergo a medical examination at the expense of the employer, who must also ensure an annual medical follow- up of all employees; and
- lists the medical facilities and services that must be provided by companies depending on the number of employees.

1.13.3 Social Protection

Law L/94/006/CTRN of 14 February 1994 establishing a Code of Social Security Act is the main source of Guinean legislation governing the protection of workers and their families against economic or social poverty and against the difficulties arising from a significant loss of income. This text deals with the legal status and financial organization of the Social Security Fund, pensions for old-age, invalidity and survivors, occupational risk prevention, family benefits, sick leaves, health and social work, provisions relating to litigation and penalties.

It repeals the Social Security Code established by Law L/94/006/CTRN of 12 December 1960.

1.13.4 Public Health

The Public Health Code (Act L/97/021/AN of 19 June 1997 on the Code of Public Health) ensures the protection and promotion of health, the rights and obligations of the individual, family and community throughout the territory of the Republic of Guinea.

Decree D/253/24/PRG on health at work creates a National Service of Occupational Medicine in the Department of Health and Public Hygiene, and defines the role and responsibilities of this department.

1.13.5 The Investment Code

The Investment Code, decreed by Order N° 001/PRG of the 3 January 1987 and modified by Law L/95/029 CMRN of 30 June 1995, establishes the guarantees afforded to investors and the advantages of different regimes and also defines their obligations. Investors are required to employ equally, as a priority, all Guinean nationals with equal qualifications and to organize training and the promotion of Guinean nationals within the company. A new Investment Code was adopted in May 2015 (Law /2015/n°008 of 25 May 2015).

1.13.6 The Child Code

The Child Code Law L/2008/011/AN of August 19, 2008 promulgated by the President of the Republic of Guinea which stated that The best interests of the Child must be the primary consideration in all measures taken with regard to the child by public or private institutions, Courts or administrative authorities. This Code establishes correctionalization and the procedure of non-incrimination by through mediation as well as the participation of the Services and Institutions concerned by Childhood in decision-making and in the choice of measures compatible with the best interests of the child. A child has right to continue to benefit from the various living conditions, and services adapted to their needs, their age and corresponding to the normal family environment.

1.13.7 Law on Child Labour

Order no 2791/MTASE/DNTLS/96 relating to the work of children, considering Decree D/94/078/PRG/SGG of August 23, 1994, on the Composition Partial of the Government supplemented by Decree D/94/079/PRG/SGG of 26 August 1994; Decree D/94/115/PRG/SGG of November 3, 1994, relating to attributions and Organization of the Ministry of Labour, Social Affairs and Employment; This code determines the working conditions of employees under the age of 18year and listed prohibited works for young workers under the age of 18.

1.14 International Conventions and Protocols

In addition to its national laws, Guinea is party to a number of international conventions and regional agreements on environmental and social issues (see Table 1.5). The signing of a convention is a first step. Ratification is the step where the country takes specific legal steps to implement the convention.

Table 1.5: International Conventions and Treaties

Convention	Date of Ratification/ Accession	Key Objectives
Convention on Climate Change	Guinea ratified the Convention in May 1993 and it entered into force in March 1994.	Since 1992, 192 countries around the world have joined an international treaty, the United Nations Framework Convention on Climate Change that sets general goals and rules for confronting climate change. The ultimate objective of the Convention is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. The Convention provides that countries must meet the Convention objectives primarily through national measures.
Kyoto protocol to the United Nations Framework Convention on Climate Change	Guinea ratified the Kyoto protocol in September 2000. It entered into force in February 2005.	This Protocol was ratified by the Guinean Government in 2000 and it came into force in February 2005. Guinea is not an Annex I Party to the Protocol and therefore does not, currently, have to meet a specific greenhouse gas emission reduction target. There is currently no Guinean specific legislation implementing the Kyoto Protocol in Guinea.
Vienna Convention for the Protection of the Ozone Layer	Guinea ratified the Vienna Convention in June 1992 and the Convention came into force in September 1992.	Guinea ratified the Vienna Convention and the Montreal Protocol. The Convention provides for the international legal framework to protect the ozone layer. Guinea has not, to date, adopted specific legal instruments to implement the Convention in its legal system.

Convention	Date of Ratification/ Accession	Key Objectives
The Montreal Protocol on Substances that Deplete the Ozone Layer	Guinea ratified the Montreal Protocol in June 1992.	The Montreal Protocol on Substances That Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature on 16 September 1987, and entered into force on 1 January 1989. The Protocol provides for the international legal framework to protect the ozone layer by setting out phasing-out targets and schedules for named substances listed in the Protocol.
Convention on the Conservation of Migratory Species of Wild Animals	Guinea is a party to this Convention which came into force in August 1993.	The convention aims to ensure the conservation of Migratory Species and Natural Environment by an intergovernmental co-operation. The convention sets out to conserve wild flora and fauna and their natural habitats; promote co-operation between states; monitor and control endangered and vulnerable species; and to assist with the provision of assistance concerning legal and scientific issues. This convention was transposed into Guinean legislation via the Guinean Code of Protection of Wildlife and Rules of the Hunt.
Convention on Biological Diversity	Guinea ratified this Convention in May 1993.	The objective of this Convention is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. The Convention has three main goals: conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources.

Convention	Date of Ratification/ Accession	Key Objectives
		This Convention has been transposed at a national level in Guinea with the Code of Protection of Wildlife and Rules of the Hunt.
African Convention for Nature Conservation and the Conservation of Natural Resources	Guinea signed this Convention in September 1968, but has yet to ratify it.	This Convention aims for the conservation and rational use of soil, water, flora and fauna resources. The objectives of this Convention are: to enhance environmental protection; to foster the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and programs.
Convention concerning the Protection of the World Cultural and Natural Heritage	Guinea ratified this Convention in March 1979.	This Convention aims to protect the world cultural and natural heritage. This Convention provides for the creation of an intergovernmental committee for the protection of the world cultural and natural heritage and its associated fund.
Ramsar Convention on Wetlands of International Importance	Signed and ratified by Guinea	The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention uses a broad definition of the types of wetlands covered in its mission, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near- shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans. Guinea has signed and ratified this Convention and it came into force in March 1993.

Convention	Date of Ratification/ Accession	Key Objectives
		Guinea has submitted national reports on the implementation of the RAMSAR Convention in Guinea which show that the Guinean government has taken some steps to implement the Convention.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Guinea has acceded to but not ratified the Convention in April 1995	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 in Basel, Switzerland, in response to a public outcry following the discovery, in the 1980s, in Africa and other parts of the developing world of deposits of toxic wastes imported from abroad. The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as "hazardous wastes" based on their origin and / or composition and their characteristics, as well as two types of wastes defined as "other wastes" - household waste and incinerator ash.
Convention to Combat Desertification (A/AC.241/27)	Guinea ratified this Convention in June 1997.	The objective of this Convention, which came into force in December 1996, is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa. The Convention aims to achieve this through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievement of sustainable development in affected areas. Guinea has also produced a national action plan against desertification. The aims and objectives of the Convention have been

Convention	Date of Ratification/ Accession	Key Objectives
		incorporated into existing legislation such as the Environmental Code, the Mining Code etc.
World Heritage Convention (UNESCO)	The Convention came into force in 1975. Guinea ratified the Convention in March 1979.	The Convention aims to promote cooperation among nations to protect the world's natural heritage and cultural properties that is of such outstanding universal value that its conservation is important for current and future generations. It defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List; and sets out the duties of States Parties, of which Guinea is one of, in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The Mount Nimba Strict Nature Reserve was established by Decree in 1944 and declared as a biosphere reserve in 1980. Guinea has listed the Mount Nimba Strict Nature Reserve on the list of world heritage in danger in 1992. The Guinean government has also listed the cultural landscape of the Mount Nimba range on the tentative list of cultural sites to be protected under the Convention.
ILO Convention 87 on Freedom of Association and Collective Bargaining, Convention 1948	Guinea ratified Convention 87 in January 1959.	The Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87) establishes the right of all workers and employers to form and join organizations of their own choosing without prior authorization, and lays down a series of guarantees for the free functioning of organizations without interference by the public authorities.

Convention	Date of Ratification/ Accession	Key Objectives
ILO Convention 98 on Right to Organize and Collective Bargaining Convention 1949	Guinea ratified Convention 98 in March 1959.	The Right to Organize and Collective Bargaining Convention 1949 (98) provides for protection against anti-union discrimination, for protection of workers' and employers' organizations against acts of interference by each other, and for measures to promote and encourage collective bargaining.
ILO Convention 111 on Elimination of Discrimination in Respect of Employment and Occupation	Guinea ratified Convention 111 in September 1960.	The Convention on the Elimination of Discrimination in Respect of Employment and Occupation provides that member states pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination in respect thereof.
ILO Convention 182 on Worst Forms of Child Labor 1999	Guinea ratified Convention 182 in June 2003.	The Worst Forms of Child Labor Convention 1999 provides that each member who ratifies the Convention must take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labor as a matter of urgency. This includes slavery, trafficking, prostitution and pornography, forced labor and recruitment into militia, as well as occupations that harm the child's safety, morals or health.

1.15 International Best Practices, Standards and Guidelines

The Project design and recommended mitigation will endeavour to uphold international best practices and maintain or reduce impacts to ALARP (as low as reasonably practical) levels.

The following international requirements and standards have been considered within the ESMP process and are described below;

- IFC Performance Standards (PS) on Environmental and Social Sustainability, 2012;
- IFC/World Bank Group (WBG) International Environmental Health and Safety (IEHS) Guidelines:
- EHS Guidelines – Food and Beverage Processing, 2007;
- EHS Guidelines: Environmental Air Emissions and Ambient Air Quality, 2007;
- IFC Good Practice Handbooks and Notes:
- IFC Good Practice Note Addressing Grievances from Project-Affected Communities;
- IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets;
- IFC Workers' Accommodation: Process and Standards;
- IFC Good Practice Handbook: Use of Security Forces: Assessing and Managing Risks and Impacts;
- IFC Good Practice Note: Managing Risks Associated with Modern Slavery;
- IFC Good Practice Note: Addressing Gender-Based Violence and Harassment (GBVH) Emerging Good Practice for the Private Sector;
- Good Practice Note: Managing Contractors' Environmental and Social Performance

1.15.1 United States International Development Finance Corporation Standards and Guidelines

U.S. International Development Finance Corporation (DFC) is America's development bank. DFC partners with the private sector to finance solutions to the most critical challenges facing the developing world today. DFC invests across sectors including energy, healthcare, critical infrastructure, and technology projects. DFC also provides financing for small businesses and women entrepreneurs in order to create jobs in emerging markets. DFC investments adhere to high standards and respect the environment, human rights, and worker rights. The guiding environmental and social policies and procedures are based in large part on environmental and social impact assessment procedures applied by organizations such as the World Bank Group,

the European Bank for Reconstruction and Development, the Inter-American Development Bank, and the U.S. Export Import Bank, among others.

DFC's business lines work closely with the Office of Development Policy to determine a project's eligibility for DFC support. Each potential project is subject to a full policy review. Thorough, accurate, and complete information in the application and supplemental materials, such as a business plan, help expedite DFC's project review. All projects and Subprojects are categorized as Category A, B, C or D based on environmental and social factors. DAI Cashew-nut processing project is classified in Category B, because its potential adverse environmental impacts on human populations or environmentally important areas are less adverse. This impact is site-specific in which mitigation measures can be designed more readily. Companies must meet the requirements of the IFC's Performance Standards.

Included within this requirement are the risk and impact identification requirements of Performance Standard 2, which requires (1) Identification of all relevant environmental and social risks of the Project including issues identified in Performance Standards through 8; (2) Identification of all factors that define the Project's Area of Influence; and (3) Identification of groups and communities that may be directly or indirectly affected by the Project (i.e., Project Affected People), including groups and communities that may be differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status. The process of identifying risks, impacts, Area of Influence and Project Affected People shall be adequate, accurate, objective and appropriate to the severity of Project risks and significance of Project impacts.

1.16 International Finance Corporation Performance Standards

Diaoune Agro-Industrie Sarl is expecting that the Project will be financed with the participation of International Financial Institutions (IFIs). It is likely that such IFIs will require the Project to comply with applicable international environmental and social sustainability standards. The most widely accepted international standards are the International Finance Corporation's Environmental and Social Performance Standards (2012) or IFC PSs. The International Finance Corporation (IFC) is a subsidiary of the World Bank Group dedicated to supporting private sector growth in developing countries. The IFC's Sustainability Framework (updated 1 January 2012), is widely considered as one of the most complete sets of standards for environmental and social management.

The IFC Performance Standards are a central element of this framework. There are eight Performance Standards (PS) which the private entity is expected to meet throughout the life of an investment by IFC:

Figure 1.2: Overview of IFC Performance Standard

Source: www.ifc.org.

Over the course of the project, some performance standards will be triggered and must be managed in a manner consistent and compliant with the World Bank's Guidelines.

Performance Standard (PS) 1: Assessment and Management of Environmental and Social Risks and Impacts

PS 1 describes the importance of an integrated assessment to identifying the environmental and social impacts, risks, and opportunities of the project, an effective community engagement through appropriate and timely disclosure of information and consultation; and the private entity's management of environmental and social performance throughout the project lifecycle. This Performance Standard applies to business activities with environmental and/or social risks and/or impacts, which fits the classification of DAI Cashew-nut processing project. As part of the requirements of this performance standard, DAI has in conjunction with all project stakeholders conducted an environmental and social assessment presented in this report, and shall establish and maintain an Environmental and Social Management System (ESMS) appropriate to the nature and level of environmental and social risks and impacts assessed.

This ESMS shall incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (iv) monitoring and review.

Performance Standard 2: Labor and Working Conditions

PS 2 recognizes that pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. This standard maintains that failure to establish and foster a sound worker management relationship can undermine worker commitment and retention, can jeopardize a project and hamper its overall sustainability. Guided by conventions and instruments of the International Labour Organization (ILO) and the United Nations (UN),

The objectives of this performance standard are to: (i) promote the fair treatment, non-discrimination and equal opportunity of workers, (ii) establish, maintain and improve the worker-management relationship, (iii) promote compliance with national employment and labour laws, (iv) protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain, (v) promote safe and healthy working conditions, and the health of workers, and (vi) avoid the use of forced labor. The environmental and social risks of this factor are established during the impacts identification process, and managed through the private entity's ESMS. DAI shall ensure that all identified risks and impacts are managed following international and national standard policies and procedures. These are either documented in this report or included in supporting documents, plans and/or policies to this report.

Performance Standard 3: Resource Efficiency and Pollution Prevention

This standard recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water and land, and consume finite resources in a manner that may threaten people and environment at the local, regional and global levels. In the light of more efficient and effective resource use and pollution prevention technologies, this performance standard takes a project-level approach to resource efficiency and pollution prevention and control in line with international best practices.

DAI will consider all ambient conditions and apply technically and financially feasible resources efficiency and pollution prevention techniques best suited to avoid, or minimize

adverse impacts on human health and the environment. The abatement measures to be implemented as highlighted in the Environmental and Social Management Plan (ESMP) and other supporting plans are consistent with national environmental laws and internationally recognized sources, including the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).

Performance Standard 4: Community Health, Safety, and Security

The objective of this performance standard is to scope and avoid adverse impacts on the health and safety of the project area during the lifecycle of the project from both direct and indirect project activities. It is also to ensure that property and personnel are safeguarded in a manner that avoids or minimizes risks to the local community especially to vulnerable groups.

Following an expansive scoping process and stakeholder engagement, DAI has documented environmental and social risks and impacts affecting the community. Mitigation measures where these impacts cannot be avoided have been proferred in the report. Further to this, actions required to meet the requirements of this Performance Standard are managed by DAI's ESMP and ESMS.

Performance Standard 5: Land Acquisition and Involuntary Resettlement

This performance standard recognizes that project-related land acquisition and land use change can have adverse impacts on persons and communities that use this land. Among the objectives of this standard are: (i) to avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs, (ii) to avoid forced eviction, (iii) to improve, or restore, the livelihoods and standards of living of displaced persons, where applicable (iv) To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use.

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

This Performance Standard addresses how the private entity can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle. The objectives of this performance standard are: (i) to protect and conserve biodiversity, (ii) maintain the benefits from ecosystem services, (iii) promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Scoping during assessment of environmental and social conditions for the DAI project identified modified habitats which will experience direct and indirect impacts because of the development. Threats to biodiversity and ecosystem services have been mapped in this report and mitigation measures proffered. Implementing measures that ensure resource efficiency and proper utilization of land area to ensure minimal distortion to biodiversity are methods proffered to minimize impacts.

Performance Standard 7: Indigenous Peoples

This standard recognizes that indigenous peoples have identities that are distinct from mainstream groups in national societies, and are often among the most marginalized and vulnerable segments of the population. This performance standard among other things aims to ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of indigenous peoples.

Performance Standard 8: Cultural Heritage

This recognizes the importance of cultural heritage for current and future generations. The requirements for this performance standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. This performance standard aims to protect cultural heritage from the adverse impacts of project activities and support its preservation, and to promote the equitable sharing of benefits from the use of cultural heritage.

1.17 International Finance Corporation/World Bank Group (IFC/WB) EHS Guidelines

The World Bank Group / IFC, Environmental, Health and Safety (EHS) General Guidelines of April 2007 superseded the World Bank Handbook issued in 1998. The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site specific targets, based on environmental assessments and/or environmental audits as appropriate, with an

appropriate timetable for achieving them. The updated EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards. When Guinean Environmental regulations differ from the levels and measures presented in the EHS Guidelines, the Project will be expected to achieve whichever is more stringent.

1.17.1 Air emissions

The IFC (International Finance Corporation) General EHS Guidelines (2007) set guidelines for ambient air quality. Table 1.6 presents international air quality standards, for the following pollutants: NO2, CO, PM10, PM10 and SO2. The international standards set by the IFC Environmental, Health, and Safety Guidelines for Air Emissions and Ambient Air Quality published on 2007 refers to the WHO Air Quality Guidelines.

The IFC Guidelines are intended to confer a maximum degree of protection of human health. However, these also include a degree of pragmatism in recognising that achievement of the guidelines may not be achievable in all circumstances; in these cases, for some pollutants interim targets are identified. These are designed to confer a degree of protection of human health, with the aim that regulators should work towards achievement of the Guideline.

Table 1.6: Air quality standards: Guinean and IFC General EHS directives

Parameter	Time Weighted Average	Guinean Air Quality Standards	IFC/WHO Guidelines Value
SO_2	Annual Average	50µg/m^3	-
	Daily average	125µg/m^3	125 (Interim target 1)
			50 (Interim target 2)
			20 (Guideline)
NO_2	Annual Average	40µg/m^3	40µg/m^3
	1 hour	200µg/m^3	200µg/m^3
PM_{10}	Annual Average	80µg/m^3	70 (Interim target 1)
			50 (Interim target 2)
			30 (Interim target 3)
			20 (Guideline)
	Daily average	260µg/m^3	150 (Interim target 1)
			100 (Interim target 2)

Parameter	Time Weighted Average	Guinean Air Quality Standards	IFC/WHO Guidelines Value
			75 (Interim target 3)
			50 (Guideline)
$PM_{2.5}$	Annual Average	65µg/m^3	35 (Interim target 1)
			25 (Interim target 2)
			15 (Interim target 3)
			10 (Guideline)
	Daily average	-	75 (Interim target 1)
			50 (Interim target 2)
			37.5 (Interim target 3)
			25 (Guideline)

1.17.2 Noise emissions

The IFC EHS General Guidelines (2007) implements the "Guidelines for Community Noise" established by the World Health Organization (WHO) in 1999. Table 1.7 details the IFC EHS guidelines to community ambient noise levels, that prescribe an absolute level of 55 dB(A) during the daytime and 45 dB(A) during night time value in residential areas. These values make reference to noise from facilities and stationary noise sources, and are commonly applied as design standards for industrial facilities; IFC has indicated that these limits are not directly applicable to transport or mobile noise sources.

In environments where the ambient noise levels already exceed a level of 55 dB(A) daytime and/or 45 dB(A) night time the IFC includes a guideline stating that noise emissions should not cause the ambient noise level in a residential area to rise by 3 dB(A) or more, determined during the noisiest hour of a 24-hour period.

Referring to noise measurements, IFC gives several specifications on noise monitoring programs design, as follow:

- measurements are to be taken at noise receptors located outside the Project property boundary;

- typical monitoring periods should be sufficient for statistical analysis and cover an appropriate time period according to noise variation (24h, hourly or more frequently); and
- monitors should be located approximately 1.5 m above ground and no closed to reflecting surface.

Table 1.7: Ambient noise levels: proposed Guinean standards and IFC guidelines

Period	Maximum Ambient Noise Level 1-hour Leq [dB(A)]				
	Guinean standards			IFC Guidelines	
	Class 1 Residential area	Class 2 Commercial area	Class 3 Industrial area	Residential Institutional, Educational	Industrial, Commercial
6:00 – 13:00	50	55	70	55	70
13:00 – 15:00	45	50			
15:00 – 22:00	50	55			
22:00 - 6:00	45	50		45	

1.17.3 Water

The IFC recommends compliance with national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges. Table 1.8 compares the effluent quality parameters before discharge in the environment of Guinean legislation and the IFC Guidelines. The IFC Guidelines are generally more stringent except for Total Suspended Solids (TSS) and Chemical Oxygen Demand (COD) depending on the flow rate of the discharge.

Table 1.8: Effluent Quality Parameters before Discharge in the Environment

Parameters	Guinean limits for wastewater discharge	IFC limits for treated sanitary water discharge
pH	5.5-9	6-9
Temperature	<30°C	<30°C

Parameters	Guinean limits for wastewater discharge	IFC limits for treated sanitary water discharge
COD	<200 mg/L if the daily flow rate is ≤30 L/day <100 mg/L if the daily flow rate is >30 L/day	125 mg/L
TSS	<15 mg/L (specific limit for the mining industry)	50 mg/L
Biochemical Oxygen Demand (BOD)5	<200 mg/L if the daily flow rate is ≤100 kg/day <100 mg/L if the daily flow rate is >100 kg/day	30 mg/L
Total nitrogen	<30 mg/L as monthly average concentration if the daily flow rate is ≥50g/day A different value can be fixed by the operating permit	10 mg/L
Total Phosphorus	<10 mg/L as monthly average concentration if the daily flow rate is ≥15kg/day A different value can be fixed by the operating permit	2 mg/L
Total hydrocarbon	15 mg/L if the daily flow rate is ≥150g/day	Total hydrocarbon

1.18 IFC Good Practice Handbook and Notes

The provisions of the IFC Good Practice Handbooks and Notes applicable to the DAI Project were taken cognisance of during the compilation of the ESMP.

IFC Good Practice Note Addressing Grievances from Project-Affected Communities

Companies across sectors and through all stages of project development can benefit from understanding community concerns and complaints and addressing them. This Good Practice Note provides guidance on basic principles and process steps that organisations should take into account when creating and implementing grievance mechanisms. Together, these

principles and steps constitute a baseline set of considerations and good strategies for designing and implementing procedures appropriate to the project scale and impact.

IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

This handbook endeavours to provide a comprehensive overview of good practice in stakeholder engagement, with a dedicated focus on stakeholder groups that are "external" to the core operation of the business, such as affected communities, local government authorities, non-governmental and other civil society organisations, local institutions and other interested or affected parties.

IFC Workers' Accommodation: Process and Standards

This guidance note, developed jointly by IFC and the European Bank for Reconstruction and Development (EBRD), looks at the provision of housing or accommodation for workers by employers and the issues that arise from the planning, construction and management of such facilities. This publication aims to provide practical guidance to IFC and EBRD specialists, consultants and clients on appropriate policies and standards relating to workers' accommodation.

IFC Good Practice Handbook: Use of Security Forces: Assessing and Managing Risks and Impacts

This Good Practice Handbook on the Use of Security Forces: Assessing and Managing Risks and Impacts have been developed for IFC clients and other private sector companies and their consultants. The handbook provides practical, project-level guidance for companies to better understand and implement the requirements outlined in Performance Standard 4. Chapters focus on risk assessment, managing private security, managing the relationship with public security, preparing a security management plan, and assessing allegations or incidents related to security personnel.

IFC Good Practice Note: Managing Risks Associated with Modern Slavery

This Good Practice Note (GPN) on Managing Risks Associated with Modern Slavery supports the private sector in the fight against modern slavery. The GPN does not set new standards but aims to provide practical tools to support environmental and social due diligence, as well as monitoring processes that many investors and companies already have in place. It also aims to

provide an understanding of why action is necessary, how to manage and address issues, and the need for cooperation with others. The GPN is of relevance and practical use for a range of company functions, including management, human resources, sustainability and procurement.

IFC Good Practice Note: Addressing Gender-Based Violence and Harassment (GBVH) Emerging Good Practice for the Private Sector

This Note outlines emerging practices in addressing GBVH in operations and investments. These practices are drawn from recent experience in the private sector, as well as a larger body of work from the non-profit sector. The guidance provides an opportunity to engage with stakeholders to refine practices as those in the private sector collectively gain implementation experience. In addition to this note, sector-specific briefs provide targeted guidance on addressing GBVH risks in key sectors, including transport, construction and manufacturing.

Good Practice Note: Managing Contractors' Environmental and Social Performance

This GPN is aimed at helping clients implement sound, consistent, and effective approaches, in compliance with IFC requirements, to manage the environmental and social (E&S) performance of their contractors, subcontractors, and other third parties working for the project. This GPN provides practical guidance to clients and contractors on the process of prequalification, solicitation, evaluation, contracting, and procurement to ensure adequate E&S management during construction, operation, and demobilisation activities. Finally, it provides recommendations on how to manage project performance during the different phases of the services being provided by contractors (i.e., from mobilisation to construction, operations, and maintenance) and how to monitor and report on contractor performance effectively.

1.19 DAI Health, Safety and Environmental Policy

Diaouné Agro-Industrie is a subsidiary of the company Diaouné et frères SARL, with a vision to become a national and international reference in the field of cashew nut processing. DAI is committed to the general well-being of its employees and ensures each employee has the right to derive personal satisfaction from his/her job and the prevention of occupational injury or illness.

DAI will initiate and maintain a complete safety program, in compliance with all applicable regulations, including accident prevention and safety training for all employees. All team leads are responsible for the safety and health of co-workers around them. By accepting mutual

responsibility to operate safely, a commitment will exist throughout the DAI organization, which will contribute to the well-being of personnel.

DAI is committed to conducting its business in compliance with environmental laws, regulations and permits, incorporating environmental responsibility into all business operations through the implementation of appropriate environmental protection measures; managing operations in an environmentally-sensitive manner, with an emphasis on conservation through improved energy efficiency, reduced consumption of natural resources, recycling, and the use of renewable resources; and maintaining an effective communication system for environmental matters through training and improved awareness.

CHAPTER TWO
PROJECT DESCRIPTION

2.1 Introduction

The Project description sets out the scope of the Project features and activities with reference to aspects which can impact the environmental and social settings. The existing cashew nut processing Plant in Kankan was established in 2019 to process raw cashew nuts into cashew kernels for local and international markets. The existing project has an annual production capacity of 10,000 tons, making it the largest cashew nut processing plant in Guinea.

Diaoune Agro-Industrie Sarl (DAI) is a registered agro-processing company in Guinea and a subsidiary of Diaoune et Frères Sarl, Côte d'Ivoire. Diaoune et Frères Sarl was established in 2004 and has been a major player in the cashew nut business, initially engaging in the cultivation and export of raw cashew nuts for processing in Asian countries, particularly Vietnam and India. DAI has its head office in Conakry, Guinea and engages in various activities in the cashew nut value chain, which includes sourcing and processing raw cashew nut as well as export of the cashew kernel.

2.2 Project Location and Accessibility

The existing DAI cashew nut processing Plant is situated in Kankan prefecture, northwest of the Kankan region. The factory is located approximately 700km northwest of Conakry (the capital of Guinea) at Baladou village, along the Kankan-Faraba-Kouroussa road, Kankan, Republic of Guinea. The facility area is bounded by the coordinates: Latitude 10^{O} 25′ 39.0″N-10^{O} 25′ 41.2″N and Longitude 9^{O} 23′ 14.3″W - 9^{O} 23′ 16.4″W. The Map showing the facility location is shown in Figure 2.1 below:

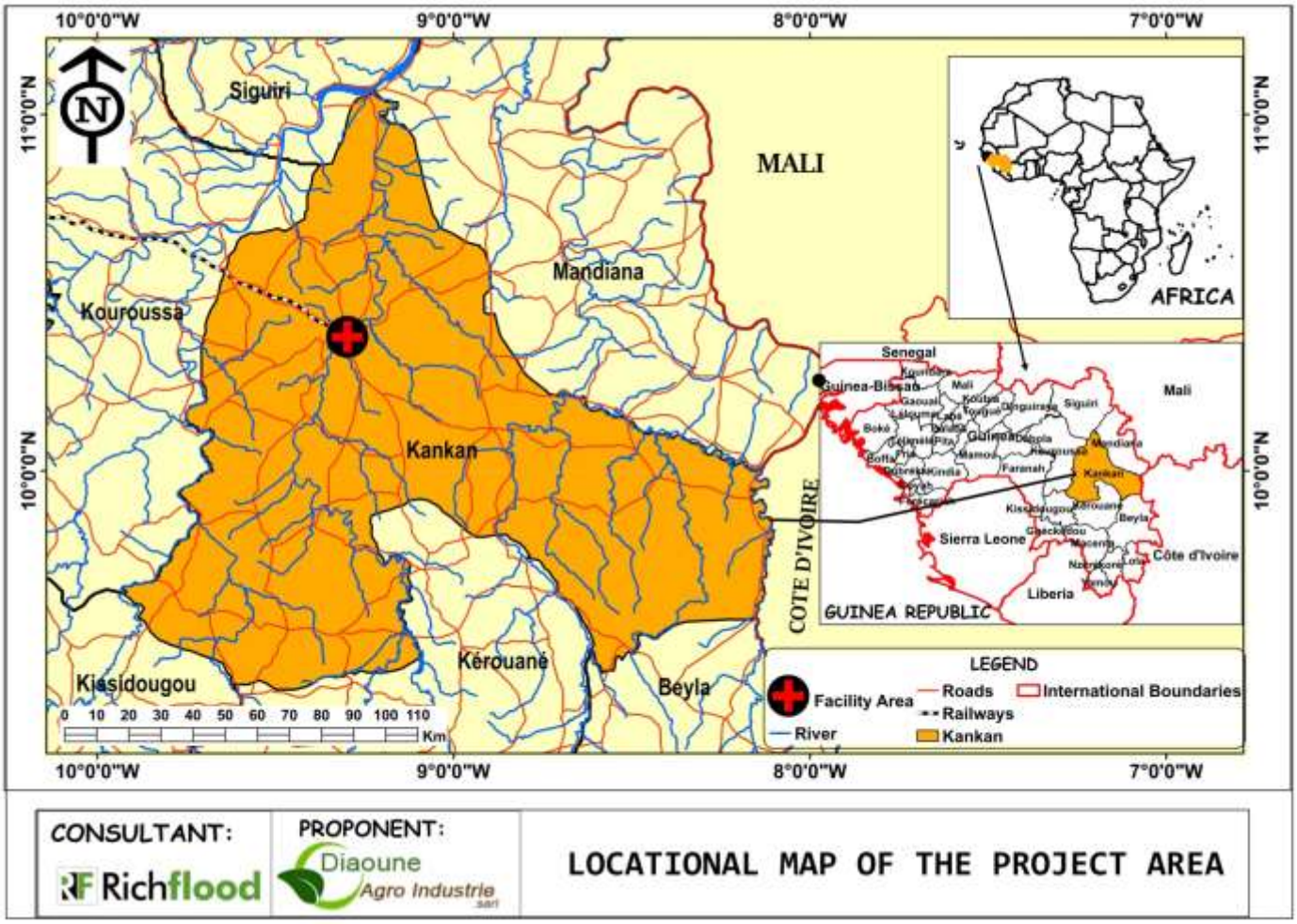


Figure 2.1: Location of the Project site within the Kankan region
Source: Richflood, 2022

2.3 Project Operations

Activities during the operational phase, the project focuses on the following points:

- Sourcing and supply of raw cashew nuts to the factory;
- Processing of raw cashew nut into kernels; and
- Distribution and export of finished raw cashew kernel; and

2.3.1 Raw material requirements and Cashew Supply Chain

The daily input raw material requirement (raw cashew nut) for the Kankan cashew processing factory is 32 tons /day for the 8-hours operation of the factory. The sourced cashew nuts are bagged based on grades after harvest and sun drying and then delivered to the factory using 40 feet size trucks. Based on the climatic conditions in the Kankan region which influence the maturity and harvesting of cashew nuts in the region, the seasonal activities for cashew nut

processing at the Kankan factory run from February to May each year. During the cashew off-peak period, the operation of the factory relies mainly on its stocks during the cashew seasonal supplies, hence, the operational cycle of the processing plant will be continuous.

DAI mainly relies on suppliers for the raw cashew nut requirements of its Kankan factory. About (95%) of the Raw Cashew Nuts (RCN) for the cashew processing factory are sourced from suppliers, with the remaining (5%) sourced directly from farmers. To ensure a sustainable supply of RCN to the factory, DAI has developed a supply database with supply contracts with the suppliers.

DAI is aware of EHS issues associated with the supply chain and is committed to taking proactive initiatives to prevent child labour/forced labour. Therefore, to further ensure that the EHS risks associated with the supply chain are identified and necessary mitigation measures are adopted, DAI will assess which farmers and suppliers are actively promoting EHS management practices in their respective supply chain levels. This will include the identification and assessment of supply chains covering their origin and use of child / forced labour.

Managing Child Labour in the Cashew Supply Chain

The following are some of the methods DAI will adopt to manage the cashew supply chain risks related to child labour:

- **Selecting Quality Suppliers**: Choosing suppliers who share similar values and checking their farming practices and cashew plantation in advance can go a long way toward preventing problems down the road. While dealing with multiple suppliers DAI shall have a formalized vendor selection process whereby vendors have to meet a series of stringent requirements before they are approved.
- **Contractual Agreements**: This involves including a clause prohibiting the use of harmful child labour in contractual agreements with suppliers and contractors. For the effectiveness of this approach, monitoring mechanisms must be put in place and DAI shall be prepared to terminate business agreements with partners who do not demonstrate a willingness to comply.
- **Subcontracting Safeguards**: This will be achieved by prohibiting the use of subcontractors. In a situation where this is difficult, DAI shall hold the contractor legally responsible for compliance of the subcontractors with agreed codes of conduct.

- **Supplier Training and Incentives**: DAI shall improve supplier farming practices through training and education on the use of child labour. Also, the use of incentives as a means of encouraging suppliers to stop using child labour.
- **Monitoring, Compliance and Corrective Action**: DAI shall not rely solely on legal agreements and codes of conduct from suppliers to do the job, rather DAI shall actively monitor working conditions through audits and independent inspections of the suppliers' cashew plantation, and exercise their ability to take corrective action up to and including termination of the relationship with partners who violate the law or their contractual terms of engagement.

Machinery and Equipment

DAI installs and operates a modern automated cashew nut processing factory. The processing equipment for the cashew processing factory is sourced majorly from Mekong Technology in Vietnam as well as other peer companies offering similar cashew processing equipment. Mekong Tech Group specializes in the design and manufacture of all kinds of raw cashew nut Sizing Machines.

Table 2.2: List of plant and machinery required

Equipment	**Capacity**
Raw Cashew cleaning	6000 kg/hour
Raw Cashew cleaning	2000 kg/hour
Cashew steaming machine	800 kg/ batch
Shelling machine with scooping system	800kg/hour
Boiler	2000kg/hour
Cashew kernel drying machine	3ton/batch (12 hour/batch)
Cashew peeling machine	300kg/hour
Cashew kernel grading machine	400kg/hour
Electronic scale	60kg-20unts;300kg-20units
Semi-Automatic Carton Sealing Machine	Conveyor speed: 16m/min

Source: DAI, 2022

2.3.2 Processing of raw cashew nuts

Processing of cashew involves the transformation of raw cashew nuts into high-quality cashew kernels. The transformation process consists of 7 key steps, which are labour-

intensive and involve a critical choice of technology and methods at each step for efficient and competitive processing. The key steps involved in the processing of RCN into kernels are listed below:

A. Cleaning & Sorting
B. Steaming
C. Shelling and Separating
D. Drying and Fumigation
E. Peeling
F. Grading
G. Packaging and Storage

The details in each step of the processing are provided below:

A. Cleaning & Sorting

Grading is the very first step in the processing of raw cashew nuts into final kernel products. This process entails separating the raw cashew nuts from impurities such as; dust, stones, wood particles etc. Cashew nuts brought into the factory in bags are first spread on the ground and manually sorted to take out waste. A high number of causal workers, mostly women are involved in this process. After manual sorting, the nuts are transferred into a sizing calibration machine for automatic sorting of waste and classification of the cashew nuts into different grades based on the quality (size).

The process involves feeding the raw cashew nut into the sorting drum of the machine through the hopper and bucket conveyor where they are sorted based on size and discharged into bags attached to different outlets. The classified cashew nuts are packed in 80kg bags and stored in the warehouse for subsequent transfer to the factory. The cashew nuts as classified into six grades which includes; C_{18}, C_{20}, C_{22}, C_{24} and C_{26} and further explained below:

i. Grade C_{26} which gives the almond quality of ww210;
ii. Grade C_{24} gives a large and small size quality of ww240;
iii. Grade C_{22} gives the almond quality of ww320;
iv. Grade C_{20} gives ww450;
v. Grade C_{18} gives a quality of ww500.

This calibration is so crucial because it will give a broad idea not only of the grades that will be obtained later but also of the quantity to be obtained in the kernel since these nuts are quantified from there.

Plate 2.1: Raw cashew nut cleaning and calibration machine
Source: DAI, 2022

B. Steaming

This is the second phase where the different graded nuts are simmered in a boiler for a period ranging from 24 to 35 minutes depending on the different grades. The cashew steaming process is amongst the most critical processes in the cashew process and decides the quality

of the finished cashew kernel. The steaming process prepares the raw cashew nut for the shelling machine, by pressure cooking the cashew nut using saturated steam from the boiler. It results in high performance and minimized broken and uncut in cashew shelling and separating system. It further helps to separate the kernels and shells and ease the process of shelling in the shelling machine. The steaming of the cashew nut in the boiler takes different timing for the different grades of cashew nuts. The boiler is designed especially for cashew processing factories, with high automatic and saving fuel. Furthermore, the boiler is compatible with cashew nut shells which are utilised by burning the shell to produce the required steam for the cashew nut steaming process. The boiler is equipped with a dust and smoke processing system to ensure a friendly environment.

Plate 2.2: Cashew nuts steaming machine

Source: DAI, 2022

C. Shelling and Separating

The process takes place in the shelling machine and involves splitting and separating the steamed raw cashew nuts into cashew shells and cashew kernels. The kernel after shelling will have a moisture content of more than 10%. The automatic cashew cutting line is a

mechanical system consisting of many automatic cashew shelling machines connected to an automatic cashew separating system which saves operating labour. This mechanized cutting of the raw nuts, allows the kernel to get rid of its shell. The shelling machines will have the capacity to shell eighteen thousand kilograms (18,000kg) for 8 hours of operation.

Plate 2.3: Cashew nut shelling machine

Source: DAI, 2022

D. Drying and Fumigation

This stage involves the drying of the unpeeled cashew kernel to a moisture content of about 3.5-4.5 %, preparing it for the cashew peeling machine. After the shelling of the kernel obtained from the shelling machines, the products are placed in the oven using a perforated tray, and drying them at a temperature of 60-80°C for eighteen hours (18hrs). Two (2) large ovens will be utilised for the process with each having a capacity of four carts. Each cart has a capacity of 120 to 128 pallets, and each pallet has a surface area of 5kg. Therefore, the two ovens have a content ranging from 4800 to 5120kg /18hour.

After drying, the coated kernels are transferred to another closed chamber for fumigation where it is placed for 20mins. The fumigation helps the kernel to increase in size and remove the skin. After this period, the same peeled kernels are returned once again to the oven to dry again for twenty-five minutes (25 minutes) to facilitate the removal of the skins. After this combination of oven work and fumigation, the dried peeled almond kernels are transferred to the next stage of the processing.

Plate 2.4: Cashew nut drying oven (left) and fumigation machine (right)

Source: *DAI, 2022*

E. Peeling

The nuts are transferred from the fumigation chamber to the peeling machine. Peeling the cashew kernels means getting rid of their hush (skin) by removing the silk from the cashew kernel. The peeling stage also serves as the first stage of the grading where whole kernels of all grades as well as broken kernels of all qualities including colour are sorted. This stage basically will involve the use of both manual and mechanised peeling methods. The mechanised peeling process using the peeling machine cannot give 100% peeled kernel, which leads to further manually peeling the kernel. The manual peeling process involves the removal of the testa from the kernel with the help of a sharp knife. The peeled kernels are transferred for grading, which is the next step.

Plate 2.5: Cashew nut peeling Machine

Source: DAI, 2022

F. Grading

Grading uses the combination of a cashew colour sorter machine and a manual approach by workers to classify cashew kernel sizes according to the size required by the export market. This process involves both mechanised and manual methods with a classification of the kernels into whole or broken kernels. At this stage, each of these grades (26, 24, 22, and 20) which are unpeeled, peeled as well as rotten kernels are classified and sorted separately. The Cashew Export and Promotion Council (CEPC) specifications are adopted for the grading of cashew kernels.

Mechanized Grading

The peeled and unpeeled kernels from the nomenclature room and the manual peeling room respectively, are fed to the grading machine for grading after the peeling according to the different grades. A typical grading machine consists of five (5) ports. One (1) port for the 24 and 26 grades which will give ww240 at 98% and ww210 at 2%, two (2) ports for the 22 grades which will give www320, one (1) port for the 20 grades which will give ww450 and ww320 minus, and the last port for the breaks that occurred during processing. The primary objective of this mechanized grading is to make manual grading not only faster but also easier, especially in the case of ww240 and ww320.

Plate 2.6: Cashew kernel grading machine

***Source**: DAI, 2022*

Manual Grading

This involves the manual separation of the kernel by the workers, who are mostly women. Proper illumination is required at this unit to ensure the classification process is thoroughly done. As a basic standard requirement, the grading room must be clean from the base to the top, especially the tables, including the baskets and the lockers. The room is also fully air-conditioned to avoid any contact with the sweat on the kernels

Plate 2.7: Manual Grading Process

Source: DAI, 2022

The classifications of the different grades of kernel adopted by DAI are as shown below:

Figure 2.3: Cashew kernel grading

Source: *DAI SARL Business Plan Report, 2022*

KEY: *WW: White Whole; WB: White Butts; SSP: Scorched Small Pieces; SP: Scorched Pieces; LWP: Large White Pieces; WSP: White Small Pieces; WS: White Splits*

Fumigation (Disinfection)

This is the process of disinfecting graded and weighed kernels possibly contaminated during touching in the grading process. Disinfectants (organic fumigation tablets) are placed at the

top of the bag containing the kernel for 3 days (72 hours). There are typically four (4) fully insulated chambers for fumigation operations of the finished products intended for local sale and export. The fumigation process not only disinfects the grain against any possible bacterial pathogen but also acts as a repellent against pests to the grains.

G. Packaging and Storage

After grading and fumigation, the kernels are packaged and stored in cartons according to grades and labelled for identification. The kernels are then conditioned for packing by maintaining a moisture content of 3.5 % – 4 %, which is ideal for packaging. The maintenance of the ideal moisture content is achieved by either drying or humidification to reach the required moisture content. Low moisture levels result in breakages after packaging, whereas high levels of moisture induce blockage or clamping of kernels after packaging. After glueing the cartons of the packed kernel, the labelled or coded cartons are sent directly to the warehouse for storage.

Plate 2.8: Packaging Machine

Source: DAI facility, Kankan

Plate 2.9: Packaged and sealed cashew kernel

Source: DAI, 2022

Plate 2.10: Storage Warehouse

Source: *DAI Facility, Kankan*

2.3.3 Distribution and Export

The finished products which are unflavored cashew nut kernels of different sizes are vacuum-packed into 21-kilogram boxes, ready to be shipped to Asia mostly Vietnam and Turkey using 20-feet containers. The distribution circuit for the processed cashew kernel is between the factory, the local market and the international market. Based on the market outlook and economic forecast of the business, about 15% of the cashew kernel is considered to be distributed and consumed locally, with the remaining 75% exported to the international markets. This will be further reviewed based on the economic outlook of the project. The international market shipping and distribution are made through sales contracts duly signed before delivery. Delivery is made within the period signed in the contract to retain the customer and be in compliance with the contractual prices as well as to cope with cash flow and inventory purchase problems. Furthermore, DAI engages local delivery workers to responsible for the delivery/distribution of the cashew kernel within the country.

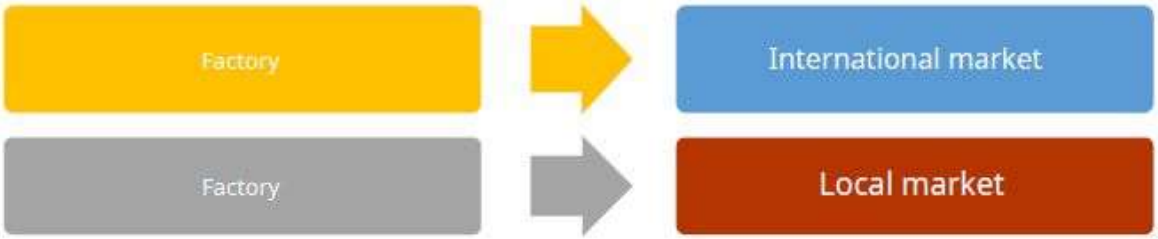


Figure 2.4: The Distribution chain for DAI SARL products

Source: DAI SARL Business Plan Report

2.4 Expected Waste Streams and Emissions

2.4.1 Solid waste generation and management

Solid waste from the project is mainly from the domestic waste generated during the operation of the factory. The cashew nut shell (CNS) is generated mainly from the operational phase of the cashew shelling process. Also, CNS exposure to weather conditions such as sun and rain results in leakage of Cashew Nut Shell Liquid (CNSL) into the soil. This could lead to pollution of surrounding freshwater streams. A summary of the waste generated with disposal & management options is detailed below.

Table 2.3: Project solid waste and management options

Waste generated	Method of handling
Domestic solid waste	Segregated at source and disposed of by an accredited waste collector.
Boiler ash	Properly landfilled (in an environmentally effective and efficient manner) following necessary precautions to avoid secondary air emissions.
Cashew nutshell	40% of this is used as fuel energy for the boiler to generate heat for cashew steaming and the balance is transformed to compost for organic fertilizer or incinerated. Deposit shells at a waste disposal site with a containment barrier or within a pit to avoid run-off of CNSL.
Testa (cashew husk) from peeling kernel	Composted for reuse as fertilizer or incinerated
Rejected kernel	Given out and combined other dry edible material to produce animal feed.
Used oil from power-generating sets	Collected in barrels and sold to authorized recyclers.

2.4.2 Waste Water

Wastewater from cashew processing is in the form of industrial wastewater from the steaming (cooking) and shelling process and sanitary wastewater (sewage).

Domestic wastewater

Sanitary wastewater is generated from the sanitary facilities in the toilet, canteen etc. The wastewater is channelled to the septic tank/ soak pit within the facility.

Industrial wastewater

Wastewater effluent from the cashew nut processing operation is generated from the steaming (cooking) process of the cashew nut as a result of the heat energy from the boiler. The wastewater includes condensed boiler water mixed with CNSL. This is managed by channelling and treatment in an Effluent Treatment Plant comprising an equalization tank,

neutralization cum settling tank and sludge drying bed. The treated effluent is discharged according to industry standards.

Table 2.3: Summary of wastewater and management options

Description	Treatment
Sanitary wastewater	Septic tank and soak pit
Steaming (cooking) condensate mixed with CNSL	Disposed and treated in ETP adopting Phyto-purification and discharged to the ground.
Cleaning and washing	Disposed and treated in ETP and discharged to the ground.

2.4.3 Air Pollution

The main sources of air pollution from the proposed project include emissions from the power generating set and the boiler flue gas which is the source of heat energy for the cashew steaming (cooking) process. The air pollutant from the boiler is mainly in the form of negligible concentration of SO_2 particulate matter in the flue gas. There are no processed gas emissions during the cashew nut processing activities as the processing is carried out under a fully closed system.

The factory is provided with cyclone dust collectors and scrubbers as Air Pollution Control measures to control the emission of particulate matter in the flue gas arising from boilers and power generating sets. Also, an adequate stack height is provided for the proper dispersion of flue gases into the atmosphere from the boiler resulting in minimum possible ground-level concentrations.

Table 2.4: Summary of Air pollution sources and control equipment

Source	Fuel requirement	Air Pollution Control equipment
Boiler	Cashew nutshell	Cyclone dust collectors and Scrubbers
Power generator set	Diesel	Scrubbers

2.4.4 Noise Pollution

Noise pollution from the project is mainly due to some fixed installations and operation of cashew processing equipment as well as the movement of machinery such as forklifts and mini bikes. The cashew steaming and shelling process and power-generating sets are the major noise-generating units in the factory.

The generator is provided with an acoustic enclosure to mitigate noise from the power-generating set. There is no need for workers to be near this unit continuously, however, workers in this area are always provided with ear muffs.

The impact of noise during the operational phase does not exceed the WHO and IFC permissible limits. All the equipment in the processing Plant is designed to have a total noise level not exceeding 85-90 dB (A) as per the requirement of OSHA (Occupational Safety and Health Administration) standards and IFC PS.

2.5 Auxiliary Facilities

2.5.1 Water Use Requirements

The water use requirement for the various operations in the project is estimated at 100m^3/day. Water required for all aspects of the factory operation including domestic and sanitary use in the facility is sourced from a dedicated borehole drilled in the project site.

2.5.2 Power Requirement

Currently, the power for the operation of the factory and the various sections in the facility is supplied through two (2) power generating sets consisting of 200KVA and 500 KVA capacities installed in the facility to provide the required power. This is alternated at peak operation hours during the day and generation is reduced at night for the essential units. The generators operate mainly on diesel and a 5000 litres fuel storage tank was installed.

The existing factory and surrounding area which is the outskirt of Kankan town, do not have access to public power supply from the national grid, despite the presence of electrical installations in the area.

2.6 Workforce Requirements

The workforce for the existing factory operation is largely from residents within the Kankan region. However, few migrant workers are engaged in the operation of the factory, especially during the peak period of the operation. Since the operational cycle of the processing factory is continuous, the project engages both permanent and casual (seasonal) workers (peak workforce) in the operation of the factory. An estimated 498 individuals are engaged as a workforce at the existing factory covering the peak and off-peak period activities. Of these figures, about 250 are seasonal workers engaged mainly during the peak production of cashew processing activities. The remaining 248 constitute the permanent workers at the

factory, which undertake work activities during the peak and off-peak periods. A larger percentage of the casual (seasonal) and permanent workforce at the factory constitute women. These casual workers are hired directly by DAI (without any third party) under a yearly contract and are engaged in the various aspects of cashew processing. These casual workers are paid weekly either by cash or bank transfer.

The main activities and operations at the factory are the responsibility of the managerial staff which includes; Plant manager, process manager, Plant maintenance supervisor, Quality controller, Database manager and Sort workshop supervisor are engaged permanently for the continuous operation of the factory. The managerial position at the factory constituted 8% of males and 7% of females. Expected production targets are given to each department, while bonus schemes are set apart.

To ensure optimal and efficient utilisation of manpower at the factory (during peak period), the operation at the factory is organized comprising three (3) shifts, with each taking turns every day, with 8 hours of work per team. Buses are utilised in the transportation of workers for the factory operation. The bus routine includes morning and afternoon pick-up at various designated locations within the town and drop-off accordingly.

Generally, activities at the factory and monitoring of workers are handled through the use of CCTVs. In addition, security guards conduct searching of bags for workers with a metal detector and all vehicles during entry and exit from the factory. There are plans to install a portal with a metal detector as well as a machine to scan bags and objects at the factory. The security guards are subjected to a code of conduct and behavioural standards. Also, codes of conduct, health and safety rules, as well as internal regulations, are posted at the different entrances. DAI also organize training and awareness sessions on violence, respect for human rights and gender-based harassment.

2.7 Project Schedule/Implementation

Although the operational lifespan of the project is estimated at 99 years based on information provided by DAI, however, the lifecycle of the Project depends on economic conditions largely bothering on the supply of raw cashew nuts as well as operation and maintenance requirements of the equipment.

2.8 Decommissioning and Restoration Phase

At the expiration of the useful life of the project which is estimated at 99 years, adequate arrangements will be made to remove all movable assets. When the life span of the project comes to an end, the facility would be decommissioned and put off use. A decommissioning process or plan would be activated. Decommissioning activities will include equipment site securitization, equipment clean-up, dismantlement of equipment and structures, as well as clean-up of site surfaces in line with applicable regulatory requirements.

The following steps would be undertaken by DAI, in decommissioning the facility:

- Regulatory Compliance and Approval;
- Site Preparation and Clearing;
- Uninstallation of facility components;
- Materials disposal; and
- Site Restoration

DAI shall implement a restoration plan for the project area unless otherwise requested by the communities within the Area of Influence (AoI). This would be done after a fully documented agreement has been reached. If this situation arises, the information would be included in the restoration and post-impact assessment reports.

Site recovery shall include taking steps to restore the project site to its original conditions by promoting the growth of lost natural vegetation to make the area accessible to local inhabitants. All installations and structures shall be completely removed and sold or moved to another factory. Almost all the equipment and machinery shall be re-used for other industrial purposes. All plant facilities and machinery that are not deemed to be of further use will be sold off as scrap or recycled at metal depots.

2.9 Project Alternatives

The Project has considered alternatives in terms of site location, design and technology options. An analysis of these alternatives has been undertaken for the Project including consideration of a no-Project scenario.

2.9.1 No-Go Alternatives

The no-go alternative means the project will not be executed, thereby retaining the status quo of the site. This means the site will continue to remain in its natural state and no structure

erected on the site. This scenario would result in both the positive socio-economic impacts and the negative environmental and social impacts of the cashew processing project not being realized.

In this scenario, the opportunities that abound in the cashew industry in Guinea would not be realized as the cashew industry in the country would remain at the level of exporting raw cashew nuts for processing to others parts of the world. This will limit opportunities for value addition in the cashew value chain in the country. Despite an attempt to develop national Industries, the majority of the West African countries export 99% of their raw cashew nuts production to India or Vietnam where value is added through processing and exported to other countries.

Not going ahead with the project means the wider benefits of the availability of cashew nuts and associated benefits to the national economy will not be realized and Guinea's economic development may therefore be hampered. This option could pose a major setback to the industrialization and economic growth of the nation. Processing of cashew nuts in Africa provides direct jobs for people living in rural communities. These jobs would ensure a stable income and better food security for farming households. Thus, the No Project Option is not considered to be a viable development option.

2.9.2 Project Site Alternatives

In deciding the execution of the project, after considering project development options, alternatives to be considered for the project includes the selection of a location to match the prospects of the project. Kankan was selected as the project location because it is one of Guinea's two main cashew production areas. The feasibility studies for the cashew business also confirm that the selected site is highly suitable and the intended operations are profitable with a fast and secured return on investment.

Other factors that were considered in the selection of the project site Include:

- Proximity to Bamako, through which the final cashew kernel products can be exported to Mali
- Availability of abundant raw materials (cashew nuts)
- Favourable landscape and topography with potential,
- Available workforce and easiness to attract qualified workers

2.9.3 Technology Alternatives

Technological choices made by DAI in the definition of the industrial process for the cashew nut processing plant configuration concerned the following topics:

- Environmental and health considerations
- Economic considerations

Commercial processing of cashew nuts at factories involves different stages of operations. The level of automation in the cashew industry is a function of the equipment and processing method to be adopted in the cashew industry. The cooking and shelling stage in the cashew process is dependent on the choice of automation in the factory, the cooking and shelling equipment and the involvement of human labour in the process. Steam-based techniques and roasting are the two main techniques deployed in the cooking of raw cashew nuts. The shelling options available in cashew processing include the manual hand-cum-pedal operated sheller, the foot-operated shell cutters and the mechanical shelling process using shelling machines.

From an environmental and health point of view, the steam-based technique of cooking cashew is a better technique due to less air pollution (particulate matter, SO_2 and odour) compared to using the roasted boiler technique. Although the roasted boiler technique is cheaper, the roasting process is hazardous to both the environment and workers.

The cashew nut processing plant would therefore have to be fitted with expensive equipment to treat atmospheric emissions. Conversely, the cashew nut processing by steaming process, which is relatively less pollution-intensive and an alternative process to the roasting process was considered to reduce the environmental discharge load and health effects.

From an economic point of view, the automatic mechanized cashew processing technique in the shelling process was the most competitive solution, allowing more production output at the lowest cost possible. The manual hand-cum-pedal operated Sheller and the foot-operated shell cutters require more manpower with lesser output. Their choosing to adopt the automatic shelling technique increases the production output with less manpower at this stage of cashew nut processing.

CHAPTER THREE
EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS

3.1 Introduction

This chapter describes the environmental and social baseline of the project area. It includes a description of the physical and biological environment including habitats as well as the human environment.

The information provided is based on the review of available desktop information as well as a field visit to the project site and surroundings. A detailed field study of the Project site has been carried out, to have available reliable, up-to-date information as to the environmental and social components inherent to the Project. The description further identifies the main environmental and social sensitivities that may be affected by the project.

The various aspects of the information are based firstly on national, regional and local information. The analysis of environmental and social issues also considers the local context in the area in which the Project is located, utilizing a description of the baseline of the Project area. The project's Area of Influence (AoI) is identified and described for each aspect, based on the relevant parameters. Three different field studies were performed for the Project by Richflood from the 27th of September to the 1st of October, and 15th to the 16th of December, 2022. They resulted in a qualitative and quantitative analysis of the biophysical and social environment, as well as public consultations. Consultations were held with the main commune authorities to establish an overview of the socio-economic conditions and social dynamics. These interviews provided information on the following features of the area.

- The administrative and social set-up of the communes;
- The main economic activities;
- Social dynamics;
- The area's existing infrastructure;
- The health situation; and
- Land tenure

The field surveys provided us with geo-referenced data on infrastructure, land boundaries and road networks within the project area. Descriptions based on the various environmental and social factors that may be impacted by the project are provided in the subsections below.

3.2 The Project Area

The facility is located in Baladou village, along the Kankan-Faraba-Kouroussa road, Kankan, Republic of Guinea. The facility area is bounded by the coordinates: Latitude N10^{O} 25′ 39.0″- N10^{O} 25′ 41.2″ and Longitude W9^{O} 23′ 14.3″ - W9^{O} 23′ 16.4″. The Map showing the facility location is shown in Figure 3.1 below:

To carry out a detailed assessment of the impacts on the surrounding environment, the study was undertaken at the micro-local level, i.e. within a 5km radius of the site. The decision for the buffer zone is based on project categorization, literature review of similar projects and qualitative investigations undertaken with local communities and field assessment. Thus, the environmental and social study area has been defined to include the receiving environment of surrounding environmental components and communities upon which the Project may have an impact.

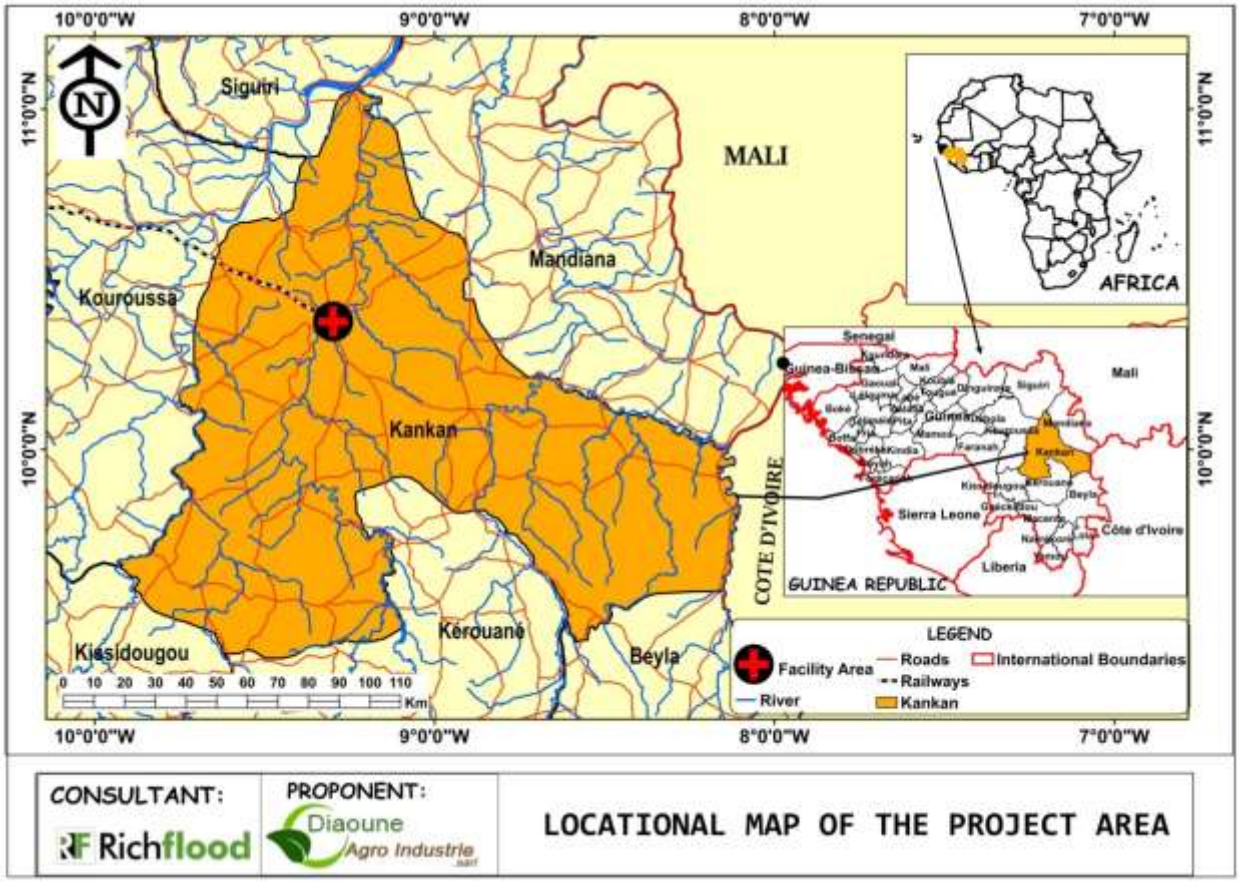


Figure 3.1: Location of the Project site including surrounding villages within Kankan Prefecture

Source: *Richflood*, 2022

3.3 Physical Environment

Generally, the climate in Guinea is influenced by the Inter-Tropical Convergence Zone (ITCZ) north and south of the equator and is characterised by wet and dry conditions controlled by the north-south movements of the Inter-Tropical Convergence Zone around the equatorial line. Climatic conditions specific to the Kankan region are largely dominated by two dominant air masses, namely the Tropical-Continental air mass (cT) which brings the dry and dusty northeasterly wind from the Sahara Region and the Tropical-Maritime (mT) air mass which originates from the Atlantic Ocean and brings warm and wet southwesterly winds. Both air masses are controlled by the movements of the Inter-Tropical Convergence Zone. This interplay of two major air masses results in a distinct wet and dry season in the area.

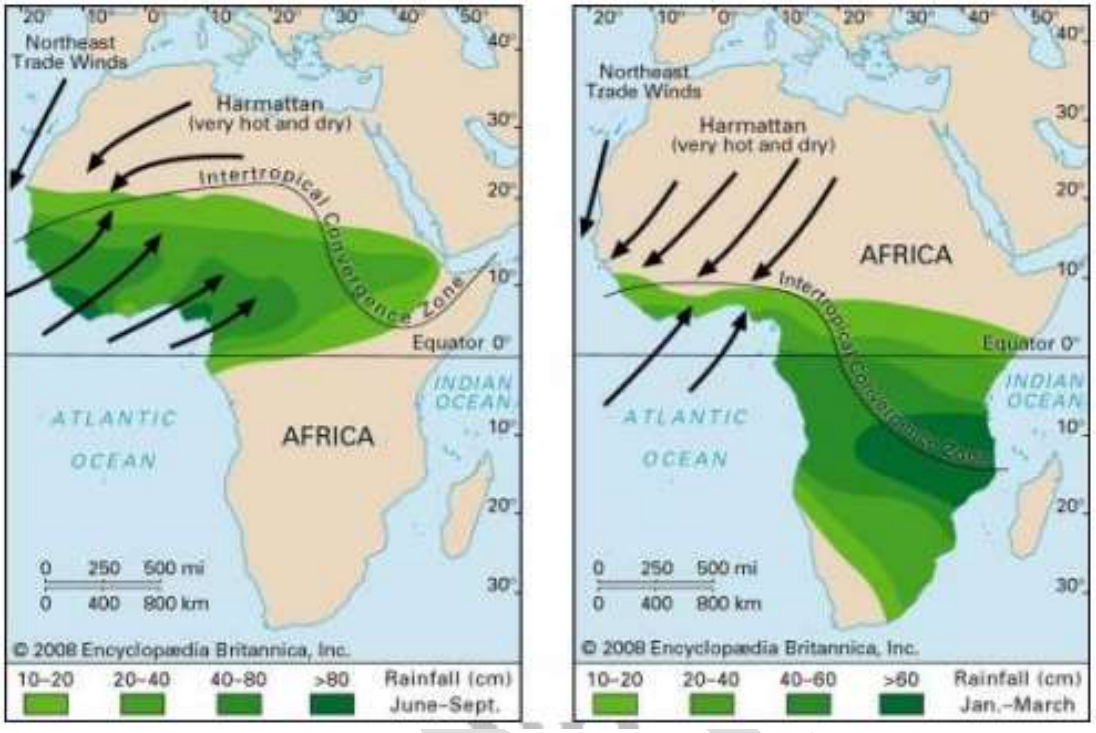


Figure 3.2: Schematic streamlines of near-surface flow in the Global Tropics

Source: *Encyclopaedia Britannica (2022)*

Rain and Temperature

Kankan has a Sahelian climate which is characterized by a shorter rainy season, and a longer dry season (December to May). In the dry season, the Harmattan blows from the East and North-East, a dry wind laden with dust. During the winter, the monsoon blows from the West and South-West, bringing humidity and abundant rainfall. The rainfall varies between 1,100 and 1,800 mm of water per year. The rainfall peaks are observed in August with a rainfall amount of 350 mm/month. The rainfall starts in this region in April and ends in November. Kankan has less rainfall total recorded; this is due to its geographical position and the late onset as well as the rapid withdrawal of ITCZ.

The temperature in Kankan varies from 25 °C to 41 °C. The maxima temperature (superior to 30°C) is recorded in March-April in the north zone and the lowest temperature is observed in December-January. Temperatures can vary from 14˚C during the rainy season to 37˚C during the dry season.

Kankan has obtained from World Data Information indicates that the air is drier (less than 20% Relative humidity in January - March) on mountainous slopes and the Savanna area, especially in the dry season, when the Harmattan breathes.

3.3.1 Geology

Geology of Guinea Republic

The Republic of Guinea lies in the West Africa Craton, in the north western part of Africa. The lithology is formed by Precambrian crystalline and Palaeozoic Rocks, which spread along the Guinean-Liberian shield. The Fouta Djallon massif is made of Silurian shade. Ordovician sandstone experienced massive arrival in both dolerites' tertiary and a parent rock gigantic bauxitic with laterite deposits (Soumah, 2009). The northwest of the basin's coastal zone consists of an unconsolidated small outcrop of upper cretaceous to Tertiary sedimentary rocks. The Mesozoic contains some Kimberlite dykes and pipes located in the southern area that is diamond-bearing (Schlüter, 2006) Figure 3.3

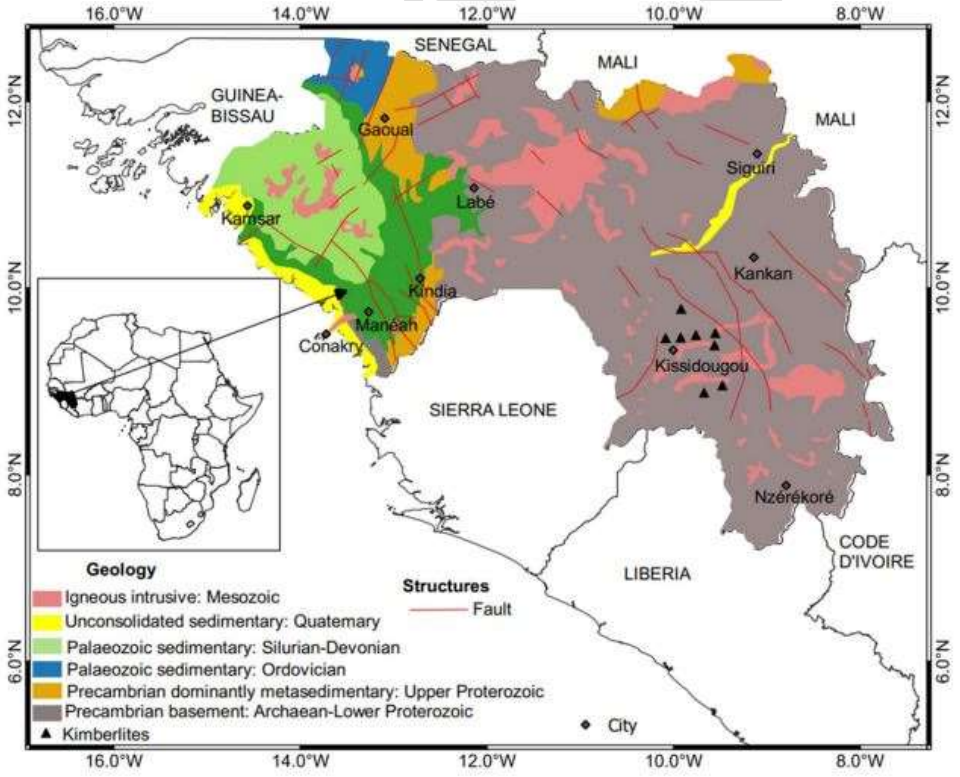


Figure 3.3: Geologic Map of Guinea (Stephen *et al.*, 2022)

Regional and Local Geology

Kankan region is predominantly underlain by Precambrian Basement: Archean-Lower proterozoic with major and minor faults (Zhang *et al*., 2018) as shown in Figure 3.4 below.

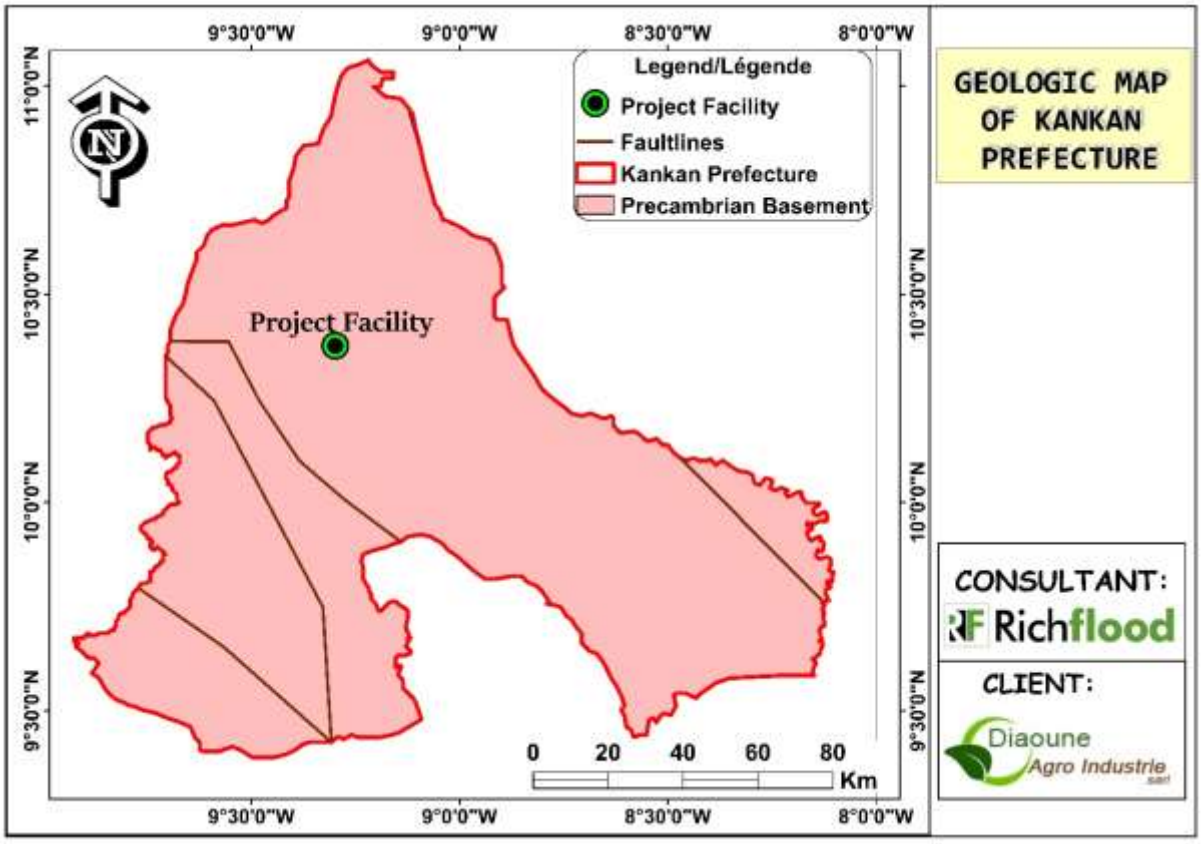


Figure 3.4: Geologic Map of Kankan Prefecture highlighting the Location of the Facility (Modified from Stephen *et al*., 2022)

3.3.2 Topography, Relief and Drainage

The general landscape of the facility area consists of relatively flat and undulating land. The landscape within the project area is adapted to vegetation and crop cultivation with most of the area having slopes under 50 degrees. The elevation of the facility AOI ranges from 390 to 440 meters above the mean sea level. The lowest elevation is the extent surrounding the facility area.

A Digital Elevation Model (DEM) of the terrain surface of the 5 km buffer around the facility is shown with the height range in Figure 3.5. Contours of the Project AOI are generated from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) relief maps and

relevant information is extracted from the Shuttle Radar Topography Mission (SRTM) DEM. All the processing was completed using the ArcGIS 10.7 and Surfer software.

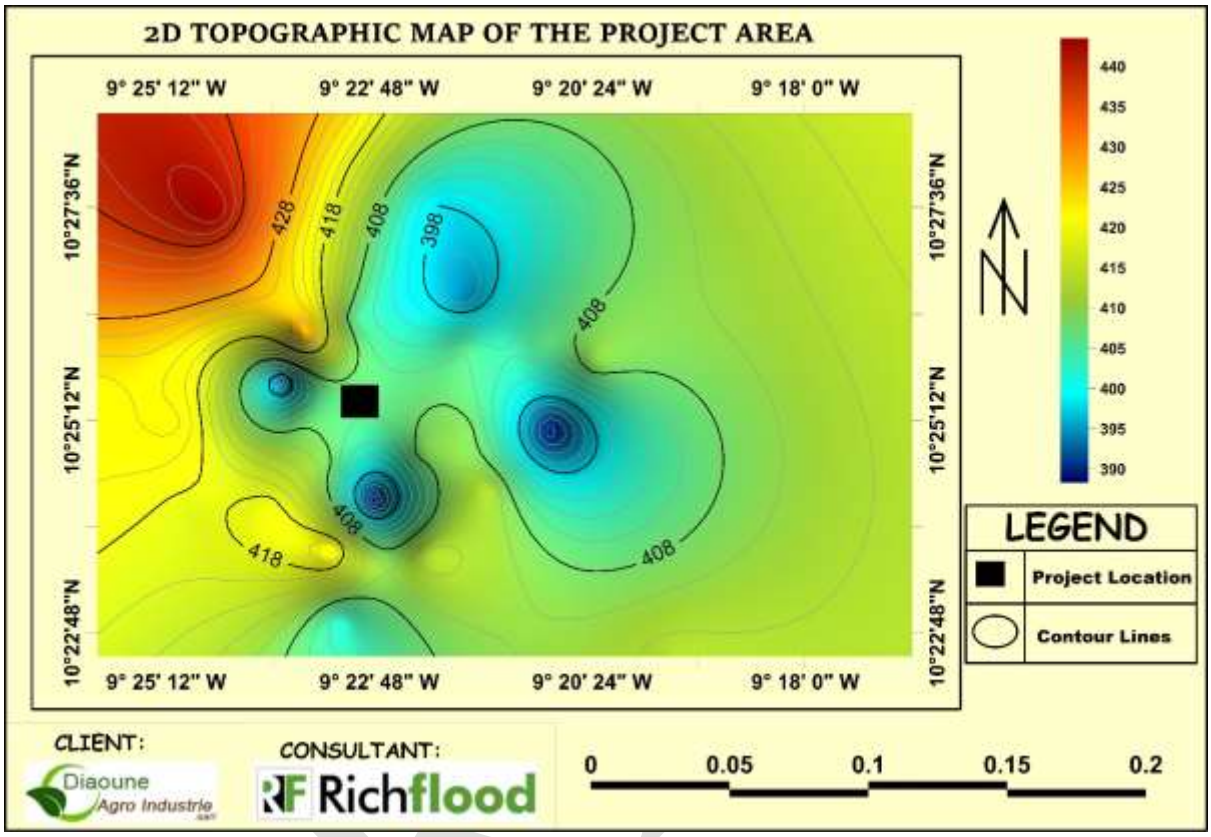


Figure 3.5: 2D Topographic map of the project area

Source: Richflood, 2022

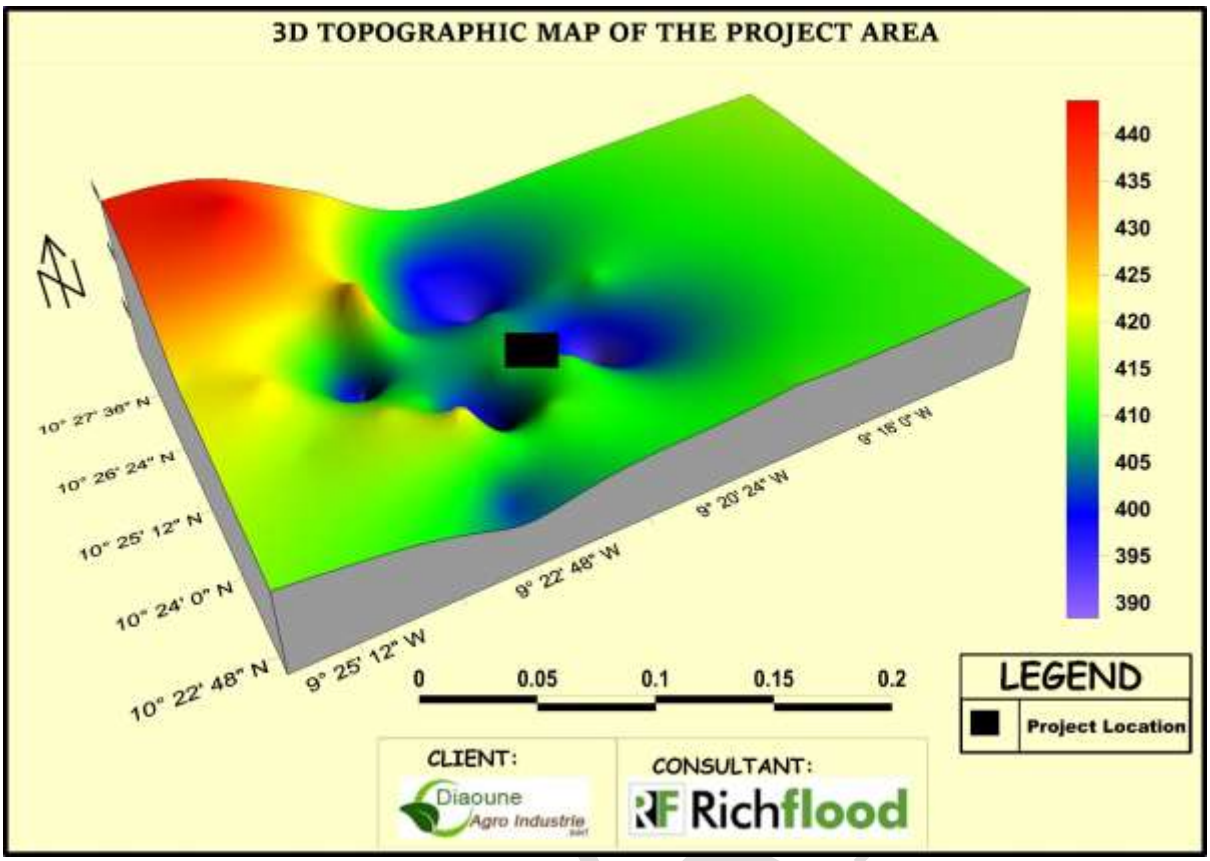


Figure 3.6: 3D Topographic map of the project area

Source: Richflood, 2022

3.3.3 Soil

Nearly half of the Guinea Republic is underlain by Pre-Cambrian granitic bedrock, thus the soils above those surfaces exhibit a certain amount of uniformity (Ahn, 1970). Representations of the distribution of Guinea's soil resources vary considerably, reflecting different classification systems. Although each of the categorizations identifies soil types, there is little apparent overlap in the distribution of these soils. Functionally, most of Guinea's soils are considered to possess low levels of fertility. Only a narrow belt of terrain straddling Upper Guinea and the Forest Region approaches medium levels of inherent fertility.

As illustrated in Figure 3.7, Guinea exhibits seven (7) different soil types, which are subdivided into 12 classes based on the mineral composition. The seven (7) major classes are Sols Hydromorphes, Lithosols, Sols Ferrallitiques, Ferrisols, Soils Fersiallitiques, Sols Bruns, and

Vertisols. The Study area in Kankan is characterised by Ferrisols and specifically soils rich in ferromagnesian minerals.

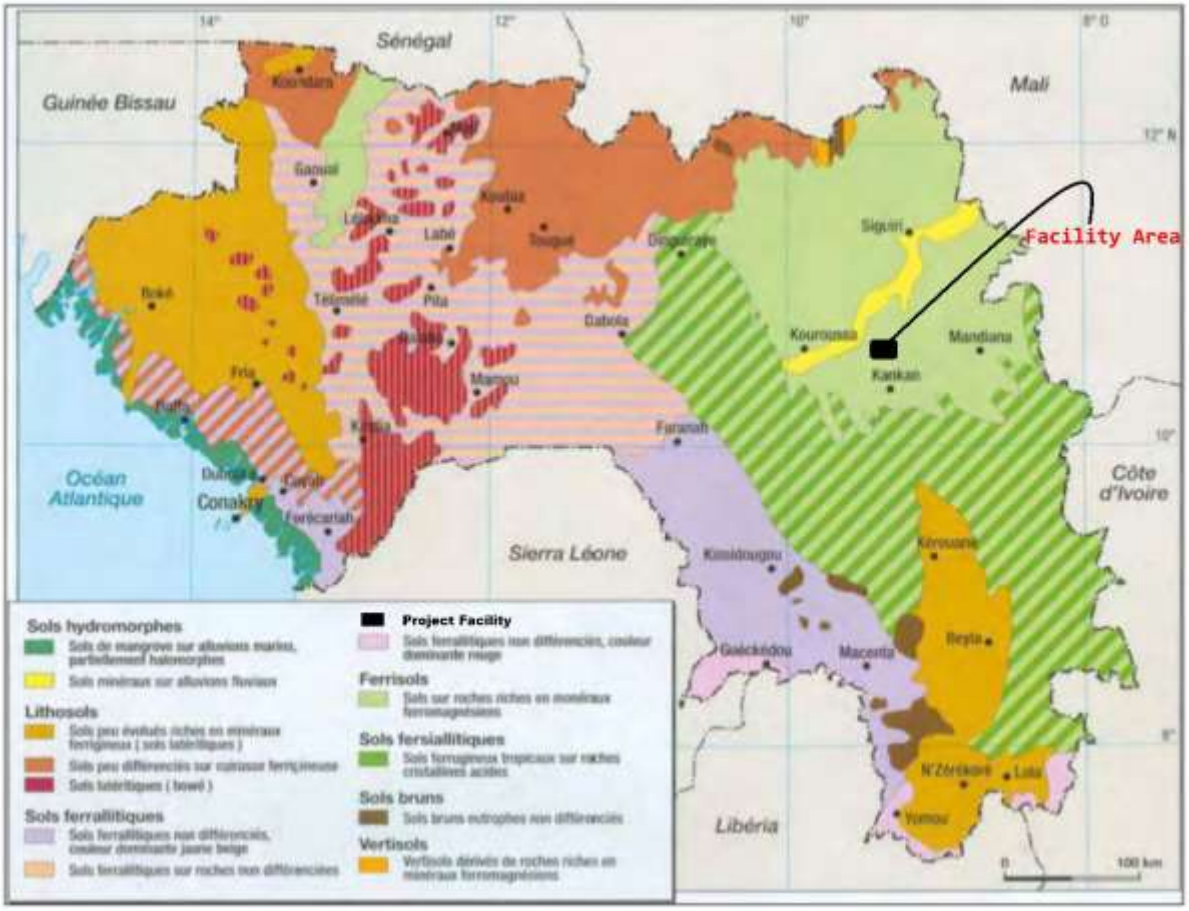


Figure 3.7: General Soil Map for Guinea Republic highlighting the facility area

Source: USAID, 2012

3.3.4 Landcover

According to the GlobeLand30 database (2019), most of the area is classified as woodland, with portions of grassland and shrubland still present in the local area. Data from the West African Land Use Dynamics project (Cotillon, 2017) show there has been an increase from 2000 to 2013 in the extent of agricultural, mining, plantation, settlements, water bodies and thickets land cover for Upper Guinea, which forms the ecoregion for the project area. There was a notable change

(or loss) of forest cover between 1975 and 2013 north of the project area, with an overall increase in the extent of degraded forest and plantation cover for the general area in 2013.

3.3.5 Water Quality

Water sampling and analysis were undertaken to understand the overall baseline water quality characteristics of the surface and groundwater in Project AoI. The surface water sampling was based on the identification of the major surface water body and its interaction with the project e.g. Dangbe River. Groundwater sampling locations were selected to obtain representative water samples from various zones within the AoI. The samples were collected from existing boreholes (hand pumps) and wells being used by the villagers.

Approach and Methods

A total of 7 samples, (2) surface water and five (5) groundwater samples were collected. The samples were analysed as per the standard procedure/method given in Standard Method for Examination of Water and Wastewater Edition 22, published by the American Public Health Association (APHA). Details of the analysis method and protocol are presented in ***Table 3.1***

Table 3.1 Method for Water Analysis

S/N	Parameter	Method	Protocol
1.	Colour	Visual Comparison	Colourless
2.	Odour	Sensory	Odourless
3.	Temperature	Thermometric	APHA 2550B
4.	PH	Electrometric	APHA 2120B
5.	Dissolved Oxygen	Electrometric	APHA 4500-O G
6.	Total Dissolved Solids	Electrometric	APHA 2540C
7.	Electrical Conductivity	Electrometric	APHA 2510B
8.	Salinity	Electrometric	APHA 2520C
9.	Total Suspended Solid	Gravimetric	APHA 2540D
10.	Turbidity	Nephelometric	APHA 2130B
11.	Total Alkalinity	Titrimetric	APHA 2320B
12.	Total Hardness	EDTA Titrimetric	APHA 2340C

S/N	Parameter	Method	Protocol
13.	Chemical Oxygen Demand	Colorimetric	APHA 5220D
14.	Biochemical Oxygen Demand	BOD 5 day	APHA 5210B
15.	Nitrate (NO_3^-)	Colorimetric	APHA 4500-NO_2^- B
16.	Nitrite (NO_2)	Colorimetric	APHA 4500-NO_3^- B
17.	Sulphate (SO_4^{2-})	Turbidimetric	APHA 4500-SO4 E
18.	Phosphate (PO_4^{3-})	Colorimetric	APHA 4500-P C
19.	Phosphorus (P)	Colorimetric	APHA 4500-P C
20.	Total Chlorine	DPD Colorimetric	APHA 4500- Cl G
21.	Magnesium(Mg)	Colorimetric	APHA 3500-Mg-B
22.	Calcium(Ca)	Atomic Absorption Spectroscopy	APHA 3500-Ca B
23.	Potassium (K)	Atomic Absorption Spectroscopy	APHA 3500-K B
24.	Aluminium (Al)	Atomic Absorption Spectroscopy	APHA 3500-Al B
25.	Manganese (Mn)	Atomic Absorption Spectroscopy	APHA 3500-Mn B
26.	Iron (Fe)	Atomic Absorption Spectroscopy	APHA 3500-Fe B
27.	Copper (Cu)	Atomic Absorption Spectroscopy	APHA 3500-Cu C
28.	Lead (Pb)	Atomic Absorption Spectroscopy	APHA 3500-Pb B
29.	Cadmium	Atomic Absorption Spectroscopy	APHA 3500-Cd B
30.	Chromium	Colorimetric	APHA 3500-Cr B
31.	Total Coliform Count	Multiple Tube Technique	APHA 9225
32.	Total Bacteria Count	Pour Plate	APHA 9215
33.	*Escherichia coli*	*Escherichia coli* Procedure	APHA 9221- E
34.	*Salmonella sp.*	*Salmonella sp.* Procedure	APHA 9260B

Source: Laboratory Report, November, 2022

There is no Guinean groundwater and surface water regulation/standard. In the absence of local country standards, the globally recognized `World Health Organization Guidelines for Drinking Water Quality, 2017` and the ´US Environmental Protection Agency (EPA) surface quality water guidelines` were used. The quality of surface water was compared with the US Environmental Protection Agency (EPA) surface quality water guidelines for *Aquatic Life and Human Health for Consumption and Organisms.*

The groundwater was compared with the World Health Organization (WHO) Drinking Water Standard for comparison.

Surface Water Quality

The main water body close to the project site is River Dangbe which flows from the southeast to the Northwest direction of the project area. Two (2) surface water samples were collected (upstream and downstream) from River Dangbe. The surface water sampling locations in relation to the project area are illustrated in Figure 3.8 and the sampling location coordinate is summarized in Table 3.2.

Table 3.2: Surface water sampling location

Sampling Code/ Description	Coordinates		Elevation (m)
	Longitude (W)	Latitude (N)	
SW1 (Downstream (River Dangbe)	9^{O} 23' 30.0"	10^{O} 25' 19.1"	382
SW2 (Upstream River Dangbe)	9^{O} 19' 50.9"	10^{O} 22' 27.5"	371

Source: *Richflood, 2022*

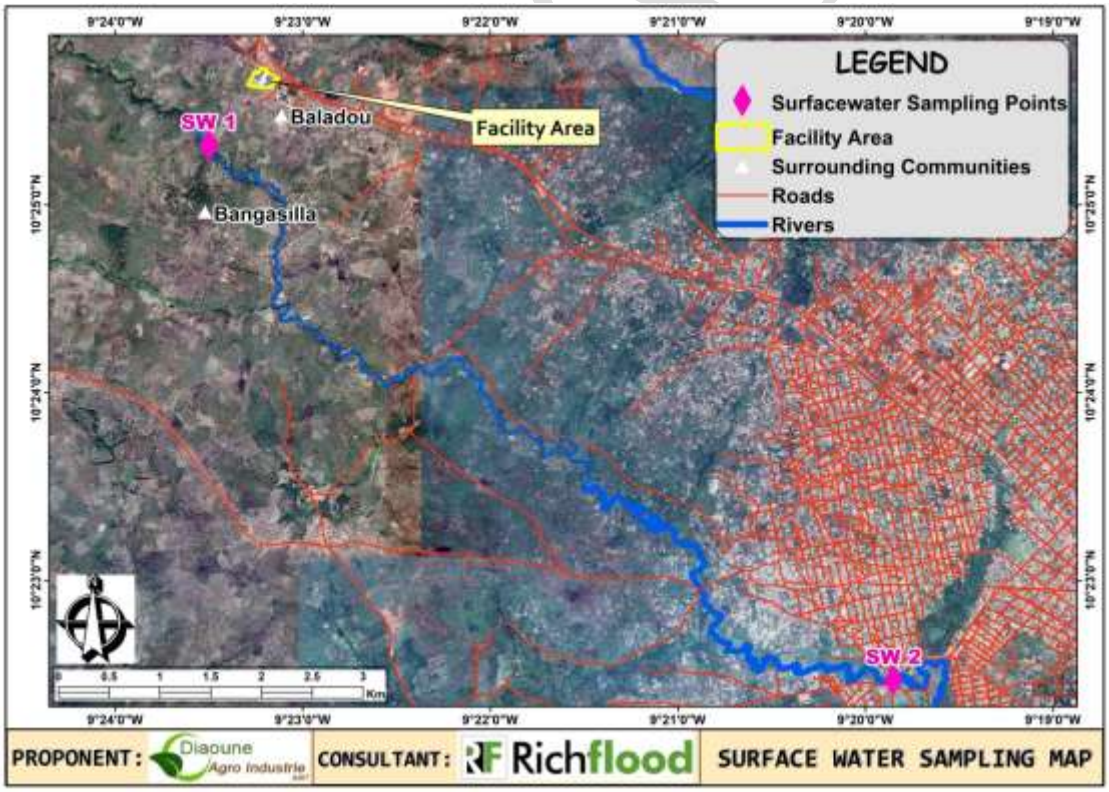


Figure 3.8: Surface water Sampling Map

Source: *Richflood, 2022*

Table 3.3: Details of Surface water Locations

S/N	Sample Location	Code	Geographical Location	Source	Justification for selectionof location
1.	Freshwater Stream Downstream of Projects water intake point	SW1	10^{O} 25' 19.1"N 9^{O} 23' 30.0"W	River Dangbe (Downstream)	Representingwater quality Downstream of water intake
2.	Freshwater Stream Upstream of Projects water intake point	SW2	10^{O} 22' 27.5"N 9^{O} 19' 50.9"W	River Dangbe (Upstream)	Representing water qualityupstream of water intake

The samples were analysed for parameters covering physical, chemical and microbiological characteristics as mentioned in the scope of work which includes certain heavy metals, trace elements and toxic constituents.

The water samples were collected in 1-litre PET bottles for general Physico-chemical analysis. Samples for heavy metals analysis were collected separately in plastic containers acidified with concentrated Nitric acid. Pre-sterilized 50ml McCartney bottles were used for samples meant for microbial analysis. In-situ measurements of fast degrading parameters including pH, Conductivity, Total Dissolved Solids (TDS), Temperature, and Dissolved Oxygen (DO) were taken at each location using calibrated Bante 900P-UK Multiparameter Water Quality Meter. All samples collected were preserved on an ice chest and transported to the Laboratory for further analysis.

Table 3.4: Surface Water Quality Analysis

S/N	PARAMETER	UNIT	RESULT		STANDARD	
			SW_1 Dangbe Stream (Upstream)	SW_2 Dangbe Stream (Downstream)	US EPA Aquatic Life Criteria (Chronic)	US EPA Human Health for Consumption and Organism
IN-SITU ANALYSIS						
1.	Colour	TCU	Not Clear	Not Clear	NS	NS
2.	Odour	TN	Unpleasant Odour	Unpleasant Odour	NS	NS

S/N	PARAMETER	UNIT	RESULT		STANDARD	
			SW_1 Dangbe Stream (Upstream)	SW_2 Dangbe Stream (Downstream)	US EPA Aquatic Life Criteria (Chronic)	US EPA Human Health for Consumption and Organism
3.	Temperature	^0C	30.10	28.40	NS	NS
4.	pH	-	7.39	6.88	6.50 – 9.00	6.50 – 9.00
5.	Dissolved Oxygen	mg/L	7.25	6.05	NS	NS
6.	Total Dissolved Solids	mg/L	7.57	8.06	NS	250.00
7.	Electrical Conductivity	µS/cm	15.15	16.26	NS	NS
8.	Salinity	mg/L	0.02	0.02	NS	25.00
CHEMICAL ANALYSIS						
9.	Total Suspended Solids	NTU	208.00	212.00	NS	NS
10.	Turbidity	mg/L	10.00	7.50	NS	NS
11.	Total Alkalinity	$mgCaCO_3/L$	60.00	60.00	20.00	NS
12.	Total Hardness	$mgCaCO_3/L$	30.00	24.00	NS	NS
13.	Chemical Oxygen Demand	mg/L	209.00	204.00	NS	NS
14.	Biochemical Oxygen Demand	mg/L	7.50	50.50	NS	NS
15.	Nitrate (NO_3^-)	mg/L	5.10	4.90	NS	10.00
16.	Nitrite (NO_2)	mg/L	0.251	0.013	NS	NS
17.	Sulphate (SO_4^{2-})	mg/L	0.00	1.00	NS	NS
18.	Phosphate (PO_4^{3-})	mg/L	0.06	0.05	NS	NS
19.	Phosphorus (P)	mg/L	0.02	0.01	NS	NS
20.	Total Chlorine	mg/L	<0.01	<0.01	NS	NS
METALS/HEAVY METAL ANALYSIS						
21.	Magnesium(Mg)	mg/L	0.534	0.645	NS	NS
22.	Calcium(Ca)	mg/L	0.37	<0.01	NS	NS

S/N	PARAMETER	UNIT	RESULT		STANDARD	
			SW_1 Dangbe Stream (Upstream)	SW_2 Dangbe Stream (Downstream)	US EPA Aquatic Life Criteria (Chronic)	US EPA Human Health for Consumption and Organism
23.	Potassium (K)	mg/L	<0.01	3.39	NS	NS
24.	Aluminium (Al)	mg/L	<0.01	0.091	NS	NS
25.	Manganese (Mn)	mg/L	0.01	0.02	NS	0.05
26.	Iron (Fe^{2+}/ Fe^{3+})	mg/L	0.30	0.17	1.00	NS
27.	Copper (Cu)	mg/L	<0.01	0.52	NS	1.30
28.	Lead (Pb)	mg/L	<0.01	<0.01	0.0025	NS
29.	Cadmium(Cd)	mg/L	<0.01	0.05	0.00072	NS
30.	Chromium(Cr)	mg/L	1.566	1.170	0.074	NS
MICROBIOLOGICAL ANALYSIS						
31.	Total Coliform Count	MPN/100ml	2.8×10^1	2.6×10^1	NS	NS
32.	Total Bacteria Count	CFU/ml	1.3×10^0	5.0×10^0	NS	NS
33.	*Escherichia coli*	CFU/ml	Absent	Absent	NS	NS
34.	*Salmonella sp.*	CFU/ml	Absent	Absent	NS	NS

MPN= Most Probable Number, ***CFU***=Colony forming unit, ***NS*****:** Not Specified, ***TN:*** Threshold Number, ***TCU***: True Colour Unit**, Detection Limits** (0.01; 0.001) ***Source:*** Richflood Laboratory, November 2022. ***Limit Source****: IFC limits for treated sanitary water discharge* and Guinean Limits for Wastewater Discharge into the environment

Table 3.5: Groundwater sampling location

Code	Location Description	Coordinates		Elevation (m)
		Latitude (N)	Longitude (E)	
GW_1	Sanakoro community	10° 27' 28.8″	9° 22′ 21.3″	406
GW_2	Bangasila community	10° 25' 0.5″	9° 23′ 36.8″	412
GW_3	Baladou community	10° 25' 38.6″	9° 23′ 7.1″	411
GW_4	Soridou community	10° 26' 22.2″	9° 24′ 16.6″	400
GW_5	Factory tap	10° 22' 34.0″	9° 17′ 51.6″	375

Source: Richflood field survey, 2022

Figure 3.9: Groundwater Sampling Map
Source: *Richflood, 2022*

Table 3.6 Details of Ground Water Sampling Locations

S/N	Sample Location	Code	Geographical Location	Source	Justification for selectionof location
1	Sanakoro community	**GW_1**	10° 27' 28.8″ 9º 22′ 21.3″	Borehole	Represents ground water quality at project site
2	Bangasila community	**GW_2**	10° 25' 0.5″ 9º 23′ 36.8″	Borehole	Represents groundwater in the nearest
3	Baladou community	**GW_3**	10° 25' 38.6″ 9º 23′ 7.1″	Borehole	Represents groundwater in the nearest
4	Soridou community	**GW_4**	10° 26' 22.2″ 9º 24′ 16.6″	Borehole	Represents groundwater in the nearest
5	Factory tap	**GW_5**	10° 22' 34.0″ 9º 17′ 51.6″	Borehole	Represents groundwater in the nearest

Source: *Richflood, 2022*

Table 3.7: Groundwater Quality Analysis

S/N	PARAMETER	UNIT	RESULT					WHO Drinking Water Standard
			GW_1 Sanankoro Borehole	**GW_2** Bangasila Borehole	**GW_3** Baladou Borehole	**GW_4** Factory Borehole	**GW_5** Soridou Borehole	
IN-SITU ANALYSIS								
1.	Colour	TCU	Not Clear	Colourless	Not Clear	Colourless	Colourless	Colourless
2.	Odour	TN	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
3.	Temperature	^{0}C	20.70	35.90	32.20	32.10	31.90	NS
4.	pH	-	5.96	6.02	7.36	6.52	8.73	6.50- 8.50
5.	Dissolved Oxygen	mg/L	2.12	2.37	2.02	10.66	2.16	7.50
6.	Total Dissolved Solids	mg/L	92.90	37.20	64.20	7.85	280.00	NS
7.	Electrical Conductivity	µS/cm	194.80	77.60	128.30	15.92	560.00	NS
8.	Salinity	mg/L	0.06	0.02	0.06	0.08	0.27	NS
CHEMICAL ANALYSIS								
9.	Total Suspended Solids	mg/L	1.00	1.00	1.00	2.00	3.00	NS
10.	Turbidity	NTU	0.00	0.00	23.00	0.01	1.40	NS
11.	Total Alkalinity	mg$CaCO_3$/L	20.00	20.00	37.00	70.00	60.00	NS
12.	Total Hardness	mg$CaCO_3$/L	42.00	54.00	32.00	20.00	31.00	80 - 100
13.	Chemical Oxygen	mg/L	108.00	110.00	160.00	242.00	132.00	NS

S/N	PARAMETER	UNIT	RESULT					WHO Drinking Water Standard
			GW_1 Sanankoro Borehole	GW_2 Bangasila Borehole	GW_3 Baladou Borehole	GW_4 Factory Borehole	GW_5 Soridou Borehole	
	Demand							
14.	Biochemical Oxygen Demand	mg/L	1.58	2.83	17.33	5.75	63.58	NS
15.	Nitrate (NO_3^-)	mg/L	1.40	0.70	0.50	0.20	4.80	50.00
16.	Nitrite (NO_2)	mg/L	0.029	0.014	0.008	0.034	0.022	3.00
17.	Sulphate (SO_4^{2-})	mg/L	<0.01	<0.01	<0.01	12.00	40.00	NS
18.	Phosphate (PO_4^{3-})	mg/L	16.905	9.342	16.869	8.428	16.106	NS
19.	Phosphorus (P)	mg/L	3.719	2.055	3.711	1.854	3.543	NS
20.	Total Chlorine	mg/L	0.02	0.01	0.41	0.24	0.01	5.00
METALS/HEAVY METAL ANALYSIS								
21.	Magnesium(Mg)	mg/L	0.785	0.286	0.799	1.619	22.193	0.30
22.	Calcium(Ca)	mg/L	2.81	<0.01	<0.01	<0.01	<0.01	NS
23.	Potassium (K)	mg/L	2.10	<0.01	0.97	3.21	2.51	NS
24.	Aluminium (Al)	mg/L	0.089	0.005	0.001	0.286	<0.01	0.200
25.	Manganese (Mn)	mg/L	0.01	<0.01	0.03	0.05	0.03	NS
26.	Iron (Fe)	mg/L	<0.01	<0.01	0.06	0.26	0.17	NS
27.	Copper (Cu)	mg/L	<0.01	0.52	<0.01	<0.01	0.50	2.00
28.	Lead (Pb)	mg/L	<0.01	<0.01	0.13	<0.01	0.04	0.01

S/N	PARAMETER	UNIT	RESULT					WHO Drinking Water Standard
			GW_1 Sanankoro Borehole	**GW_2** Bangasila Borehole	**GW_3** Baladou Borehole	**GW_4** Factory Borehole	**GW_5** Soridou Borehole	
29.	Cadmium (Cd)	mg/L	0.12	0.09	<0.01	0.08	<0.01	0.003
30.	Chromium (Cr)	mg/L	0.869	0.944	1.109	1.085	1.265	0.05
MICROBIOLOGICAL ANALYSIS								
31.	Total Coliform Count	MPN/100 ml	1.7×10^{1}	Absent	2.1×10^{1}	Absent	Absent	0.00
32.	Total Bacteria Count	CFU/ml	4×10^{0}	1.1×10^{1}	$2.\times 10^{0}$	9.0×10^{1}	3.1×10^{1}	1.0×10^{2}
33.	*Escherichia coli*	MPN/100 ml	Absent	Absent	Absent	Absent	Absent	0.00
34.	*Salmonella sp.*	CFU/ml	Absent	Absent	Absent	Absent	Absent	0.00

MPN= Most Probable Number, ***CFU***=Colony forming unit, ***NS*****:** Not Specified, ***TN:*** Threshold Number, ***TCU***: True Colour Unit, **Detection Limit**s (0.01; 0.001), **WHO*:*** World Health Organization ***Source:*** Richflood Laboratory, November 2022. ***Limit Source:*** World Health Organization Guidelines for Drinking Water Quality, 2017.

The key parameters in groundwater are discussed below, compared with the World Health Organization Standards for drinking water.

pH

The pH of the groundwater range from 5.96 to 8.73. As observed from the test results, the pH of the groundwater at Sanankoro and Bankassiya is below the WHO standard range of 5.9 to 8.50, while the sample collected at Sordou slightly exceeded the WHO standard range.

Total Dissolved Solid (TDS)

The total dissolved solids content of the groundwater ranged from 7.85 to 280.00mg/L.

Total Hardness (as $CaCO_3$)

Total Hardness of the groundwater range from 20.00 to 50.00mg/L which is within the WHO standard range of 80 to 100mg/L.

Nitrate

The nitrate content of the groundwater range from 0.20 to 4.80mg/L which are below the WHO permissible standard of 50mg/L.

Nitrite

The nitrate content of the groundwater range from 0.0014 to 0.022mg/L which are below the WHO permissible standard of 3mg/L.

Total Chlorine

The total chlorine content of the groundwater samples ranges from 0.01 − 0.41mg/L which is well below the WHO permissible standard of 5mg/L.

Coliform

The Total coliform level of the groundwater sample collected at the Sanankoro community is 1.7×10^1 MPN/100mL and that of the Baladou community is 2.1×10^1 MPN/100mL This is an indication of *faecal contamination in the* groundwater source. Coliform levels were found to be nil in the samples collected from the other three communities. As also observed, the *Escherichia coli* levels were found to be absent in the groundwater samples meeting the drinking water standard requirement of 0 number/100ml.

Magnesium and Aluminium

The magnesium content of the groundwater samples ranges from 0.286 to 22.193mg/L. As observed the magnesium level of the groundwater sample collected at Bankassiya community is below the WHO standard limit of 0.3mg/l while the levels in the samples collected at the other four locations exceed the standard limit indicating high magnesium content in the ground waters of the study area.

The aluminium content of the groundwater at the Sordou community is below the detection limit, while its level in the groundwater collected at Sanankoro, Bankassiya and Baladou communities ranges from 0.01 to 0.089mg/L which is below the WHO permissible standard of 0.2mg/L. As also observed, groundwater at the factory has an aluminium content of 0.286mg/L which exceeds the WHO permissible limit.

Chromium and Cadmium

The Chromium content of the groundwater ranges from 0.286 to 22.193mg/L which exceeds ***the*** WHO standard limit of 0.05mg/L.

The Cadmium levels of the groundwater at Baladou and Soridou communities are below the detection limit, while its levels at Sanakoro, Bangasila and the Factory range from 0.008 to 0.12mg/L which exceeds the WHO permissible standard of 0.003mg/L.

Other Heavy Metals

Other heavy metals content of the groundwater such as Copper were below the WHO permissible limits in all the groundwater samples in the area.

3.3.6 Soil Quality

Sampling Methodology and Locations

The soil sampling strategy was designed to assess the existing soil quality over the study area. Samples were collected from a total of eight (8) locations within the study area. The detail of the sampling locations is presented in ***Table 3.8***. A composite sampling technique1 was used for soil sampling from each location.

Table 3.8: Location of Soil Samples

S/N	Sample Location	Code	Geographical Location	Land use and justification
1.	Sanankoro Community	**SS_1**	10° 27' 28.8″N 9º 22′ 21.3″W	Project Area of Influence
2.	Bangasila Community	**SS_2**	10° 25' 0.5″N 9º 23′ 36.8″W	Project Area of Influence
3.	Baladou Community	**SS_3**	10° 25' 38.6″N 9º 23′ 7.1″W	Project Area of Influence
4.	DAI Facility	**SS_4**	10° 25'38.9″N 9º 23′ 14.4″W	Project Area of Influence
5.	Soridou Community	**SS_5**	10° 26' 22.2″N 9º 24′ 16.6″W	Project Area of Influence
6.	Factory Area(Processing)	**SS_6**	10° 22' 34.1″N 9º 17′ 50.0″W	Project Area of Influence
7.	Factory Area(Staff Quarters)	**SS_7**	10° 22' 34.6″N 9º 17′ 50.9″W	Project Area of Influence
8.	Factory Area(Gate)	**SS_8**	10° 22' 34.1″N 9º 17′ 52.l4″W	Project Area of Influence

Source: Richflood, 2022

Soil samples were collected using tools from a depth of 45 cm from the top soil surface. At each location, soil samples were collected from three spots and homogenized. The homogenized samples were collected following the quartering technique and then packed in polythene plastic jars and sealed. The sealed samples were sent to the laboratory for analysis.

Analysis Results and Discussions

The analysis results of the physicochemical parameters of soil samples are presented in Table 3.9 below.

Table 3.9: Soil Quality

S/N	PARAMETER		UNIT	SS_1 Sanankoro Community	SS_2 Bangasila Community	SS_3 Baladou Community	SS_4 DAI Facility	SS_5 Soridou Community	SS_6 Factory Area(Processing)	SS_7 Factory Area(Staff Quarters)	SS_8 Factory Area(Gate)
IN-SITU ANALYSIS											
1.	Colour		-	Reddish Yellow 7.5YR6/6	Reddish Yellow 7.5YR5/6	Brown 7.5YR5/2	Brown 7.5YR5/4	Brown 7.5YR5/4	Reddish Brown 7.5YR6/6	Brown 7.5YR5/4	Brown 7.5YR5/4
2.	pH		-	7.22	6.56	6.47	7.48	5.29	5.85	6.67	6.01
3.	Temperature		˚C	26.00	27.50	26.00	26.00	27.50	32.10	30.50	31.50
4.	Electrical Conductivity		µS/cm	64.00	67.00	142.00	69.2	73.90	75.00	68.90	63.50
5.	Particle Size Distribution	Sandy	%	96.35	96.82	95.42	95.49	94.74	97.24	97.82	88.67
		Clay		3.58	3.03	4.32	4.39	5.14	2.64	2.03	10.65
		Silt		0.07	0.15	0.26	0.12	0.12	0.12	0.15	0.68
6.	Texture			Sand	Sand	Sand	Sand	Sand	Sand	Sand	Loamy Sand
7.	Bulk Density		g/cm^3	1.12	0.94	0.91	1.06	0.77	0.89	1.01	0.76
8.	Permeability		-	Low	Low	Low	Low	Low	Low	Low	Low
9.	Porosity		%	12.00	18.50	19.00	13.00	12.50	16.50	19.00	21.50
10.	Moisture Content		%	5.00	6.50	5.00	8.00	7.00	4.00	2.50	3.00
CHEMICAL ANALYSIS											
11.	Nitrate		mg/kg	3.60	3.80	4.20	1.60	3.60	1.40	<0.01	<0.01

S/N	PARAMETER	UNIT	SS_1 Sanankoro Community	SS_2 Bangasila Community	SS_3 Baladou Community	SS_4 DAI Facility	SS_5 Soridou Community	SS_6 Factory Area(Processing)	SS_7 Factory Area(Staff Quarters)	SS_8 Factory Area(Gate)
12.	Sulphate	mg/kg	1.00	<0.01	5.00	<0.01	<0.01	1.00	<0.01	2.00
13.	Phosphate	mg/kg	0.22	0.27	0.19	0.11	0.28	0.29	0.12	0.09
14.	Phosphorus	mg/kg	0.07	0.09	0.05	0.03	0.09	0.09	0.04	0.02
METALS/HEAVY METAL ANALYSIS										
15.	Potassium(K)	mg/kg	<0.01	<0.01	0.04	0.42	0.56	0.32	<0.01	<0.01
16.	Aluminium (Al)	mg/kg	1.080	1.415	1.587	1.610	1.380	1.717	2.143	1.829
17.	Cobalt (Co)	mg/kg	0.770	0.426	0.229	<0.001	0.084	0.452	<0.001	0.066
18.	Iron (Fe)	mg/kg	<0.01	0.35	0.16	<0.01	<0.01	<0.01	<0.01	0.06
19.	Lead (Pb)	mg/kg	<0.01	<0.01	<0.01	1.51	<0.01	0.16	0.06	0.23
20.	Zinc (Zn)	mg/kg	0.21	<0.01	<0.01	0.58	<0.01	<0.01	0.06	<0.01
21.	Manganese(Mn)	mg/kg	0.21	0.20	<0.01	<0.01	0.15	0.19	0.21	0.08
22.	Calcium(Ca)	mg/kg	<0.01	<0.01	2.48	<0.01	<0.01	1.78	<0.01	<0.01
MICROBIOLOGICAL ANALYSIS										
23.	Total Heterogenic Bacteria	CFU/g	3.0×10^1	2.2×10^1	7.6×10^1	9.2×10^1	1.64×10^2	2.16×10^2	4.7×10^1	2.8×10^1
24.	Total Coliform Count	CFU/g	1.0×10^1	1.7×10^1	3.1×10^1	2.6×10^1	2.9×10^1	6.5×10^1	1.3×10^1	1.7×10^1
25.	*Echerichia Coli*	CFU/g	Absent	Absent	Absent	5.0×10^1	Absent	6×10^0	1×10^0	Absent
26.	Faecal Coliform	CFU/g	Absent	3.0×10^0	2.0×10^0	5.0×10^0	Absent	6.0×10^0	1.0×10^0	Absent
27.	Yeast and Moulds	CFU/g	Absent	Absent	2.0×10^1	Absent	Absent	Absent	Absent	Absent

CFU=Colony forming unit, **Detection Limits**: (0.01; 0.001),
Source: Richflood Laboratory; November, 2022.

Physical Characteristics of Soil

The particle size distribution of the soil samples shows a major percentage of sand in all the samples. The soil at the Sanankoro community has 96.35% sand and is of Sandy texture. The soil at Bangasila Community, Baladou Community, DAI Facility, Soridou Community, Factory Area(Processing), and Factory Area (Staff Quarters) is of sandy texture except for the Factory Area(Gate) is of Loamy Sand texture. This can be attributed to weathering, breakdown, and fragmentation of rocks such as limestone, granite, and quartz. The soil sample from Factory Area (Staff Quarters), shows more percentage of sand as compared to clay.

pH of Soil

The pH of soil samples from Sanankoro Community and DAI Facility was found to be slightly alkaline. The soil samples from Bangasila Community, Baladou Community, Factory Area (Staff Quarters) and Factory Area(Gate) were slightly acidic while the soil samples from Soridou Community and Factory Area were found to be moderately acidic.

Soil Minerals and Nutrients

Phosphorus, Potassium and Nitrate are the main nutrients that define soil fertility. Phosphorous content was observed to range from 0.02mg/kg to 0.09mg/kg across the sample area. The range of Potassium content ranged from <0.01mg/kg to 0.56mg/kg while the Nitrate content range was from <0.01mg/kg to 4.20mg/kg.

Metals in the Soil

Potassium, Aluminium, Cobalt, Iron, Lead, Zinc, Manganese, and Calcium were detected in the soil samples. Among these metals, the content of Calcium, Lead and Cobalt were the highest.

3.3.7 Ambient Air Quality Assessment

Air quality varies with the season due to variations in temperature, humidity, and rainfall. During the dry season, dust that is suspended in the near-ground air layers may cause frequent, but not significant, hazes which reduce visibility. However, during the wet season, rainfall removes dust from the atmosphere and improves air quality. The dry season is characteristic of very dry and dusty conditions in the proposed project area.

Air Quality Standards (AQS)

In Guinean, ambient air quality standards are defined in the Guinean Standard NG 09-01-011:2012 / CNQ: 2004 On Atmospheric Pollution – Discharge. The IFC (International Finance Corporation) General EHS Guidelines (2007) set guidelines for ambient air quality. Table 3.3 presents international air quality standards, for the following pollutants: NO_2, PM_{10}, $PM_{2.5}$ and SO_2. The international standards set by the IFC Environmental, Health, and Safety Guidelines for Air Emissions and Ambient Air Quality published in 2007 refers to the WHO Air Quality Guidelines.

Table 3.10: Guinean and IFC/WHO air quality standards

Parameter	Time Weighted Average	Guinean Air Quality Standards	IFC/WHO Guidelines Value
SO_2	Annual Average	50µg/m^3	-
	Daily average	125µg/m^3	**125 (Interim target 1)**
			50 (Interim target 2)
			20 (Guideline)
NO_2	Annual Average	40µg/m^3	40µg/m^3
	1 hour	200µg/m^3	**200µg/m^3**
PM_{10}	Annual Average	80µg/m^3	70 (Interim target 1)
			50 (Interim target 2)
			30 (Interim target 3)
			20 (Guideline)
	Daily average	260µg/m^3	**150 (Interim target 1)**
			100 (Interim target 2)

Parameter	Time Weighted Average	Guinean Air Quality Standards	IFC/WHO Guidelines Value
			75 (Interim target 3)
			50 (Guideline)
$PM_{2.5}$	Annual Average	65µg/m^3	35 (Interim target 1)
			25 (Interim target 2)
			15 (Interim target 3)
			10 (Guideline)
	Daily average	-	**75 (Interim target 1)**
			50 (Interim target 2)
			37.5 (Interim target 3)
			25 (Guideline)

Air Quality Monitoring

A total of Eight (8) monitoring stations were established within and around the facility area. Four (4) monitoring stations (AQ_4, AQ_6, AQ_7 and AQ_8) are located within the facility boundary area while four (4) monitoring stations (AQ_I, AQ_2, AQ_3 and AQ_5) are located in the surrounding communities. There were no nearest sensitive receptors that could be affected by a Project-related degradation of ambient air quality. The pollutants assessed are discussed below:

- ***Particulate Matters (PMs)***

Particulate matters (PMs) are airborne particles that include dust, smoke, and soot. PMs can either be emitted naturally (e.g. windblown dust of loose soils) or through human activity (e.g. as a result of vehicular emissions). It is defined by size, with coarse particles being between 2.5-10 microns (PM_{10}), fine particles less than 2.5 microns ($PM_{2.5}$), and ultrafine particles less than 0.1 microns in aerodynamic diameter. Globally, PM_{10} and $PM_{2.5}$ have been identified as priority pollutants and they need to be monitored and managed where the source activity has the potential or is generating PM emissions.

- ***Sulphur Dioxide (SO_2)***

Sulphur Dioxide (SO_2) is a colourless gas and is characterised by a strong odour. It is a primary pollutant, which can react easily with other substances and form secondary pollutants such as sulphur trioxide and sulphuric acid, amongst others. SO_2 is formed by human activities through mainly industrial processes that contain sulphur.

- **Nitrogen Dioxide (NO_2)**

Nitrogen Dioxide (NO_2) is a naturally forming gas, characterised as having a strong odour. Small quantities can be produced by plants, soil, and water, but anthropogenic activities such as the combustion of fossil fuels and biomass are also seen as sources of NO_2 in the atmosphere.

- ***Carbon Dioxide (CO_2)***

Carbon Dioxide (CO_2) is the main product of fuel combustion in vehicle engines, along with water. CO_2 is the most significant greenhouse gas (GHG) influencing climate change, posing a threat to public health and the environment. Carbon Monoxide (CO) is released into the atmosphere as a result of incomplete combustion, which occurs when the carbon in the fuel is only partially oxidised, forming CO and not CO_2. It is a colourless and odourless but highly toxic gas. Direct exposure to CO reduces the flow of oxygen in the bloodstream and is particularly dangerous to people with heart disease. Like Hydrocarbons (HCs), CO also contributes to the formation of ground-level ozone and smog.

- ***Hydrogen Sulphide (H_2S)***

Hydrogen Sulphide (H_2S) is a colourless, poisonous, corrosive and flammable gas, with trace amounts in an ambient atmosphere having a characteristic foul odour of rotten eggs. It is most commonly formed due to the microbial breakdown of organic matter in the absence of oxygen.

- ***Ozone (O_3)***

Ozone (O_3) is a molecule made up of three oxygen atoms, often referenced as O_3. Ozone is formed when heat and sunlight causes chemical reactions between oxides of nitrogen (NO_X) and Volatile Organic Compounds (VOCs), which are also known as Hydrocarbons. This reaction can occur both near the ground and high in the atmosphere.

- ***Volatile organic compounds (VOCs)***

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health

effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products. VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents. VOCs are common ground-water contaminants.

3.3.8 Monitoring Description

The air quality monitoring was conducted between 27th September and 1st October, 2022. Given the limited time available to complete the study and the absence of long-term monitoring data, the baseline survey reflects only a snapshot of the existing air quality conditions. The result provides some insights into the current air quality on-site. To assess the current ambient air quality situation, Aeroqual 500 series was used. This equipment was calibrated and each sensor measuring each specific air pollutant was connected to the equipment and held at arm's length, 2 meters above ground level towards the direction of the prevailing wind at every monitoring location. The GPS coordinates as well as the descriptions of the monitoring stations are provided in Table 3.11 and depicted in Figure 3.10 below. The concentration of each gaseous pollutant was read off directly from the equipment screen after 10 minutes. The findings of the short-term monitoring are reflected in Table 3.12 below.

Table 3.11: Air Quality Monitoring Locations

Code	Location Description	Coordinates		
		Latitude (N)	Longitude (E)	Elev. (m)
AQ_1	Sanakoro Community	10° 27' 28.8″	9º 22′ 21.3″	406
AQ_2	Bangasila Community	10° 25' 0.5″	9º 23′ 36.8″	412
AQ_3	Baladou Community	10° 25'38.9″	9º 23′ 14.4″	415
AQ_4	Facility Area (Warehouse)	10° 26' 22.2″	9º 24′ 16.6″	400
AQ_5	Soridou Community	10° 22' 27.1″	9º 18′ 10.8″	392
AQ_6	Facility Area (Processing Unit)	10° 22' 34.8″	9º 17′ 59.1″	383
AQ_7	Facility Area (Staff Quarter)	10° 22' 34.8″	9º 17′ 50.6″	371
AQ_8	Factory Area (Entrance Gate)	10° 22' 34.1″	9º 17′ 52.4″	374

Source: *Richflood, 2022*

Figure 3.10: Air Quality and Noise Monitoring Map

Source: Richflood, 2022

Table 3.12: Results of the Air Quality Monitoring

Sample Points	Sample Location	O_3 (µg/m^3)	CO (µg/m^3)	SO_2 (µg/m^3)	NO_2 (µg/m^3)	H_2S (µg/m^3)	CO_2 (µg/m^3)	VOCs (µg/m^3)	SPM (µg/m^3)	
									$PM_{2.5}$	PM_{10}
AQ_1	Sanakoro Community	BDL	BDL	BDL	11.00	BDL	501000	200.00	1.00	3.00
AQ_2	Bangasila Community	BDL	3060.00	BDL	BDL	BDL	466000	100.00	BDL	BDL
AQ_3	Baladou Community	9.00	BDL	BDL	BDL	BDL	454000	100.00	1.00	1.00
AQ_4	Facility Area (Warehouse)	2.00	BDL	BDL	BDL	BDL	443000	10.00	BDL	BDL
AQ_5	Soridou Community	1.00	640.00	BDL	12.00	BDL	481000	10.00	BDL	BDL
AQ_6	Facility Area (Processing Unit)	3.00	1230.00	BDL	BDL	BDL	475000	BDL	1.00	BDL
AQ_7	Facility Area (Staff Quarter)	14.00	110.00	BDL	BDL	BDL	469000	140.00	3.00	1.00
AQ_8	Factory Area (Entrance Gate)	16.00	BDL	BDL	BDL	BDL	474000	BDL	BDL	BDL
Guinean AQS				**125**	**200**					**260**
IFC/WHO AQS		**100**		**125**	**200**			**-**	**75**	**150**

[Note: BDL - Below Detection Limit of the Equipment (BDL = <0.01µg/m^3)]

Source: Richflood, 2022.

Discussion

SPM: The $PM_{2.5}$ concentration in ambient air was recorded in the range of <0.01 – 3.00µg/m^3. The concentration of PM_{10} at the monitoring locations was reported in the range of <0.01 – 3.00µg/m^3. There were no exceedances of the PM_{10} 24-hour Guinea Standard (260µg/m^3) and the PM_{10} 24-hour IFC/WHO AQS (150 µg/m^3) throughout the monitoring stations.

. **SO_2:** The SO_2 concentration was recorded as <0.01µg/m^3 across all monitoring stations. SO_2 concentrations measured were substantially below the 24-hourly Ambient Air Quality Standard for both the Guinean AQS and IFC/WHO AQS (125 µg/m^3). These results show that the generation of SO_2 concentrations as a result of DAI's operations has a low potential to result in a nuisance and impact the health of nearby communities.

NO_2: The NOx concentration was recorded in the range of <0.01 – 12.00µg/m^3. NOx concentrations at all the monitoring locations were reported to be below 200 µg/m^3, which is the 24-hourly Ambient Air Quality Standard for both the Guinean AQS and IFC/WHO AQS. These results show that the generation of NO_2 concentrations as a result of DAI's operations has a low potential to result in a nuisance and impact the health of nearby communities.

CO: The 24-hourly average CO concentration was recorded below the detection limits and ranged up to a maximum of 3060.00µg/m^3.

O_3: The O_3 concentration was recorded in the range of <0.01 – 16.00µg/m^3. O_3 concentrations at all the monitoring locations were substantially below 100µg/m^3, which is the 24-hourly Ambient Air Quality Standard (NAAQS) for both National and IFC/WHO AQS.

H_2S: The H_2S concentration was recorded below the detection limits. The concentrations of H_2S are reported low at all the monitoring locations.

Results in all the monitoring locations are within both the Guinean Ambient Air Quality Standards and IFC/WHO AQS daily average. Also, there were no nearest sensitive receptors that could be affected by a Project-related degradation of ambient air quality.

3.3.9 Noise Monitoring

To assess the current noise level at the Cashew nuts processing facility, ambient environmental noise monitoring was undertaken between 27th September and 1st October, 2022 at eight locations in and around the facility (Figure 3.10). All sound level measurements were free-field measurements (i.e. at least 3.5 m away from any vertical reflecting surfaces). Sound level measurements were taken with an Extech II Sound Level Meter. The sound level meter was calibrated before and after measurements were conducted and no significant drifts (differences greater than 0.5 dB(A)) were found to occur. The sound level meter was programmed to run for 10mins at each monitoring point. The readings were stored in the memory of the meter and recorded on a field sheet

The main aim of the noise assessment was to ascertain typical levels of ambient noise in the DAI noise study area. Locations where measurements were taken and the parameters recorded in the DAI surveys were based on a noise monitoring plan and guidelines prepared by Richflood. The plan was adapted as necessary during the survey. As planned, two surveys were carried out. The main survey was the Project baseline environmental noise survey required to establish the levels of noise currently experienced by communities near and far (the Community Survey). The second survey was source-oriented and was conducted at the DAI Cashew nut processing facility site.

Community Survey

The Community Survey comprised measurements taken at the external surroundings of the DAI Cashew nut processing facility. The purpose of the Community Survey was to obtain ambient noise levels currently experienced by communities located within the potential audible range of the DAI plant;

A total of eight (8) monitoring stations were established within and around the project area. Three (4) monitoring stations (N_4, N_6, N_7 and N_8) are located within the facility boundary area while four (4) monitoring stations (N_I, N_2, N_3, and N_5) are located in the surrounding communities.

3.4 Noise Survey Results

The results from the noise monitoring conducted are presented in Table 3.13 below. Noise levels were compared to the typical day-time guideline level for noise in residential areas for Guinean Noise Limits (50 dB(A)) and IFC Noise Limits (55 dB(A)). Noise levels at all eight monitoring locations were below the IFC Noise Limits guideline level. However, the noise levels at some of the locations are higher than the Guinean Noise Limits. Such locations are within the Facility location (N_6 and N_7). Dominant noise sources at these locations included working machinery for cashew nut processing and Staff quarters.

Table 3.13: Results of the Noise Monitoring

Code	Monitoring Location	Average Noise [dB (A)]
N_1	Sanakoro Community	45.4
N_2	Bangasila Community	42.5
N_3	Baladou Community	45.3
N_4	Facility Area (Warehouse)	44.9
N_5	Soridou Community	48.2
N_6	Facility Area (Processing Unit)	51.4
N_7	Facility Area (Staff Quarter)	50.1
N_8	Factory Area (Entrance Gate)	49.3
Guinean Noise Limits		**50**
WHO/IFC Guidelines (Noise Limits)		**55**

Source: Richflood Fieldsurvey, 2022

It could be observed that the existing baseline noise levels at all monitoring stations are within the IFC Noise Limits for daytime. However, the noise levels at the two sampling locations are higher than the Guinean Noise Limits. The sampling locations are the processing unit of the facility area (N_6), and the staff quarters in the facility area (N_7). Dominant noise sources at these

locations included noises from passersby and other background sources of noise like distant traffic.

3.4.1 Land Use/Cover

To define land use/ cover in the project area and surroundings, a Landsat Operational Land Imager (OLI) 8 imagery (dated May, 2022) was considered as a global land cover spatial representation for the project area. The classification operation combined with ground truthing information of the area resulted in the delineation of four (4) land cover/habitat classes which include: Modified savannah forest/grassland and fallow land, Transformed areas, Riparian area and freshwater stream (Figure 3.12).

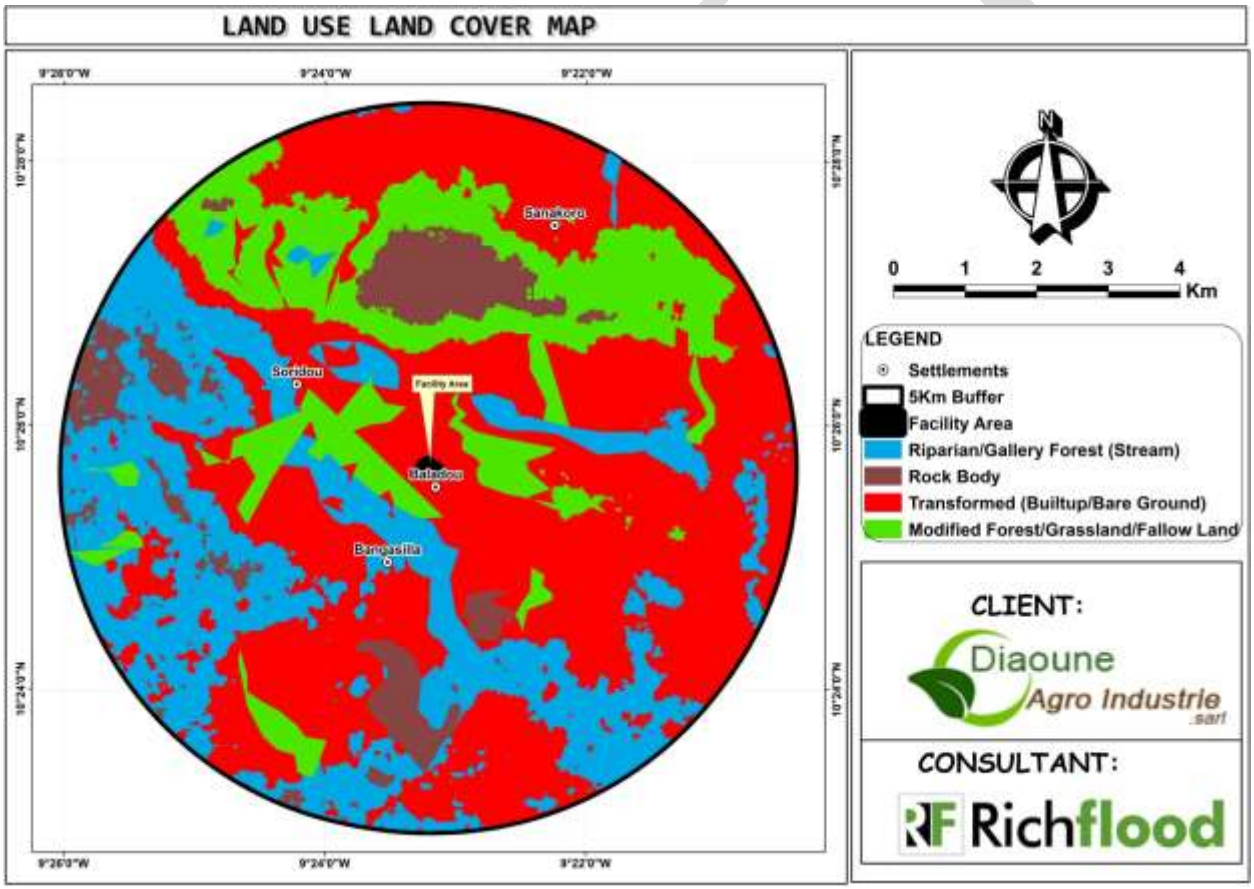


Figure 3.11: Land use/cover map of the Project Area

Source: Richflood, 2022

The result of the classification scheme within a 1km buffer for the project AoI indicates the modified forest/grassland/fallow land habitats make up about 18%, Transformed area covers about 42%, Riparian/gallery forest cover about 29% and about 11% is covered by rock outcrop (Figure 3.11).

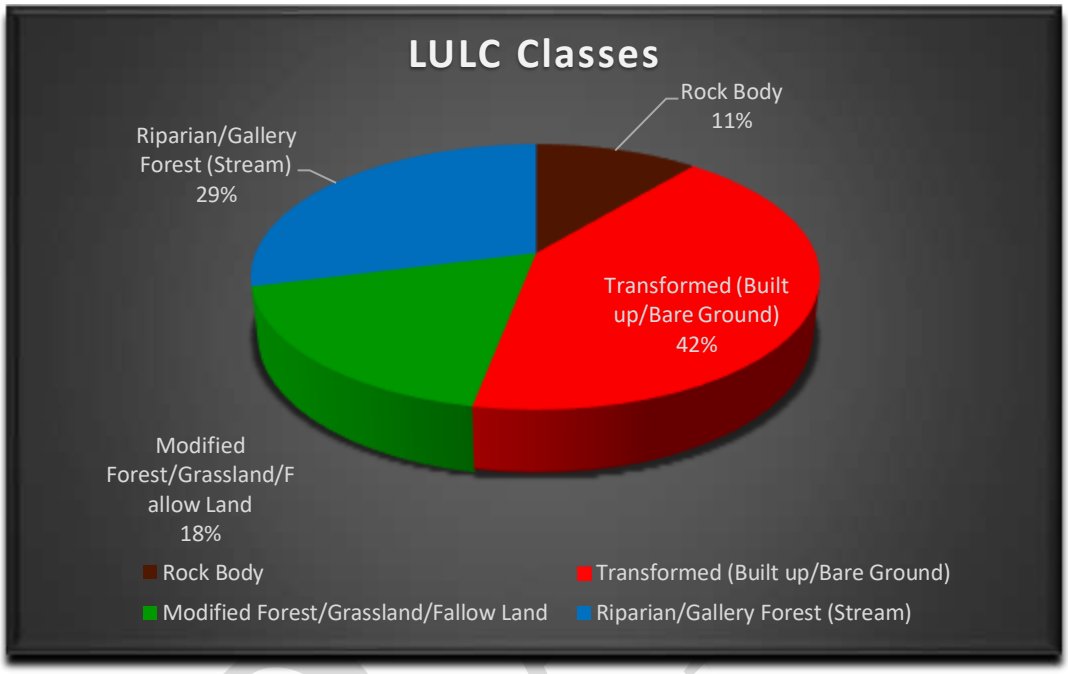


Figure 3.11: Land Use/Cover classes

Source: Richflood, 2022

The surrounding environment has undergone significant transformation due to rural subsistent agriculture including grazing, harvesting of surrounding trees for fuelwood and building materials as well as Plantation stands majorly cashew trees. The existing vegetation in the area largely consists of a mosaic of dry savannah forest and grassland agricultural as well as Plantation stands in the area.

The Current land use within the surrounding area is dominated by agricultural uses, mostly consisting of plantation stands and subsistence crop cultivation. Villages are present within the surrounding areas and are associated with the surrounding agricultural plantations and housing settlements (Plate 3.1a and Plate 3.1b).

Plate 3.1a: Transformed area from cashew Plantation within the Project AoI

Source: *Richflood, 2022*

Plate 3.1b: Transformed area from housing settlement within the Project AoI

Source: *Richflood, 2022*

3.5 Ecological Resources

As part of the assessment of the baseline ecological conditions for the project, a site visit was undertaken where the areas around the cashew processing factory were surveyed in other to provide information on the ecological resources and conditions within the project area. Details of the results and information from the field survey are as provided in the biodiversity assessment report (Appendix A).

The project area falls within the Sudan-savannah ecological zone of Guinea, which is a characteristic ecological cover of the upper Guinea region, majorly determined by the temperature and rainfall pattern within the region.

Broadly, the entire region including the project area constitutes a dense and dry forests ecosystem which consists of a mixture of savanna and woodlands characterised by tall grassland, scattered trees and scrubs. The vegetation unit is predominantly made up of different grass species, with patches of shrubs and sparsely distributed trees, consisting largely of species such as; *Melicia excelsa*, *Antiaris africana*, *Khaya senegalensis*, *Afzelia africana*, *Sterculia tragacanta*, *Cola cordifolia*, *Daniellia oliverii*, *Parkia biglobosa*, *Pterocarpus erinaceus*, *Terminalia spp*, *Combretum spp* etc.

According to Terrestrial Ecoregions of the World (TEOW), (Olsen, *et al*. 2001), the West Sudanese Savanna ecoregion stretches from the Atlantic coast of Senegal to the Mandara Mountains of Nigeria. The ecoregion is regarded as Endangered or Critically Endangered based on the threats it experiences from agriculture, fire, overhunting and tree clearance with its associated charcoal production (Magin, 1998). This ecoregion is a dry wooded area that constitutes mostly of larger trees while the understory is made up of grasses, shrubs and herbs (Oneearth, 2022).

The West Sudanian Savanna Ecoregion possess few animal endemics, consisting of two small mammals (a White-toothed Shrew (*Crocidura cinderella*) and a Zebra Mouse (*Lemniscomys linulus*)) (Happold 1987), eight reptiles, and three amphibians. Three bird species are considered near-endemic: Dorst's Cisticola (Cisticola dorsti, DD), White-crowned Robin-chat (*Cossypha albicapilla*) and Mali Firefinch (*Lagonosticta virata*). As the ecoregion overlaps with the Sudanian regional centre of endemism, it is regarded as an important area for plant endemism.

3.6 Habitats

Four habitat types were delineated for the project footprint area and the associated AoI. These habitats are briefly discussed below.

Riparian Forest

The riparian habitat plays a crucial role as a water source for the local community. However, this area has been infringed upon and is utilised extensively. The abstraction of water daily for various domestic uses leaves the habitat in a constant state of disturbance. This habitat, even though somewhat degraded, is still important as a movement corridor for several faunal species, especially birds and plays a vital role as a water resource not only for the biodiversity but also for the local community. This habitat unit can be regarded as highly important, not only within the local landscape but also regionally. The habitat sensitivity is considered moderate.

Plate 4.4: Riparian habitat observed along the freshwater stream
Source: *Richflood, 2022*

Agricultural Plantation

Agricultural plantation within the project AoI majorly consists of stands of cashew trees which constitute the predominant cash crop cultivated by residents in the area. Plantations were found at various clusters around the villages within the project AoI and serve as one of the major sources of livelihood in the area. The agricultural plantation is derived from the clearing of natural habitats in the area and is considered to support low biodiversity compared to the natural habitats. Despite supporting low biodiversity, the agricultural plantation habitat forms a unique habitat within the area, playing an important role within the faunal species makeup by providing refugia and food for faunal species especially birds and lower invertebrates. The habitat sensitivity is considered low. The habitat is highly modified and No SCC was recorded within this habitat unit.

Plate 3.3a: Agricultural plantation (cashew plantation observed) in the area
Source: *Richflood, 2022*

Transformed

This habitat is characterised by areas cleared of natural vegetation mainly for housing and infrastructure as well as some of the large and rural roads within the project AoI. The area where the existing cashew processing plant is located is also classified as transformed habitat. The vegetation structure consists of shrubs and tall grasses including a few scattered trees. No species of conservation concern were recorded within this habitat unit. This habitat is assigned a low sensitivity.

Plate 4.5: Transformed habitat from housing and road infrastructure within the project area

Source: *Richflood, 2022*

Natural and modified Grassland

This habitat is a mosaic of natural and modified savannah forests within the project AoI. The habitat consists mostly of dry savannah forests and modified grassland resulting from the loss of the natural savannah forest ecosystem. Also within this habitat type are fallow lands (arable land used for rotational crop cultivation) in various states of utilisation and recovery. These small patches have been modified by livestock grazing.

The mosaic natural and modified grassland habitat has undergone a variable level of anthropogenic pressure including the harvest of wood for charcoal production, bush fire, and use of timber associated with the local community. The vegetation unit found here consists of scattered woodland tree species and shrubs as well as grasses that are known to grow in more disturbed areas. Some larger trees spread out through the area can also be found. The trees all have medicinal and food properties and evidence of harvesting can be seen in some instances. No IUCN Red-listed plant species were recorded within this habitat.

Plate 4.6: Mosaic natural and modified grassland habitats

Source: *Richflood, 2022*

3.7 Flora

A total of 41 plant species were observed during the field survey and are provided in Table 6. Plants were recorded across 21 families, with Poaceae having the highest proportion of species followed by Combretaceae, Mimosoideae and Annonaceae. All of the species have at least one known secondary ecosystem service that it provides to the local community. The three main categories of ecosystem services are medicine, food source or construction materials (e.g. thatch or wood).

All the species recorded were non-endemic and none were Species of Conservation Concern (SCC), this speaks to the modified nature of the habitat in the project area. Of the recorded species, the dominant growth forms within the project area consist of trees (23%) and shrubs (19%) followed by herbs (15%) and grasses (43%). Critical habitat assessment for flora as per IFC Performance Standard 6 found no critical habitats to be present within the project area.

Table 3.15: Flora species recorded in the proposed project area

Scientific Name	Common Name	Family	IUCN Status	Endemic Status	Growth Form	Uses
Lophira lanceolata	Red ironwood	Ochnaceae	LC	Non-Endemic	Tree	Consumed as food, construction & medicinal
Parkia biglobosa	African locust bean tree	Mimosoideae	LC	Non-Endemic	Tree	Consumed as food
Anthocleista procera	Cabbage tree	Loganiaceae	LC	Non-Endemic	Shrub	Medicinal use
Antiaris africana			LC	Non-Endemic		
Ageratum conyzoides	Goat weed	Asteraceae	LC	Non-Endemic	Herb	Medicinal use
Cola cordifolia			LC	Non-Endemic	Tree	
Tamarindus indica	Tamarind	Caesalpinioideae	LC	Non-Endemic	Tree	Medicinal use, ingredient for local drink
Sterculia tragacanta		Sterculiaceae			Tree	Food and household items
Chromolaena odorata	Chromolaena	Asteraceae	LC	Non-Endemic	Herb	Medicinal use
Khaya senegalensis	African mahogany	Meliaceae	VU	Non-Endemic	Tree	Medicinal use
Ceiba pentandra	Silk cotton tree	Bombacaceae	LC	Non-Endemic	Tree	Consumed as food and used for construction
Sporobolus patulus	Salt grass	Poaceae	LC	Non-Endemic	Grass	Medicinal use
Piliostigma thonningii	Camel's foot	Caesalpinioideae	LC	Non-Endemic	Shrub	Medicinal purpose
Vitellaria paradoxa	Shea tree	Sapotaceae	VU	Non-Endemic	Tree	Consumed as food
Milicia excelsa	African teak	Moraceae	NT	Non-Endemic	Tree	Construction purpose
Xylopia aethiopica	Guinea pepper	Annonaceae	LC	Non-Endemic	Tree	Consumed as food
Albizia adianthifolia	West African albizia	Mimosoideae	LC	Non-Endemic	Tree	Medicinal use
Combretum nioroense	Bushwillow	Combretaceae	LC	Non-Endemic	Shrub	Material for making dye
Uapaca heudelotii	-	Euphorbiaceae	LC	Non-Endemic	Tree	Medicinal purpose
Digitaria perottettil	-	Poaceae	LC	Non-Endemic	Grass	Human and cattle feed
Terminalia catappa	Tropical Almond	Combretaceae	LC	Non-Endemic	Tree	Consumed as food
Allophylus africanus	African Allophylus	Sapindaceae	LC	Non-Endemic	Shrub	Consumed as food
Annona senegalensis	Wild custard apple	Annonaceae	LC	Non-Endemic	Shrub	Consumed as food
Uvaria chamae	Bush banana	Annonaceae	LC	Non-Endemic	Tree	Medicinal purpose
Pennisetum purpureum	Elephant Grass	Poaceae	LC	Non-Endemic	Grass	Consumed as food

Scientific Name	Common Name	Family	IUCN Status	Endemic Status	Growth Form	Uses
Andropogon tectorum	Beard Grass	Poaceae	LC	Non-Endemic	Grass	Used for furniture
Isoberlinia doka	-	Fabaceae	LC	Non-Endemic	Tree	Used for furniture
Anacardium occidentale	Cashew tree	Anacardiaceae	LC	Non-Endemic	Tree	Consumed as food
Afzelia africana	African oak	Caesalpinioideae	VU	Non-Endemic	Tree	Medicinal use
Dichrostachys cinerea	Sickle bush	Mimosoideae	LC	Non-Endemic	Tree	Medicinal use
Daniellia oliveri	West African copal Tree	Caesalpinioideae	LC	Non-Endemic	Tree	Medicinal & woodwork
Dialium guineense	Velvet tamarind	Caesalpinioideae	LC	Non-Endemic	Tree	Food & furniture making
Borassus aethiopium	African fan palm	Arecaceae	DD	Non-Endemic	Tree	Food & roofing material
Anogeissus leiocarpus	African birch	Combretaceae	LC	Non-Endemic	Tree	Medicinal use
Diospyros heudelotii	-	Ebenaceae	LC	Non-Endemic	Tree	Wood for construction
Penisetum subsangustum		Poaceae	LC	Non-Endemic	Grass	Medicinal use
Ancylobotrys amoena	-	Apocynaceae	LC	Non-Endemic	Shrub	Used as medicine and gum
Utricularia subulata		Lentibulariaceae		Non-Endemic	Grass	Medicinal use
Bombax costatum	Red kapok tree	Bombacaceae	LC	Non-Endemic	Tree	Medicinal use
Dilophotriche occidentalis	-	Poaceae	LC	Non-Endemic	Grass	Consumed as food
Utricularia rigida	Bladderworts	Lentibulariaceae	LC	Non-Endemic	Herb	Medicinal use
Panicum tambacoundense		Poaceae	LC	Non-Endemic	Grass	Medicinal use
Rottboellia exalta	Guinea-fowl grass	Poaceae	LC	Non-Endemic	Grass	Medicinal use
Neocarya macrophylla	Gingerbread plum	Chrysobalanaceae	LC	Non-Endemic	Tree	Used as medicine
Panicum phragmitoides	-	Poaceae	LC	Non-Endemic	Grass	Medicinal use
Ficus platyphylla	Flake rubber tree	Moraceae	LC	Non-Endemic	Tree	Consumed as food

Source: Richflood, 2022

3.8 Mammals

As a large portion of the project area is covered with agricultural plantations and modified grassland, rodent species were the predominant mammal species occurring in the area. During field observations, the mammal species observed in the project area include; Grasscutter (*Thryonomys swinderianus*) and Tree Squirrel (*Xerus erythropus*). The result of the field observation is likely due to the disturbed nature of the area from human anthropogenic activities with the resultant loss of habitat and utilisation as a food source. Considering a large portion of the project area is consist of the agricultural stand, rodent species are still very likely to occur. A critical habitat assessment for mammals found no critical habitats to be present within the project area.

3.9 Avifauna

A total of thirty-seven (37) species were observed during the field assessment and are listed in Table 3.16. Most of the species are regarded as generalist common species that are well adapted to human disturbances. None of the species recorded is species of conservation concern.

During the assessment, it was discovered that the modified savannah forest still harbours a rich species of avifauna. Also, the riparian habitat is regarded as important habitat for avifauna. Based on IFC Performance Standard 6 Critical habitat assessment for avifauna, no critical habitat was identified for the avifauna component of the project.

Table 3.16: Avifaunal species recorded in the project area during the field assessment

Scientific Name	Common Name	IUCN Status	Endemic Status
Polyboroides typus	African Harrier Hawk	LC	Not endemic
Tockus fasciatus	African Pied Hornbill	LC	Not endemic
Cinnyris venustus	Variable Sunbird	LC	Not endemic
Vidua chalybeata	Village Indigobird	LC	Not endemic
Crithagra mozambica	Yellow-fronted Canary	LC	Not endemic
Euplectes ardens	Red-collard Widowbird	LC	Not endemic
Lagonosticta rubricata	African Firefinch	LC	Not endemic
Chrysococcyx klaas	Klaas's Cuckoo	LC	Not endemic
Illadopsis fulvescens	Brown Illadopsis	LC	Not endemic
Gypohierax angolensis	Palm-nut vulture	LC	Not endemic
Chrysococcyx caprius	Diederik Cuckoo	LC	Not endemic
Cyanomitra olivacea	Olive Sunbird	LC	Not endemic
Platysteira cyanea	Brown-throated Wattle-eye	LC	Not endemic
Streptopelia semitorquata	Red-eyed Dove	LC	Not endemic

Scientific Name	Common Name	IUCN Status	Endemic Status
Streptopelia vinacea	Vinaceous Dove	LC	Not endemic
Ploceus cucllatus	Village Weaver	LC	Not endemic
Pogoniulus bilineatus	Yellow-rumped Tinkerbird	LC	Not endemic
Pogoniulus chrysoconus	Yellow-fronted Tinkerbird	LC	Not endemic
Corvus albus	Pied Crow	LC	Not endemic
Camaroptera brevicaudata	Grey-backed Camaroptera	LC	Not endemic
Pycnonotus barbatus	Common Bulbul	LC	Not endemic
Numenius arquata	Eurasian Curlew	NT	Not endemic
Tringa totanus	Senegal Coucal	LC	Not endemic
Prinia subflava	Tawny-flanked Prinia	LC	Not endemic
Terpsiphone rufiventer	Red-billed Paradise Flycatcher	LC	Not endemic
Passer griseus	Northern Grey-headed Sparrow	LC	Not endemic
Cypsiurus parvus	African Palm Swift	LC	Not endemic
Butorides striata	Green-backed Heron	LC	Not endemic
Kaupifalco monogrammicus	Lizard Buzzard	LC	Not endemic
Accipiter tachiro	African Goshawk	LC	Not endemic
Pternistis bicalcaratus	Double-spurred Francolin	LC	Not endemic
Actophilornis africanus	African Jacana	LC	Not endemic
Turtur afer	Blue-spotted Wood Dove	LC	Not endemic
Chrysococcyx cupreus	African Emerald Cuckoo	LC	Not endemic
Halcyon malimbica	Blue-breasted Kingfisher	LC	Not endemic
Eurystomus gularis	Blue-throated Roller	LC	Not endemic
Bycanistes fistulator	Piping Hornbill	LC	Not endemic
Nicator chloris	Western Nicator	LC	Not endemic
Spermestes cucullata	Bronze Mannikin	LC	Not endemic
Vidua macroura	Pin-tailed Whydah	LC	Not endemic
Lagonosticta senegala	Red-billed Firefinch	LC	Not endemic

Source: Richflood, 2022

3.10 Herpetofauna

During field observations, relatively few species of herpetofauna were recorded within the assessment area, with only three (2) observed during the survey period (Table 3.17). The species recorded comprised two (2) reptiles and one (1) amphibian species. The relatively low richness of herpetofauna was likely due to the synergistic effect of habitat degradation due to anthropogenic activities. Furthermore, no herpetofauna species of global conservation concern were recorded, and none of the species recorded are regarded as endemics. Critical habitat assessment for herpetofauna found no critical habitats to be present within the project area.

Table 3.17: Herpetofauna species recorded in the project area during the field assessment

Scientific Name	Common Name	IUCN Status	Endemic Status
Reptile			
Agama agama	Common Agama	LC	Non-endemic
Hemidactylus angulatus	House Gecko	LC	Non-endemic
Chamaeleo africanus	African Chameleon	LC	Non-endemic
Amphibians			
Hyperolius spatzi	African reed frog	LC	Non-Endemic
Leptopelis viridis	Rusty Forest Tree frog	LC	Non-Endemic

Source: *Richflood, 2022*

3.11 Ecosystem Services

Ecosystem services are outputs, processes, and or conditions which directly or indirectly benefit humans or enhance social welfare. They include provisioning (food, water, raw materials, etc.), regulating (flood / erosion control) and cultural services (spiritual & recreational services).

The ecosystem services identified within the project area are summarised in Table

3.17. Some of the obvious uses of forest species which includes constriction (roofing material) firewood, timber and charcoal clearly have been recognized and incorporated into local lifestyle among villagers. Other, less apparent products (foods, oils, medicines) play major roles in traditional usage amongst local people.

Table 3.17: Ecosystem services identified within the project area

Ecosystem Services	Description
General farming and foraging activities	• Fruits • Various plant species • Fishing • Cultivation of crops
Raw materials from the Environment	• Timber • Fuelwood and Charcoal • Construction (roofing material)
Fresh water	• Domestic use • For human consumption • For hygiene

Ecosystem Services	Description
Medicinal Resources	• Various plants (see Table 3.2)
Air Quality Regulation	• From vegetation
Water flow regulation & Erosion control	• The freshwater stream riparian area • From ephemeral watercourses
Habitat	• All habitats present within the project AoI terrestrial ecology

Plate 3.7: Ecological services: *Penisetum subsangustum* used as roofing material in the area

Source: *Richflood, 2022*

3.11.1 Current impacts on ecological resources

Based on field observations, it is evident that ecological resources in the project area are currently impacted by a range of factors. Plate 3.7 illustrates a selection of these factors which include:

- Roads;
- Agricultural Plantation;
- Harvesting of timber for charcoal and fuelwood;
- Cutting of trees (vegetation removal); and
- Developments and houses.

3.12 Habitat Sensitivity

Habitats provide ecosystem services in the form of food and aesthetic value. The riparian forest and fresh water streams within the project area are rated as moderately sensitive. The habitat has already been modified by impacts such as replacement for palm plantation agriculture. The extent of the habitat that will be altered as a result of the project can thus not be regarded as extensive.

Areas that are classed as sensitive are generally those which are considered to be in a natural condition or were found to contain (or provide habitat for) threatened faunal or floral species. The following classifications are used to describe the possible sensitivity rankings:

- Low – insignificant amounts of natural habitat or vegetation present. The existing habitat has been extensively transformed. The remaining vegetation is dominated by alien invasive plant species;
- Low-Moderate – existing habitats have been heavily transformed and little natural vegetation or habitats are present. Species diversity is considered low. The area may be considered otherwise moderately important (such as a movement corridor for fauna);
- Moderate–existing habitats have been modified or transformed but an equal percentage of natural vegetation and habitats remain. Species diversity is considered moderate. Such habitat is considered to have a strong chance of successful rehabilitation if left to restore through natural succession processes;
- Moderate-High – the majority of the area is considered to be in a near-natural state. Species diversity is high, and the ecosystem function is healthy. Minor impacts may be present; and
- High – the area is considered to be in a largely natural condition with high levels of species diversity and also a good probability of Critical Habitat classification. Alternatively, an area may be regarded as having a high sensitivity (even if the habitat is modified) but is found to be a habitat, or a breeding area, for any Species of Conservation Concern.

Each habitat unit was assessed and assigned a habitat sensitivity rating.

3.13 Socio-economic and Health Conditions of the Study Area

This section covers the socio-economic and health assessment of the identified communities within the facility's area of influence. This baseline provides a description of existing conditions which is essential to the identification and assessment of the impacts of the facility. From the social and health perspective, the assessment covers the facility operation on human conditions in the identified community to predict and mitigate any possible adverse future impact of the plant on the socio-economic and health conditions of the human inhabitants in the study area. The study furthered by assessing the gender-based issues, and child labour issues ranging from child labour-specific activities to gender-based violence within the identified communities.

Demographic Profile of the Study Area

- ***Population Distribution***

The Facility site is located in Kankan prefecture in the Kankan region, Guinea. The facility site is located on the outskirt of Kankan town, which is about 11.2km away, along Kankan-Kouroussa Road. Kankan region is divided into five prefectures; which are further subdivided into 57 sub-prefectures, 5 urban communes, 53 rural communes, 878 arrondissements, 68 neighbourhoods and 1864 sectors. The 5 prefectures include Kankan, Kérouané, Kouroussa, Mandiana and Siguiri. Kankan prefecture covers a total land area of 17,420 Km^2, with a total population of 473,359 people, according to the 2014 national census (Institut National de la Statistique de Guinée).

Name	Status	Population Census 1996-12-31	Population Census 2014-03-01
Kankan	Prefecture	262,350	473,359

Kankan

473,359 Population [2014] – *Census*

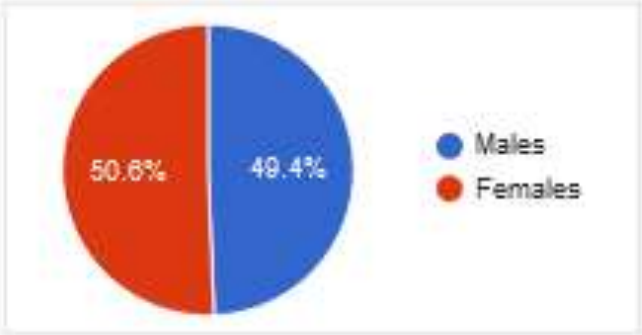
17,420 km² Area

27.17/km² Population Density [2014]

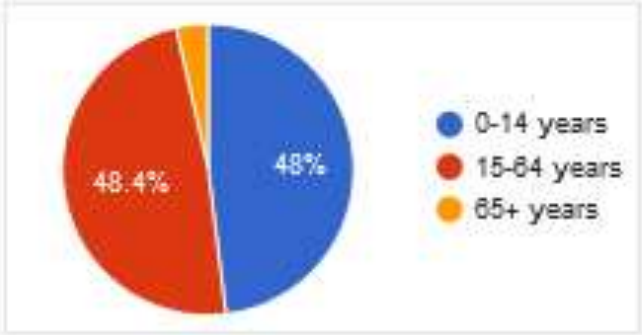
3.5% Annual Population Change [1996 → 2014]

Figure 3.12: The population status of Kankan prefecture

Source: citypopulation.de



Gender (C 2014)	
Males	233,617
Females	239,742



Age Groups (P 2014)	
0-14 years	256,326
15-64 years	258,209
65+ years	18,994

Figure 3.16: Population distribution in Kankan prefecture

Source: citypopulation.de

❖ ***Economic activity***

The main economic activity in Kankan is agriculture, where crops such as sorghum, corn, fruits, yam, and mango are cultivated. Kankan has a riverport on the Milo River. The city centre also hosts a university and an airport. The main ethnic group of Kankan is Malinké (Mandinka), and the main spoken language is Malinké.

❖ ***Religion***

Religion in Guinea is approximately 89 per cent Muslim, 7 percent Christian, with 2 percent adhering to indigenous religious beliefs. There are also smaller numbers of Atheists and practitioners of other religions in the country. Much of the population, both Muslim and Christian, also incorporate indigenous African beliefs into their outlook (WorldFactbook, 2022).

❖ ***Health***

In addition to the General health facility within the Kankan metropolis, there are other primary health facilities (private and government-owned) which offer healthcare services for the people. Approximately 85% of health care facilities are government-run facilities with 15% privately run facilities. The most prevalent disease is malaria and other common diseases include typhoid, cholera and diarrhoea (Wikipedia, 2022).

3.14 Administrative Divisions and Institutions

A. Devolved Power

❖ ***<u>Prefecture</u>***

The administrative head of a prefecture is the Prefect. The prefect is appointed by a decree of the President of the Republic from public servants belonging to levels A and B of the civil service and senior officers from the army, the gendarmerie and the police. He must reside in the capital of the prefecture. Under Decree 081/PRG/SGG/87, he is a representative of the President of the Republic and of each member of the government: in that capacity, he is responsible for enforcing laws, regulations and government decisions, as well as for ensuring public order in the prefecture.

According to the decree, the prefect assists the populations with decentralization, namely the constitution of their decentralized communities. Moreover, the prefect oversees all the entities in the subprefecture, whether they are subject to deconcentration or decentralization,

namely the rural communes (formerly rural development communes) and the urban communes as well as the rural districts and the urban quarters that they consist of, respectively.

The prefect is assisted by two general secretaries of the prefecture; the one is responsible for decentralized communities and the other for administrative matters. Thus theoretically the prefecture supports decentralization structures through the appointment of a secretary responsible for decentralized communities. The two general secretaries are appointed by a decree of the President of the Republic from public servants belonging to levels A and B (Swartz, 1980).

- ***Subprefecture***

The administrative head of a subprefecture is the Subprefect. The subprefect is appointed by an order of the Minister of Territorial Administration and Decentralization from public servants belonging to levels B and C and officers and non-commissioned officers of the army, the gendarmerie and the police. This appointment by the Minister is the result of the reorganization of the ministries by the Government of President Alpha Condé in January 2011. Under Decree 081/PRG/SGG/87, the subprefect must reside in the capital of the subprefecture.

The subprefect is assisted by an assistant subprefect, who is also a public servant. The assistant subprefect is appointed by an order of the Minister of the Interior and Decentralization on the same conditions as the subprefect. Like the prefecture, the subprefecture rarely plays a role on the district level. Even so, it may play a role in conflict management.

Moreover, the subprefecture is often closer to the authorities on the micro-local level (district or sector) and it is therefore better equipped than the prefecture to manage conflicts, including those between herders and farmers. In addition, it should be noted that there is no equivalent of the subprefectoral level for urban communes. Kankan urban commune therefore depends directly on the prefecture on the administrative level (Swartz, 1980).

B. Decentralized Power

- ***Rural Communes and Urban Communes***

Administrative decentralization began in the Republic of Guinea on December 22, 1985 (Condé, 2003) with the creation of a Secrétariat d'État responsible for decentralization, but

rural development communes did not become widespread until early in the 1990s. Since 2011, the rural development communes have become rural communes (CRs), even though the legislation governing them has not really changed.

The rural communes and the urban communes are decentralization entities of the State and are independent in terms of their budgetary management and development decisions. The boundaries of the CRs are most often based on those of the subprefecture. The Local Governments Code, which sets out the organization and responsibilities of the decentralization bodies, was revised by the Ministère de la Décentralisation in 2008.

Even though the draft decrees accompanying it could not be ratified by the Assemblée Législative as a result of various political events that followed its development, the revised Local Governments Code is the reference currently used by Guinea's decentralization bodies. The Community Council manages various matters by deliberation on the level of the CR. It establishes the development program for the entire CR with funds from the community (obtained from taxes and fees), but also with borrowed funds, if necessary, or, if the opportunity arises, support funds (provided by NGOs, cooperation bodies or even private investors).

The Community Council is therefore responsible for drawing up and, as necessary, amending the CR's budget. Similarly, it is involved in setting and collecting income taxes and local taxes and fees, within the limitations set by the State's laws and regulations. If, in practice, the Council is not really involved in setting tax rates (they are uniform from one CR to another), it collects most of the income tax paid by citizens.

Under the Local Governments Code, about 75% of the income tax collected locally must return to the CR. The Council therefore normally has funds it can use before it borrows funds or uses support funds. Even so, previously a large portion of the rural commune budgets came from collection of the minimum local development tax.

The Community Council is theoretically involved most often in the creation of infrastructure. It is responsible for developing and maintaining public thorough fares and squares, as well as tracks connecting the districts in the CR/subprefecture. It is also responsible for resource management. In this capacity, the CR manages firefighting and the setting of bushfires. It is also responsible for adjusting the regime and the terms of access and use for water points of all kinds. It also creates and develops transhumance paths for livestock within the CR (EEM, 2015).

❖ ***Districts and Sectors***

Even though the district is officially recognized from the administrative standpoint, that is not the case of the sector, even though it represents an extension of local administration. Its role, especially in the study area, is closely related to that of local traditional and religious institutions, whose connections and implications are described in the sections below (EEM, 2015).

❖ ***Traditional and Religious Powers***

Decisions concerning land management and village matters are generally made by the founding lineage with input from other lineages or by the founding lineage after mandatory consultation of all elders from the other lineages present. The general traditional hierarchy in the community is as shown in Figure 3.15.

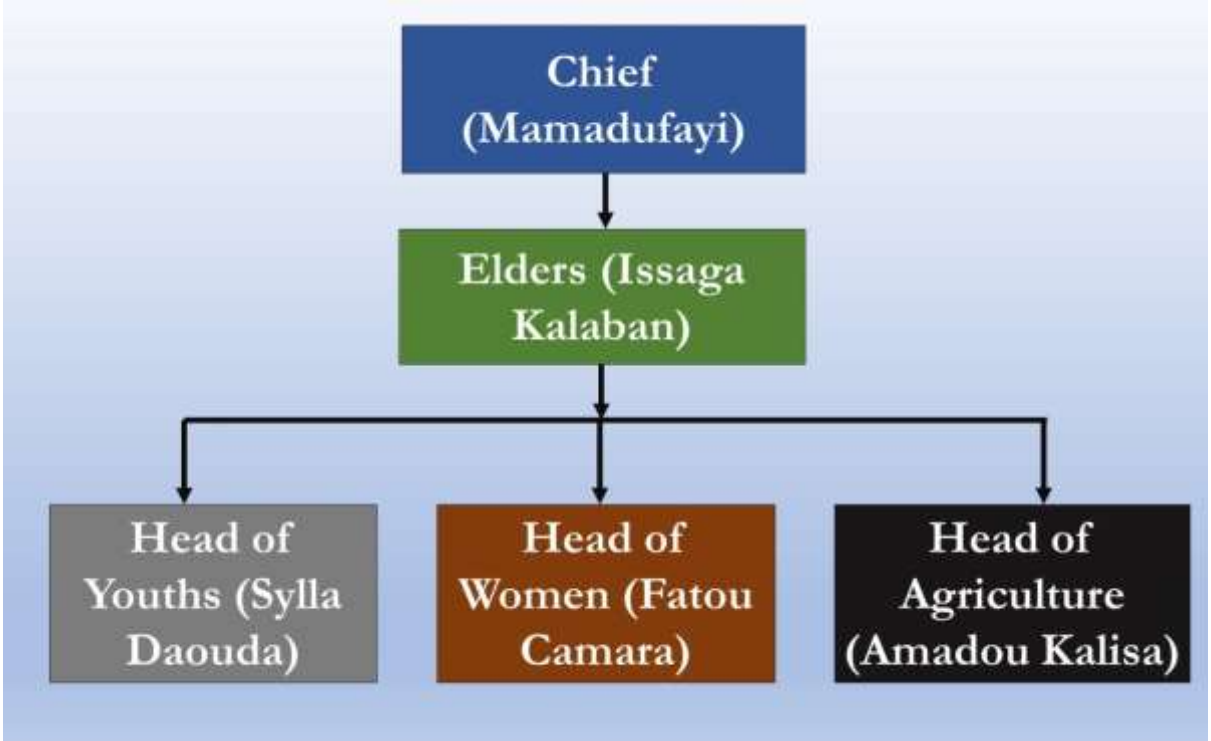


Figure 3.15: Leadership Hierarchy in the Communities around the Facility Area

Source: Richflood field survey, 2022

1. **Council of Elders:** The members of this council are selected, rather than elected, as a function of their age or their status in the lineage. The council is always overseen by the elder of the founding lineage when the founding lineage has all the traditional power in the village or by the oldest man in the village when decisions are made in common with all the other lineages in the village.

To belong to the council, a man must fulfil the following criteria: be of good character, honest and able to defend the interests and resolve the conflicts of the village. The members' roles include management of social events (weddings, baptisms and funerals) and land disputes. They are also responsible for ruling on disputes between herders and farmers.

2. **Mosque Council:** This council is overseen by the first Imam. It meets in the villages that have a mosque, but its members may be learned men from other villages that do not have a mosque. The members of this council are selected on the basis of their level of education at Koranic school. They are generally part of the Council of Elders and play fairly similar roles. Even so, if a matter cannot be decided by the Council of Elders, this council is called on to provide religious advice based on Sharia law.

3. **Youth Organizations:** The youth organizations are very active and take part in work to develop their village (opening of roads, construction of mosques, funeral ceremonies, social mutual aid, etc.).

4. **Women's Organizations:** They are central to domestic functions, activities and other work, but they usually are not allowed to take part in decision-making in the villages.

Project Area of Influence

The project Zone or Area of Influence (ZoI / AoI) defines the project area, as well as the most directly affected villages closest to the project site. This was calculated based on those villages within a radius of approximately 5 km buffer around the project site. The identified area of influence around the project site includes Baladou, Bangasila, Sanankoro and Soridou.

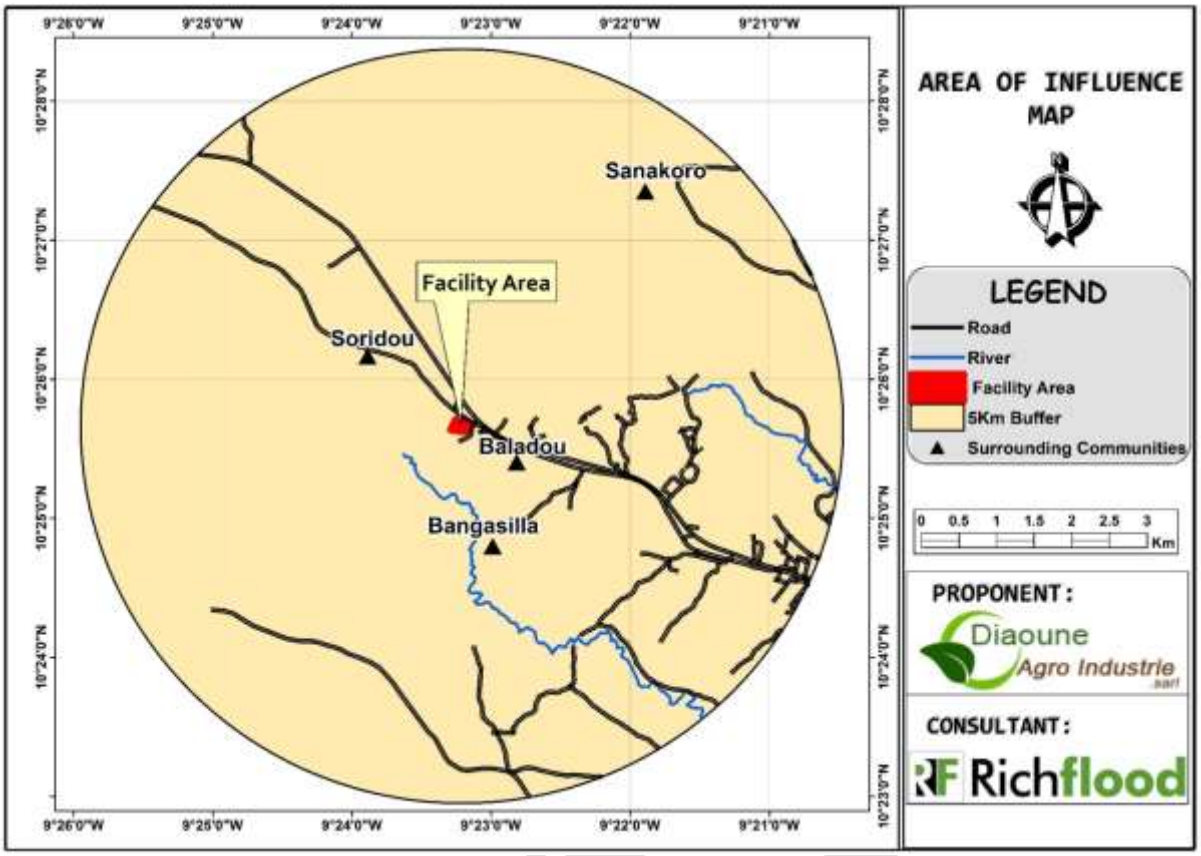


Figure 3.18: Project Area of Influence Map

Source: Richflood, 2022

3.15 Access to basic social services and related infrastructure

Access to Electricity

Although most surveyed villages are not connected to the national electricity grid, the majority of the household use Gas lamps (59.38%), while some use Solar energy (34.38%) as an alternative source of electricity. Also, the study revealed that about 7.81% uses Lanterns/candles to illuminate their homes, 1.56% use Generator as a source of lighting, 1.56% of the respondents use electricity via the national grid 1.56% of the households use Battery operated lamp.

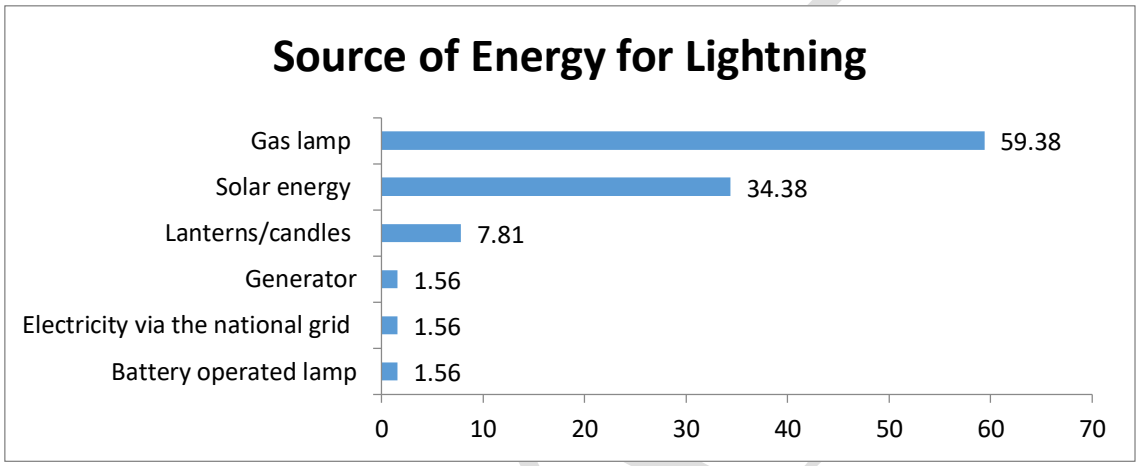


Figure 3.17: Source of Energy for Lightning

Source: *Richflood, 2022*

Plate 3.8: Source of electricity observed within the communities

Source: *Richflood, 2022*

Cooking Fuel

The bulk of the surveyed area households (97.0%) use wood for cooking followed by charcoal (3.0%) as shown in Figure 3.20.

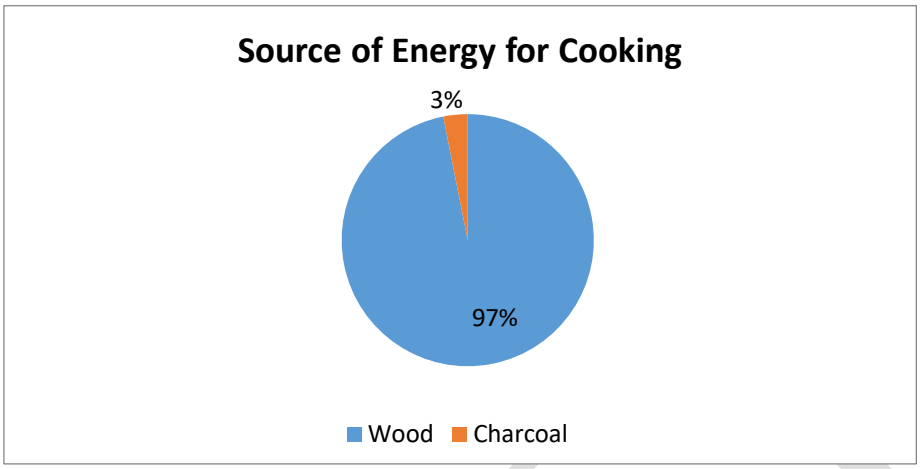


Figure 3.18: Source of Energy for Cooking

Source: Richflood, 2022

Access to water

Public standpipe and drilling wells/pumps/pipes, including wells, were found in the communities. There is a high proportion of people who have access to water; however, most residents in the host communities rely on public standpipes. The survey data revealed that public standpipes are the most common source of water with 46.88% of respondents making use of it; 35.94% making use of drilling well/pump/pipe water supply, 17.19% of the respondents using Surface water, 9.38% depend on rainwater, 9.38% make use of private well while 3.12% of respondents depend on public well water (Figure 3.21).

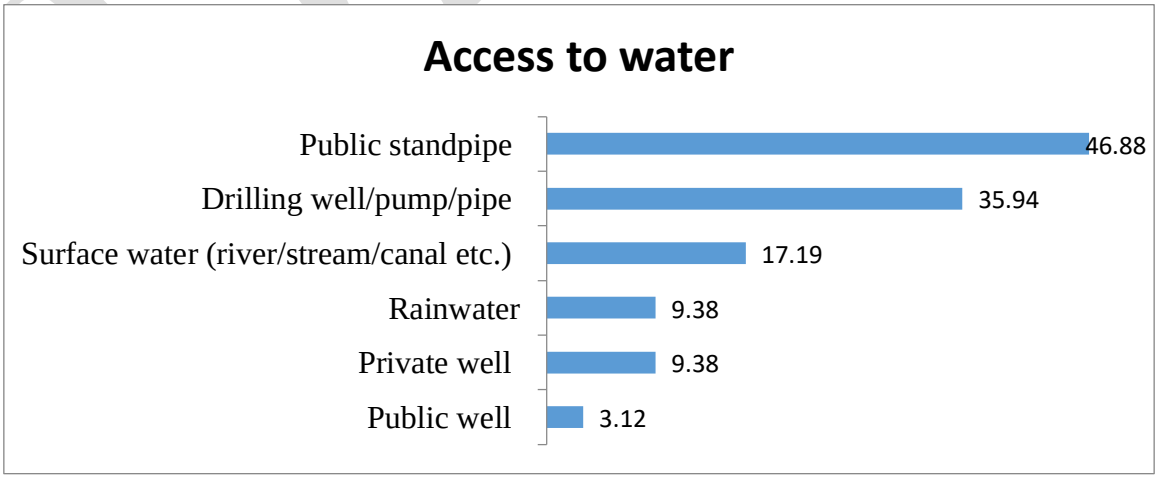


Figure 3.19: Source of Drinking Water in the Project Area

Source: *Richflood, 2022*


Plate 3.9: Source of drinking water within the communities.

Source: *Richflood, 2022*

Sanitation

There is no sewerage system, so those with sanitation use a form of latrine or septic tank. It was reported that residents of the settlements within the AoI have no formal sanitation provision. There is no formal waste disposal system within the community. Residents of the study area generally burn domestic waste or dispose of it in the surrounding bushlands.

Road Infrastructure

The common forms of transportation in the study area are bicycles, commercial tricycles, cars, motorcycles and buses. The road networks linking the communities are fairly okay, the internal roads are neither paved nor tarred and they are not so busy.


Plate 3.10: Footpath access roads observed in Baladou community

Source: *Richflood, 2022*

3.16 Education

Access to education would mean the extent to which individuals have access to uninterrupted opportunities to acquire primary, secondary and tertiary education in Guinea. The study

recorded a higher proportion of the respondent with no formal education.1.56% of respondents have attained university education; 4.69% have a junior secondary school education, 6.25% attained senior secondary school education, only 12.5% have completed primary school education and 75.0% have no formal education (Figure 3.22 and Plate 3.11).

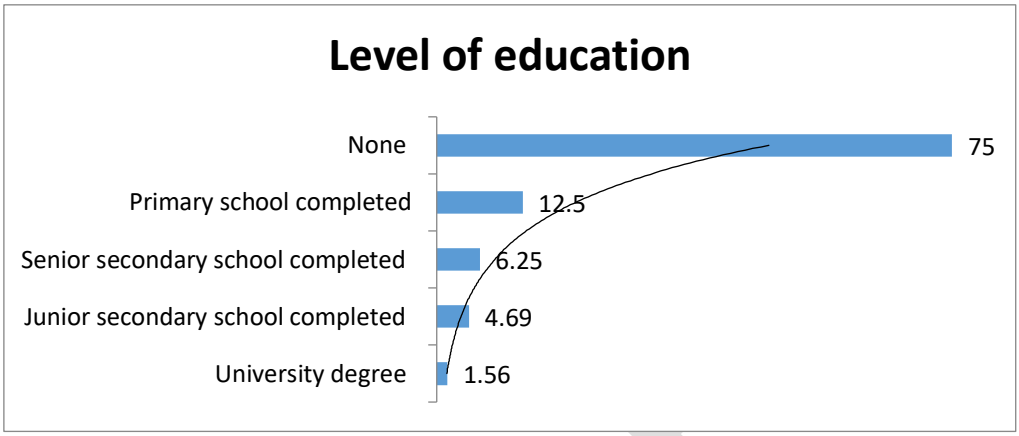


Figure 3.20: Educational Status of the Project area

Source: *Richflood, 2022*

Plate 3.11: Pupils and Schools observed in Bankassila community

Source: *Richflood, 2022*

Literacy Level

An advanced level of educational attainment is pivotal to economic liberation and empowerment. Levels of educational attainment by residents within the proposed area are somewhat matched by the level of literacy. About 69.0% of the surveyed groups reported that they cannot read and write as illustrated below in Figure 3.23.

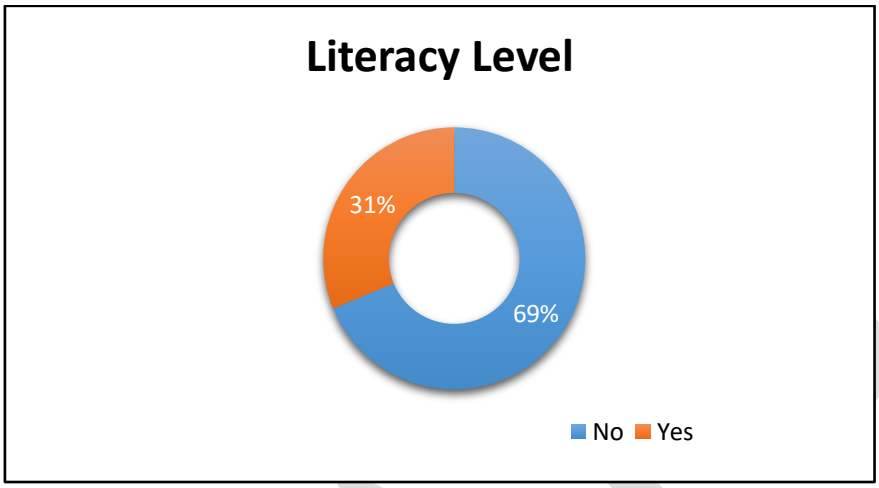


Figure 3.21: Literacy Status of the Project area
Source: *Richflood, 2022*

3.17 Livelihood practises (Economics, Livelihoods, and Employment)

The major livelihood activities reported in the host communities are farming, trading, civil/public service and artisanship.

- ***Agriculture***

Farming is one of the primary occupations of most residents in the study area. This farming is done mostly by men along with their family members. Notably, crops planted by the farmers are cashew, vegetables, tubers, maize, and plantain among others. Animal grazing and husbandry is also notable agricultural activity in the community. Cows, goats, sheep and fowls are common animals being reared (Plate 3.12). They either sell their farm produce or consume them with their family.

During the survey, it was revealed that agriculture is the mainstay of the economy of the people, and it cuts across all gender and all segments of the villages. About 51.56% of host communities have farming as their primary occupation.


Plate 3.12: Agricultural activities in the community

Source: *Richflood, 2022*

Cashew Plantation Ownership

During the interview with the farmers, it was gathered that 87.0% of the farmers own a cashew farm plantation. Also, some of the farmers usually sublet their farm plots to other community members. This suggests that some of the farmers surveyed on the site may not be the original farm owners. Figure 3.24 shows the distribution of cashew plantations ownership.

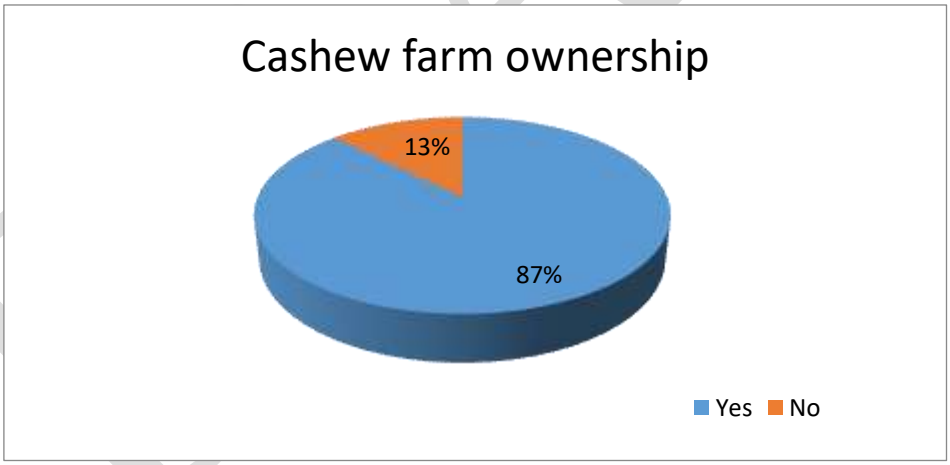


Figure 3.22: Cashew Farm Owners' Status in the area

Source: *Richflood, 2022*

Cashew Plantation Size

Out of the 87.0% that claimed to own cashew plantation farms, the study revealed that the size of the cashew plantation plot owned by these farmers ranged from 1 hectare to 100 hectares. While farmers who own a 1-hectare area had the highest percentage of 65.62%,

followed by 12.5% of farmers own 2 hectares, 6.25% own 3 hectares, 1.56% of the farmers own 4 hectares while 1.56% of the farmer own 100 hectares.

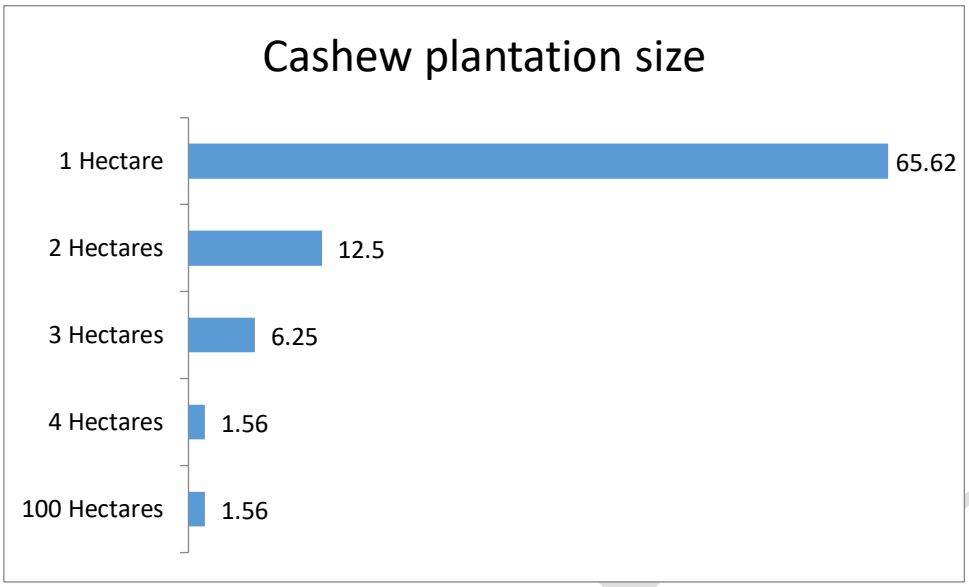


Figure 3.23: Cashew Plantation Status per Household in the area

Source: *Richflood, 2022*

Cashew Plantation Labour Source

In addition to the information provided above by the farmers, 82.81% of the surveyed farmers stated that they cultivate on the site by themselves while 39.06% used family support (adults) followed by 26.56% claimed to engage in family support (children under 18) on the site to save the cost of labour. 1.56% explained that they hired labour to work for them on the farm while 1.56% depends on caretakers/farmers' tenants as the source of labour.

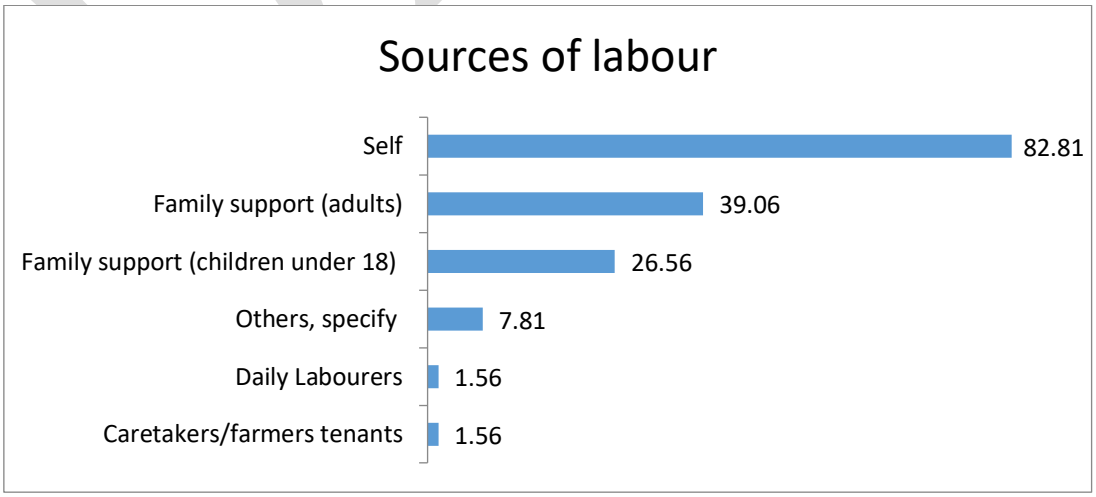


Figure 3.24: Source of labour

Source: Richflood, 2022

- ***Trading***

The exchange of goods and services is common in the communities of study. This exchange occurs almost on every corner, from the street hawkers to kiosks and the main market. This activity is not gender specific as both men and women were found selling and buying goods market and around the community. The trading activities range from having a kiosk in front of a house to large-scale buying and selling in designated markets.

Trading activities begin very early in the morning and close late at the night. Some common products found in the markets are cashew nuts, palm oil, potatoes, mangoes, meats, peppers, tomatoes and other food supplements, shoes, clothes; and services like tailoring, barbing, and hairdressing salons. 51.56% of the respondents stated that they are farming (51.56%), 40.62% of the respondents stated they are into cashew farming, 4.69% of the respondents engage in trade/small business owned by a household while 1.56% of the respondents are employed in a company (Manufacturing, mining, etc.).

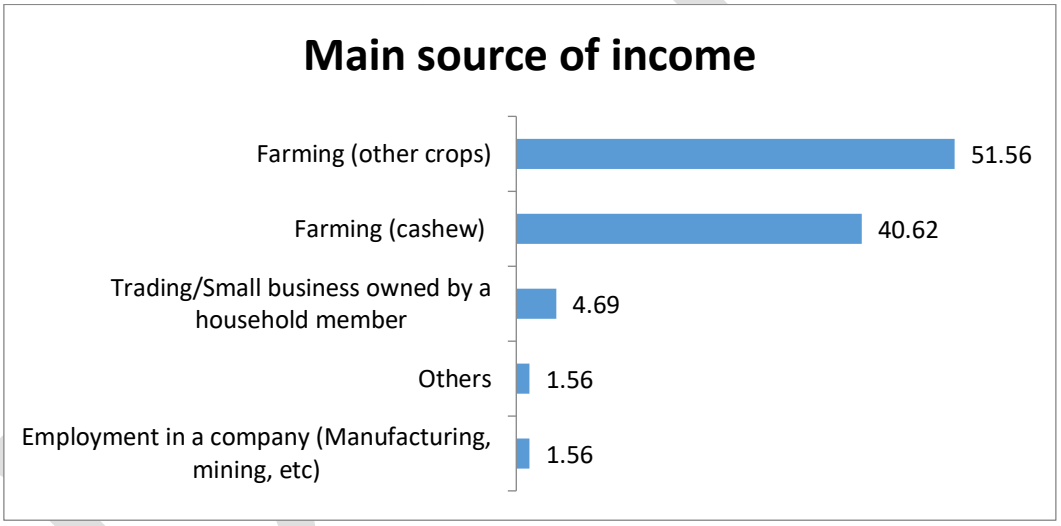


Figure 3.27: Source of Income

Source: *Richflood, 2022*

Plate 3.13: Trading activities in the community

Source: *Richflood, 2022*

3.18 Settlement Patterns/ Housing

A settlement pattern refers to the way that buildings and houses are distributed in a particular geographical location. The settlement pattern observed in most of the communities is a nucleated type in which houses are concentrated at a spot while there are few dispersed settlements in the area.

The survey shows that 49% of the survey respondents are living in Huts/several small buildings (same compound), 46% of the respondents live in compound houses (rooms) while 5% of the respondents live in separate houses (multiple rooms). (Figure 3.28). Materials used in the construction of the houses in the communities are mud or mud brick or earth wall and cement block with corrugated iron sheets or grass plants for roofing.

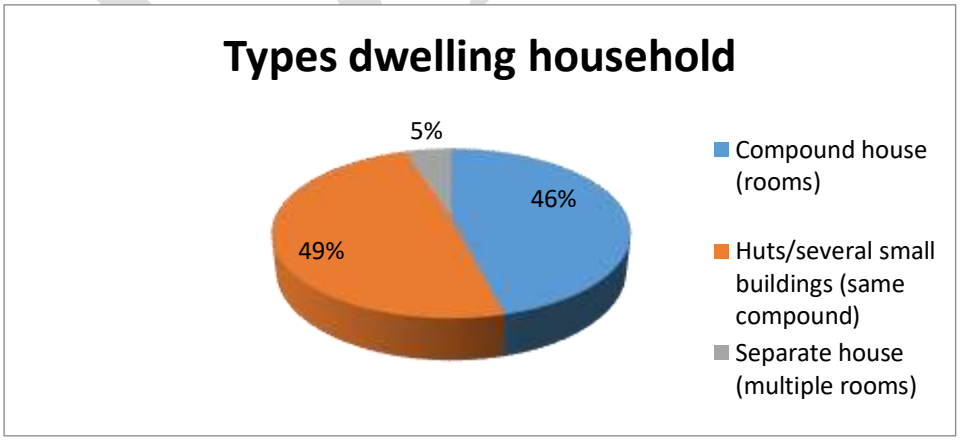


Figure 3.28: Types of dwelling household

Source: ***Richflood, 2022***

Plate 3.14: Settlement patterns and housing Structures in the host communities

Source: *Richflood, 2022*

3.19 Gender Assessment at the Cashew nut Facility

- **Age of working women**

Women between the age range of 25-32 were the predominant working class at the Cashew nut facility in Kankan. The majority (33%) fell into the 25-32 age group, 29% fell into the 18-24 age group, and 9% constituted the 41-47 age group. This information is illustrated in the below diagram.

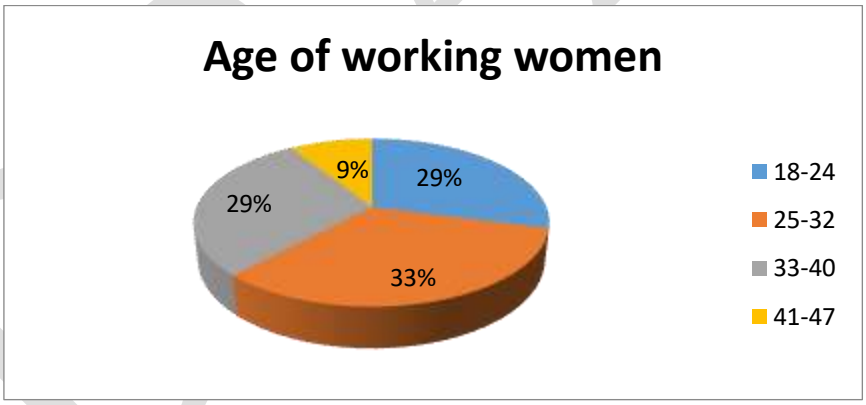


Figure 3.27: Gender Survey: Women Age Group

Source: *Richflood Field survey, 2022*

- **Marital Status**

The majority of the women working at the facility were married (64%), followed by 16% of the women to have separated or divorced, 2% of the women were widowed and 2% of the women were single.

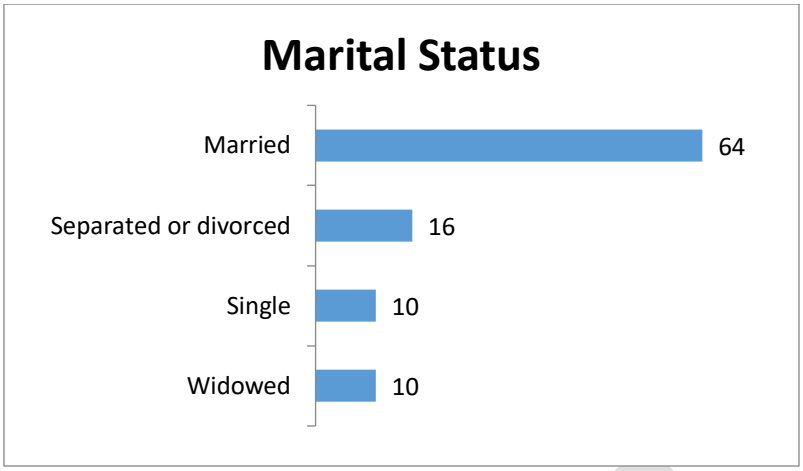


Figure 3.30: Gender survey: Marital status
Source: Richflood Field survey, 2022

- **Women's work description at the facility**

The study revealed that women were involved in cashew-related activities at the facility. During the survey, 53% of the women were engaged in sorting the cashew followed by 26% of the women who worked in uncapping cashew while 21% of the women engaged in other cashew-related activities at the facility.

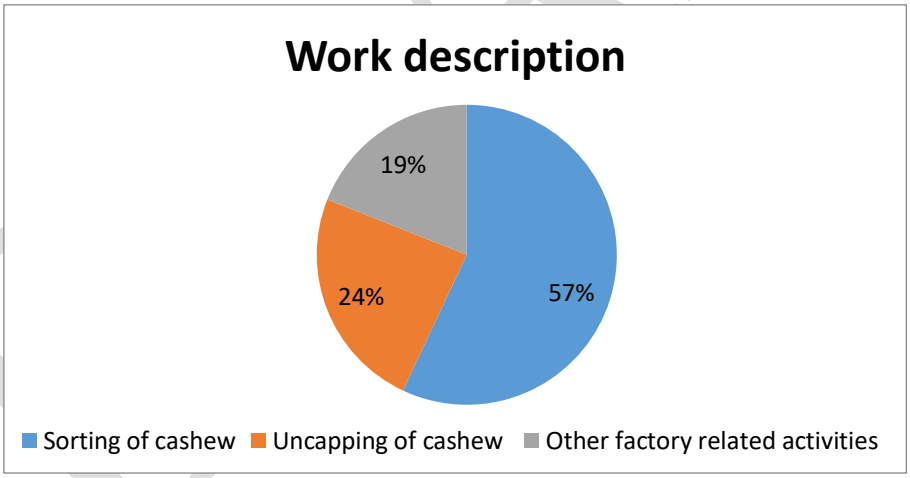


Figure 3.29: Gender survey: Area of Work
Source: *Richflood Field survey, 2022*

- **The expectation of women and working condition**

Duration of work

Based on the survey, the entire respondents stated they worked 8 hours a day with an hour break interval from Monday to Friday (including holidays). The majority of the respondents

reported they engage in sorting cashew on the night shift as part of their work in the factory. 67% of the respondents reported they were not been paid on time and had poor salary structure for the employees.

Lighting/ventilation

Workplace lighting and ventilation are an important aspect that determines the efficiency of workers in any facility. The survey revealed the facility was well-lighted. Also, the surveys show that 43% of the respondents described ventilation within the workplace as well-ventilated, 19% of the respondents described ventilation within the workplace as moderately ventilated, 21% of the respondents reported that the workplace was poorly ventilated while 5% of the respondents stated that there was no ventilation within their workplace.

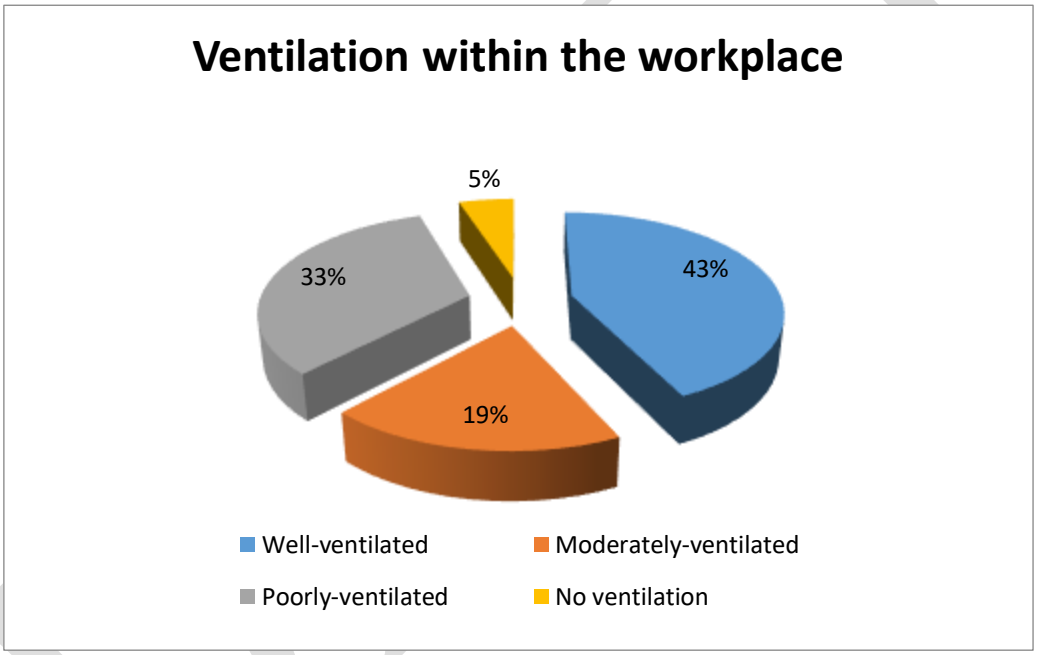


Figure 3.30: Workplace ventilation

Source: Richflood Field survey, 2022

- **Occupational Health and Risk**

As reported during the survey, the major health challenge for women working within the facility is related to ergonomic stress. The baseline survey from the multiple choice questionnaires revealed that the majority of the respondents (81%) experienced back pain, shoulder pain, and neck pain, 38% of the respondents stated cut fingers was the major health hazard/risk associated with their work, 33% revealed that air pollution/odour was the health

hazards/risks related to their work within the facility, hand pain was reported by (24%) of the respondents while 14% stated burnt hands was the major health hazards/risks associated with their work.

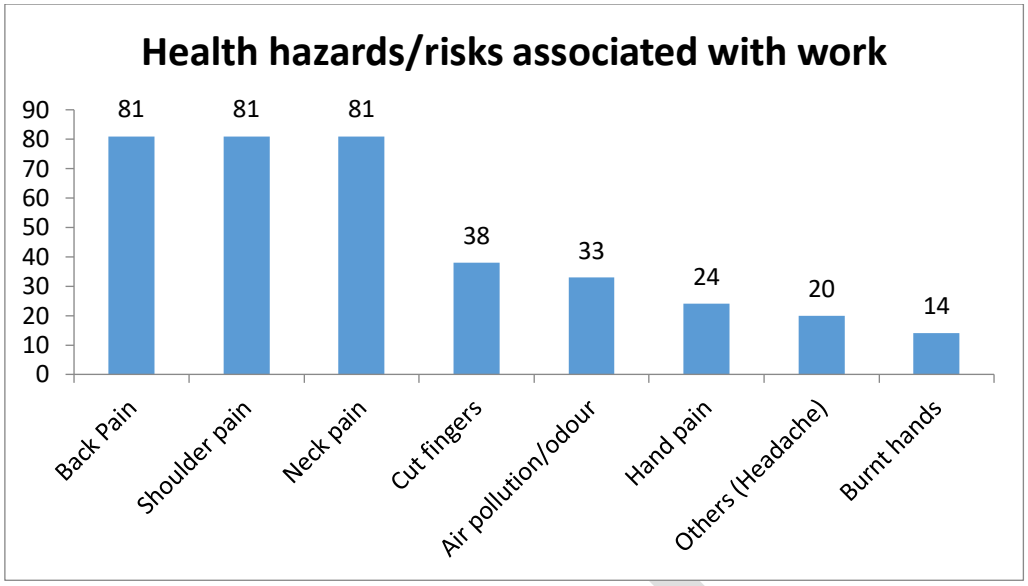


Figure 3.33: Health hazards/risks associated with work

Source: Richflood Field survey, 2022

- **Safety in the work environment**

Workplace safety refers to the limitation of elements that can cause harm, accidents, and other negative outcomes in the workplace. The majority of the respondents reported there was adequate safety equipment in the workplace and felt safe and secure while undertaking their daily routine work at the factory. The study revealed 81% of the women working within the facility have access to personal protective equipment.

All the respondents (100%) reported that they have access to hand gloves, 76% of the respondents make use of Nose masks, 67% of the respondents have access to appropriate clothing during work, 10% of the respondents make use of helmets while 5% of the respondents reported access to safety boots when working within the facility.

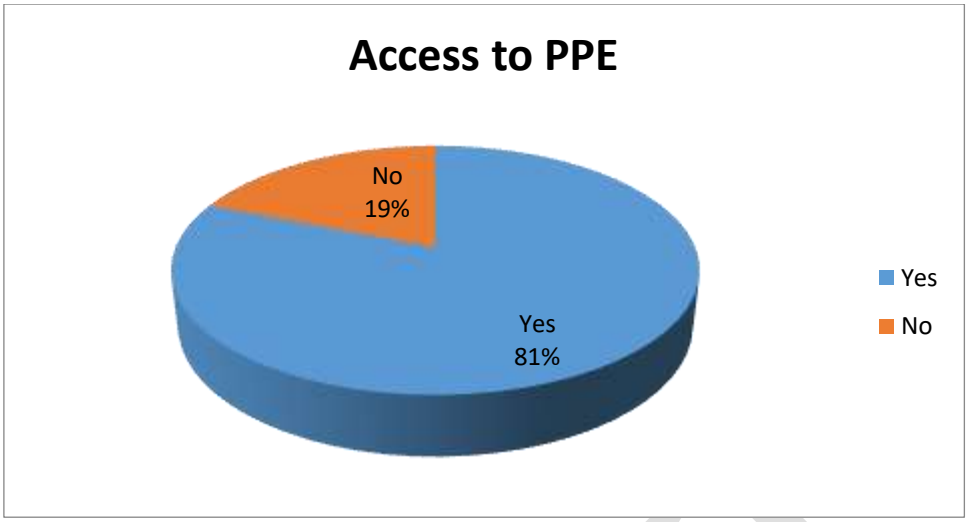


Figure 3.34: Access to Personal Protective Equipment

Source: Richflood Field survey, 2022

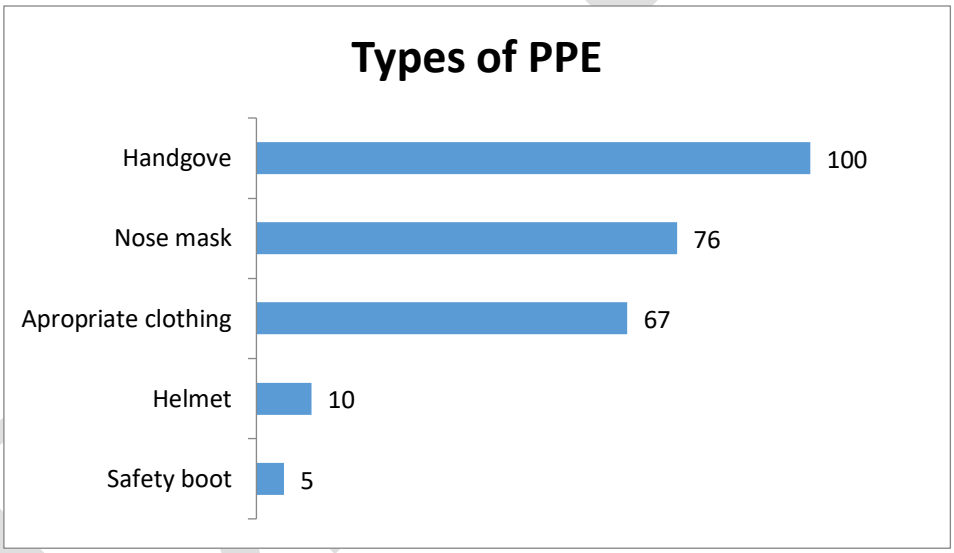


Figure 3.35: Types of Personal Protective Equipment

Source: Richflood Field survey, 2022

- **Sexual Harassment/Gender-based Violence**

According to the survey conducted by the Richflood team in 2022 for the DAI staff on sexual harassment/gender-based violence (GBV), all the women working in the factory reported to have not experienced any form of sexual harassment and/or gender-based violence while working at the factory.

Plate 3.15: Engagement with women groups

Source: Richflood, 2022

3.20 Child Labour Assessment

- **Age of working children**

Children between the age range of 3-17 were interviewed as part of the child labour assessment for this project. The majority of the respondents (66.7%) fell into the 8-13 age group, 25.0% fell into the 14 – 17 age group and 8.3% constituted the age group of 3-7. This information is illustrated in the below diagram.

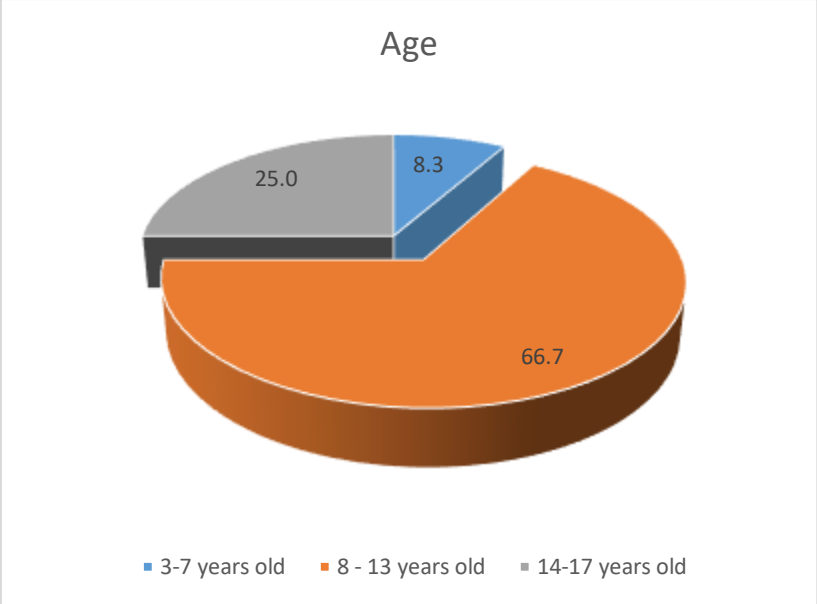


Figure 3.36: Children Survey: Children Age Group

Source: Richflood Field survey, 2022

- **Gender**

During the child labour survey, 62.5% of female child and 37.5% of a male child was interviewed. The survey results revealed that 75.0% of the children live with their biological parents while 25.0% of children were not. Some of the reasons given by those children for not living with their biological parents include, attending school outside the parent's place of residence, parents trusted into the custody of a relative; attending Arabic school, and parents were deceased.

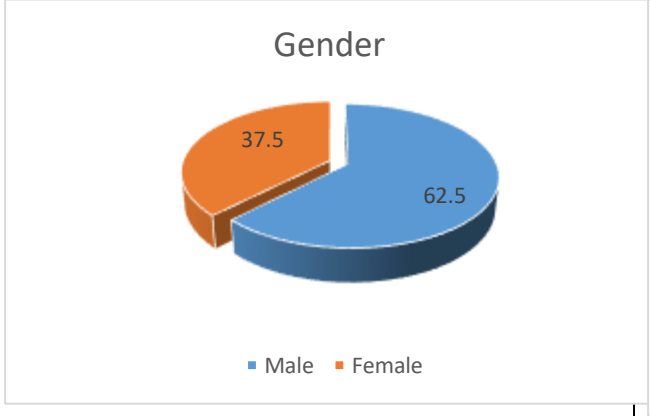


Figure 3.37: Children Survey: Gender

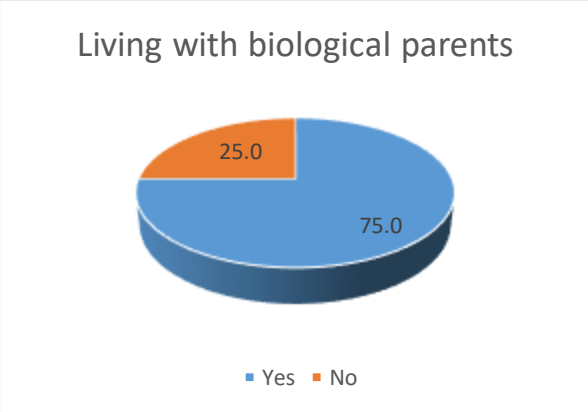


Figure 3.38: living with biological parents

Source: Richflood Field survey, 2022

- **School Enrolment**

Amongst the interviewed children, 16.7% of them were not enrolled in any school during the study period due to different reasons ranging from lack of family support (deprivation of access to education by the family), high registration fees and helping parents on the farm.

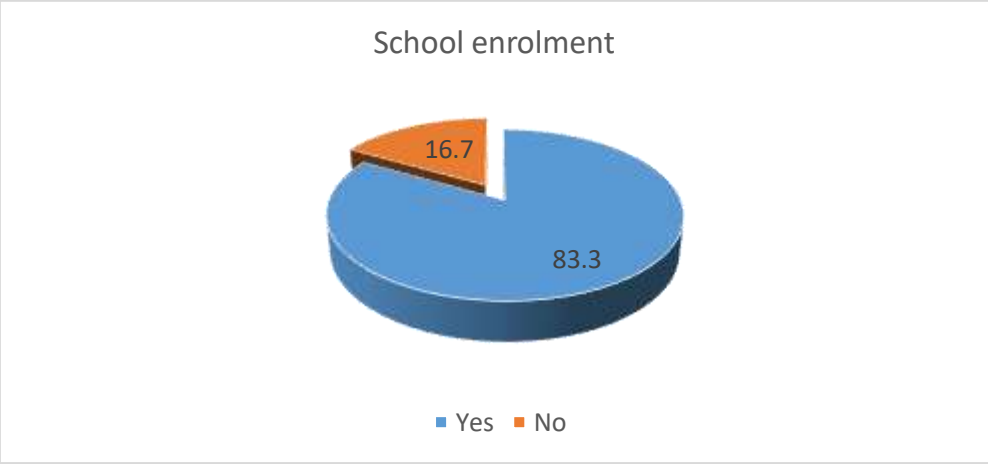


Figure 3.39: Children Survey: Educational Status
Source: Richflood Field survey, 2022

Plate 2: Children enrolled in school
Source: Richflood Field survey, 2022

- **Work description in the cashew value chain**

Works are done by children in the last 7 days

Based on the survey, assessment of child-related work in the cashew value chain in the last 7 days reported children to have been engaged in carrying out a task in cashew farms, either in the family cashew nuts farm or working for someone else's (guardian, relative, parent's friend or child's friend). The survey reported that the children were engaged in different activities in the cashew-nut value chain, which includes harvesting/gathering matured fallen cashew (36%), helping in a family cashew nuts business or someone else's cashew nut business with or without pay, weeding of cashew plantation (14%), any work or help on a cashew farm, including family's own or someone else's farm (14%), watered the cashew plant (7%) and engage in any other cashew nut business activity in return for income in cash or kind even for only one hour (7%).

Table 3.18: Works done in the last 7 days

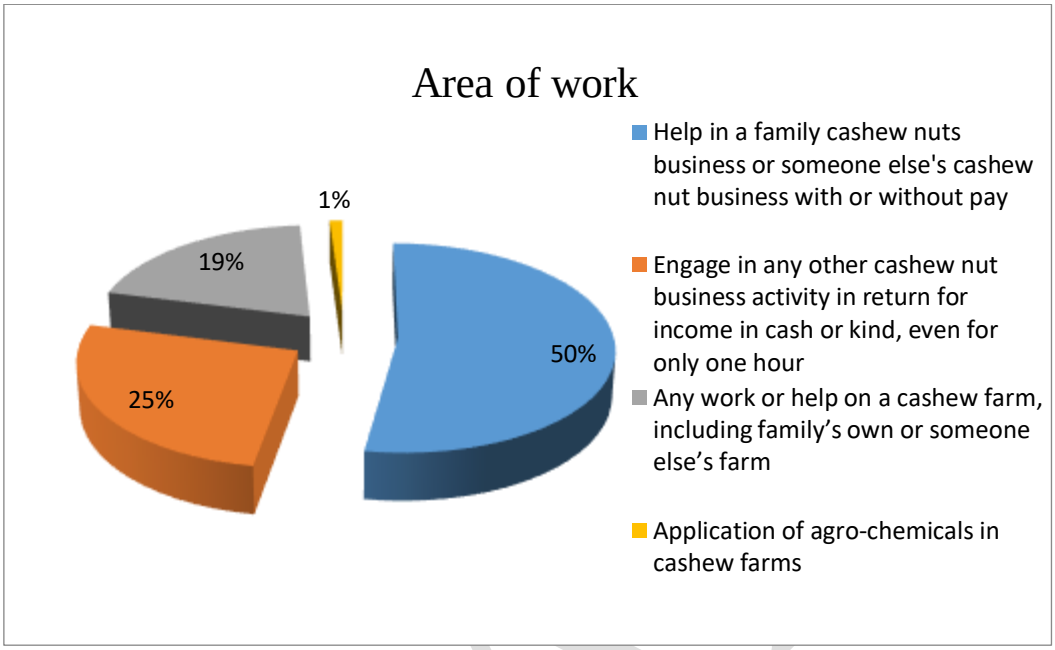
Variables	**Percentage (%)**
Harvesting/ gathering matured fallen cashew	36
help in a family cashew nuts business or someone else's cashew nut business with or without pay	22
Weeding cashew plantation	14
Any work or help on a cashew farm, including family's own or someone else's farm	14
Engage in any other cashew nut business activity in return for income in cash or kind, even for only one hour	1

Source: Richflood Field survey, 2022

Worked on a cashew farm in the last 12 months

According to an analysis of child-related work in the cashew value chain over the previous 12 months, children were working in cashew farms, either on their own family's farm or for a guardian, relative, parent's friend, or child's friend. Children were reportedly involved in a variety of activities along the cashew-nut value chain, which includes; helping in a family cashew nuts business or someone else's cashew nut business with or without pay (50%), Engaging in any other cashew nut business activity in return for income in cash or kind, even

for only one hour (25%), Any work or help on a cashew farm, including family's own or someone else's farm (19%), and application of agro-chemicals in cashew farms (6%). Generally based on the survey, the children engaged in these activities without monetary gains as a form of a family assistance and for family friends.



. **Figure 3.40**: Children Survey: Area of Work

Source: Richflood Field survey, 2022

Plate 3.16: Engagement with Children in Kankan

Source: Richflood, 2022

3.21 Health Profile

From the KII held with healthcare providers in the community, it was found that there are public hospitals including pharmaceutical outlets, private hospitals and private clinics in Kankan. They also added that malaria drugs and drugs for fever are the most in-demand drugs in the communities. Typhoid, toilet infections, Skin rashes and measles are also common in the community.

From the survey data, there is no health facility in the communities where the facility is located. 55% of respondents have access to medical facilities such as pharmaceutical outlets, private clinics and public hospitals while 45% do not have access to medical facilities. The survey data revealed that 63% of respondents make use of public hospitals; 29% make use of pharmaceutical outlets to purchase drugs or seek advice and 8% make use of private hospitals/clinics. The health status of respondents is moderate with the data showing that 70% agreed that they have good health, 25% rated their status as excellent and 5% of respondents rated their health status as poor.

Plate 3.17: Health facility in the Kankan

Source: Richflood, 2022

3.22 Community Concerns and Perception

The survey data revealed that all of the respondents were aware of the facility. During the discussion with the men, youths and women, the Project components and associated impacts were carefully explained. The reaction was positive as 39% of the participants believe that there is an impending economic advantage for them in terms of employment, 32% of the participants were in support of the project, 24% of the participant anticipated that the facility would increase an opportunity for direct sales of cashew nuts to the company while 5% were indifferent.

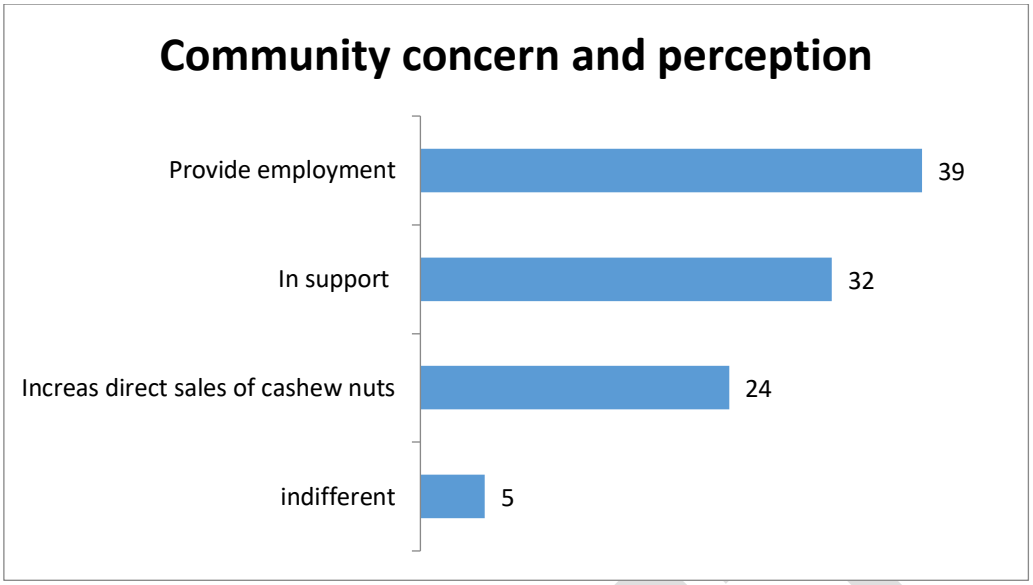


Figure 3.41: Community concern and perception

Source: Richflood, 2022

Plate 3.18: Communities engagement in Kankan.

Source: Richflood, 2022

Plate 3.19: Different sections within the facility, Kankan

Source: Richflood, 2022

CHAPTER FOUR

ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

4.1 Introduction

This section contains an assessment of the project operations' environmental and social impacts and mitigation measures, which includes the action plans that can be taken to avoid, minimize, or compensate/offset the negative impacts of the project activities. The action plan includes a list of mitigation/ management/ avoidance measures for the project's identified potential adverse impact. The plan provides operational details such as environmental, frequency of implementation and supervisor action party or personnel for each mitigating measure.

The assessment process involved looking at the environmental features, uniqueness, potential vulnerabilities and the nature, location, and project design features in effect throughout the operation. An understanding of the nature of the impacts that the cashew-nut processing activities or operations would have on the natural and human environment is vital to decision-making on the path of both the company and the government.

The impacts that may result from the cashew-nut processing project were considered for the following aspects:

- Air quality, including greenhouse gas emissions;
- Noise;
- Ecology and biodiversity;
- Ecosystem services;
- Soil;
- Socio-economics;
- Traffic;
- Waste Management;
- Water resources (surface and groundwater);
- Child Labour/Forced labour; and
- Gender-based violence

Impacts relating to each of the categories mentioned above are described and rated in the subsequent sections for the operation and decommissioning phases of the project, respectively, both before and after the effective implementation of the mitigation measures recommended.

4.2 Impact Assessment Methodology

The impact assessment will be conducted in an integrated manner that links the socio-economic components with the biophysical components of the environment. The methodology used for the assessment was designed to ensure a comprehensive and systematic evaluation of all positive and negative effects associated with the project. The main goal of the assessment is to identify where mitigation is required to ensure that appropriate control measures and monitoring programs are developed to minimize the adverse effects.

4.2.1 Predicting the magnitude of impacts

The term 'magnitude' covers all the dimensions of the predicted impacts on the natural and social environment including:

- The nature of the change (what resource or receptor is affected and how);
- The spatial extent of the area impacted or the proportion of the population or community affected;
- Its temporal extent (*i.e.* duration, frequency, reversibility); and
- Where relevant, the probability of the impact occurring as a result of accidental or unplanned events.

4.2.1 Impact Significance Rating

Practicable management measures will be recommended that avoid, and if avoidance is not possible, then reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design. Impact matrices for the project were created utilizing the following criteria:

Table 4.1: Impact Characteristic Terminology

Impact Magnitude	
Type	**Direct –** impacts that result from a direct interaction between the project and resource/receptor. **Indirect** – impacts that follow from direct interactions between the project and its environment as a result of subsequent interactions. **Induced** – impacts that result from other activities that happen as a consequence of the project.

Impact Magnitude	
Extent	**Local** – impacts are limited to the Cashew-nuts Processing Plant location in Boke and Kankan and the surrounding area. **Regional** – impacts that are experienced beyond the local areas to the wider region. **International** – impacts that are experienced at an international scale i.e. affecting another country.
Duration	**Temporary** – predicted to last less than the project duration. **Short-term** - predicted to last only for the duration of the construction activities (i.e. up to approximately one year). **Medium-term** - predicted to last from one year to the end of the project life (i.e. 5 years). **Long-term** - predicted to continue beyond the project life but will cease in time. **Permanent** – impacts that cause a permanent change in the affected receptor or resource that endures substantially beyond the project lifetime.
Frequency	**Continuous** – impacts that occur continuously or frequently. **Intermittent** – impacts that are occasional or occur only under specific circumstances
Likelihood*	**Unlikely** – the event is unlikely but may occur during the project. **Possible** – the event is likely to occur at some point during the project. **Likely** – the event will occur during the project (i.e. it is inevitable).

* For unplanned events only.

Magnitude describes the actual change that is predicted to occur in the resource or receptor (*e.g.* the area and duration over which land take will occur; the degree of impact on the livelihoods of a local community; the probability and consequences in terms of accidental events). An assessment of the overall magnitude of an impact is, therefore, provided that takes into account all the dimensions of the impact described above to determine whether an impact is of small, medium or large magnitude.

4.2.2 Sensitivity/vulnerability/importance of resources and receptors

The significance of the impacts resulting from an impact of a given magnitude will depend on the characteristics of resources and receptors to that impact in terms of their sensitivity,

vulnerability and importance. The quality or importance of a resource will be judged by taking into account, for example, its national or international designation, its importance to the local or wider community, its ecosystem function or its economic value. The assessment of the sensitivity of human receptors will consider their likely response to the change and their ability to adapt to and manage the effects of the impact.

4.2.3 Assessment of impact significance

All human activity imposes some level of change on the natural and social environment, because of physical interactions with natural systems or other human activities. To provide information to decision-makers and other stakeholders on the importance of different project impacts, the assessment team evaluates the significance of each such change.

There is no statutory definition of significance. Therefore, in the ESMP, the evaluation of significance is inherently subjective. It is based on the professional judgment of the assessment team, informed by legal standards, national and regional government policy, the current industry good practices and the views of stakeholders. Where specific standards are either not available or provide insufficient information on their own to allow grading of significance, evaluation of significance will take into account the magnitude of the impact and the quality, importance or sensitivity of the affected resource or receptor.

Magnitude and receptor quality/importance/sensitivity are assessed in combination to evaluate whether an impact is, or is not, significant and if so its degree of significance (defined in terms of Minor, Moderate or Major). Impacts ranked as Negligible include those that are slight or transitory and those that are within the range of natural environmental and social change.

Table 4.2 Significance Matrix

Sensitivity / Vulnerability / Importance	**Magnitude of Impact**			
	Negligible	**Small**	**Medium**	**Large**
Low	*Negligible*	*Negligible*	*Minor*	*Moderate*
Medium	*Negligible*	*Minor*	*Moderate*	*Major*
High	*Negligible*	*Moderate*	*Major*	*Major*

- An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the

predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

- An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
- An impact of **moderate** significance has an impact magnitude that is within applicable standards but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, designing an activity so that its effects only just avoid breaking a law and/or causing a major impact is not the best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to a minor, but that moderate impacts are being managed effectively and efficiently.
- An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resources/receptors. IA aims to ensure that Project does not have any major residual impacts, however, for some aspects, there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied).

For impacts that are initially assessed during the assessment process to be of *Major* significance, a change in design is usually required to avoid, reduce or minimise these, followed by a reassessment of significance. For impacts assessed during the assessment process to be of *Moderate* significance, where appropriate the discussion explains the mitigation measures that have beenconsidered, the one selected and the reasons (*e.g.* in terms of technical feasibility and cost-effectiveness) for that selection. Impacts assessed to be of *Minor* significance are usually managed through good industry practice,operational plans and procedures.

The ESMP is intended to help decisions on projects to be made in full knowledge of their likely impacts on the environment and society. The residual impacts and their significance reported in this report are based on the Cashew-nuts Processing Plant as described, i.e. inclusive of all the proposed mitigation.

4.2.4 Mitigation Measures

According to the IFC's management hierarchy: "Recommendations for management should focus on avoidance, and if avoidance is not possible, then to reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design." Hence, one of the key objectives of this assessment is to identify and define socially and environmentally acceptable, technically feasible and cost-effective mitigation measures. Mitigation measures are developed to avoid, reduce, remedy or compensate for the significant negative impacts identified during the ESIA process, and to create or enhance positive impacts such as environmental and social benefits. In this context, the term mitigation measures include operational controls as well as management actions.

Where a significant impact is identified, a hierarchy of options for mitigation is explored (Table 4.3).

Table 4.3 Hierarchy of options for mitigation

• ***Avoid at Source*** – avoiding or reducing at source through the design of the Project
• ***Abate on Site*** – add something to the design to abate the impact
• ***Abate at Receptor*** – if an impact cannot be abated on-site then control measures can be implemented off-site
• ***Repair or Remedy*** – some impacts involve unavoidable damage to a resource and these impacts can be addressed through repair, restoration or reinstatement measures.
• ***Compensate in Kind*** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect on the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

4.2.5 Residual Impacts Significance

The degree of significance attributed to residual impacts indicates the level of importance that should be associated with each impact, in the decision-making process on the Project.

Table 4.4 Ranking of residual impacts

Impacts of *Major* significance, whether positive or negative, are considered to warrant substantial weight when compared with other environmental, social or economic costs and benefits; conditions will be expected to be imposed to control and, if necessary, monitor adverse impacts and deliver benefits.
Impacts of *Moderate* significance are considered to be of reduced importance to making decisions, but still warrant careful attention to conditions regarding mitigation and monitoring, to ensure the most appropriate (technically feasible and cost-effective) mitigation measures are used and to ensure benefits are delivered.
Impacts of *Minor* significance are brought to the attention of decision-makers but will be identified as warranting little if any weight in their decision; mitigation will be achieved using normal good practice and monitoring may be required to confirm that impacts are as predicted.

4.3 Screening / Identification of Impacts

The initial stage of the assessment process is the screening of potential impacts. This was conducted based on a preliminary Project description and involved the production of a high-level, matrix of potential interactions between the activities and the surrounding environment. The preliminary interaction matrix for the Project is included in Table 4.5.

Table 4.5: Environmental Impacts Screening Matrix for the Cashew-nut Processing Plant Project

Project Phases and Activities	Physical					Biological		Socio-Economic				
	Soils	Hydrology	Air Quality	Climate Change	Noise and Vibration	Biodiversity and nature conservation	Invasive / Alien species	Livelihood and Socioeconomic activities	Community Health & Safety	Landscape and Visual	Ecosystem Services	Occupational Health & Safety
Operational Phase												
Job creation/ business opportunities/diversification of livelihoods								X	X			X
Accidental events (Increased potential for accidents, the Increased potential for oil spills)	X	X							X			X
Maintenance of landscaped vegetation	X	X				X	X		X	X	X	
Potential for expansion of cashew plantation				X		X		X		X		
Increased noise/odour pollution/pollutants in the air					X	X			X		X	X
Increased potential for oil spills	X	X							X			X
Increased solid (Cashew nutshell and domestic waste) and liquid wastes generation	X	X							X			X

Project Phases and Activities	Physical					Biological		Socio-Economic				
	Soils	Hydrology	Air Quality	Climate Change	Noise and Vibration	Biodiversity and nature conservation	Invasive / Alien species	Livelihood and Socioeconomic activities	Community Health & Safety	Landscape and Visual	Ecosystem Services	Occupational Health & Safety
Flora and Fauna (Habitat fragmentation)						X	X					
Physical presence of workers/Workers safety								X	X			X
Site runoff (uncontaminated rainfall runoff and potentially contaminated drainage)	X	X							X			X
Water supply/ drainage management		X							X			X
Induced traffic			X	X	X				X			X
Potential for GBV and Sexual harassment of female workforce								X	X			X
Increased potential for child labour across the cashew nut value chain								X	X			X
Increased occupational hazards e.g. Musculoskeletal disorders, pruritic dermatitis etc.									X			X
Improvement in the economic status of the host communities								X				

Project Phases and Activities	Physical					Biological		Socio-Economic				
	Soils	Hydrology	Air Quality	Climate Change	Noise and Vibration	Biodiversity and nature conservation	Invasive / Alien species	Livelihood and Socioeconomic activities	Community Health & Safety	Landscape and Visual	Ecosystem Services	Occupational Health & Safety
Equipment/material/worker transport			X	X	X				X			X
Accidental events (spills/uncontrolled releases)	X	X							X			X
Induced traffic			X	X	X				X			X
Increase noise level					X	X			X			X

4.4 Preliminary Assessment of Impacts

From the information provided in the screening matrix above, a more detailed preliminary assessment was performed by assessing the potential interactions between the Project and environmental and social sensitivities to determine whether they are significant or not, based on the magnitude of impacts and the quality, importance or sensitivity of the receiving environment. Mitigation measures are taken into account in assessing the significance of the impact.

- Table 4.6 presents the preliminary assessment of the impacts associated with the operational phase of the Project; and
- Table 4.7 presents the preliminary assessment of the impacts associated with the decommissioning phase of the Project.

Table 4.6a: Preliminary Assessment – Environmental Impacts during the Operational Phase

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
OPERATION PHASE					
Air Quality	• Process emissions from streaming (cooking of raw cashew nuts) • Odour from microbial action in stored waste areas • Release of gaseous emissions (SOx, NOx) – with potential effects on air quality from the operation of the plant generators • Exhaust from vehicular movements	• Use of cyclone dust collectors and scrubbers as air pollution control measures to control the emission of particulate matter in the flue gas arising from boilers and power generating sets respectively • Odour (VOCs) generation from the cashew nut steaming process will be treated/ controlled using odour control technologies/equipment • Solid waste generated from process activity will be collected and stored in closed bins to minimise the odour problem near storage areas • Use of PPE (like nose mask, helmet, ear plugs and glasses) shall be	**Medium-** impacts on air quality will be limited to the project area.	**Low** – Greenhouse gas emissions in Guinea are limited when compared to other countries	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		mandatory for workers/ employees/ visitors working in these areas. • Routine inspection and maintenance of engines, vehicles, generators and other equipment to minimise air emissions			
Ecology and Biodiversity	• Impact on vegetation	• Tree planting (re-vegetation) • Care will be taken to avoid any disturbance to the flora and fauna of the area • Care will be taken to minimize de-vegetation of the site. • Conscious efforts shall be made to develop greenbelts on the site	Small - likely migration/loss of fauna from disturbance and habitat fragmentation over the project area extent.	Medium – the surrounding area is made up of secondary forest with a comparative number of fauna and flora abundance	**Minor**
Ecosystem Services	Impact on freshwater stream quality.	• Stormwater management plan must be compiled and implemented; • Implement an Erosion and Sediment	**Small:** Site or local	**Low:** Potential siltation of surrounding	Negligible

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		Control plan; • Implement an alien and invasive species management plan		fresh water stream	
Noise and vibration/ Air pollution	An increase in noise levels with the associated disturbance to communities and fauna	• Best practice and good operation management will be applied; • Routine inspection and maintenance of combustion engines to ensure adequate operation; and • Routine inspection and maintenance of engines, vehicles, generators and other equipment to minimise noise emissions.	**Small** – noise emissions will occur at the site during operation. Emissions will not affect local residents as noise level increase above background levels will be barely perceivable for most receptors.	**Medium** - The presence of sensitive receptors in the vicinity such as residential areas increases the sensitivity to this type of pollution.	**Minor**
Surface water	Pollution of surface water due to runoff of potential pollutants	• An agricultural and/or soil capability assessment should be conducted • liquid discharges will be treated in a	**Small– i**nfiltration of pollutants with runoff water to	**Medium** – Aquatic habitat and potential	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		wastewater treatment unit before being routed to the effluent pond and discharged into the public sewage system or used to water green space	nearby streams within the project footprint is expected in the likely event of accidental spills.	ecosystem services from the watershed.	
Groundwater	• potential degradation of soil/groundwater quality due to infiltration of potentially polluted water runoff; • potential degradation of soil/groundwater quality due to liquid discharges (black and grey water).	• site area will be watertight in particular for hazardous chemicals or waste storage areas and processing area, to avoid infiltration and affection to groundwater; • storage of hazardous substances and wastes (i.e. oil) in tanks/containers in bunded areas; • liquid discharges will be treated in a wastewater treatment unit before being routed to the effluent pond and discharged into the public sewage system or used to water green space	**Negligible**– Infiltration of pollutants with runoff water is not expected unless in case of accidental spills	**Medium** – Potential use of shallow groundwater by local communities for domestic use	Negligible

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
Waste Management	Pollution of soil and water resources	• Identification and classification of waste into different waste classes; • Define a waste hierarchy and waste minimization strategy; • Define and implement procedures for waste handling (i.e. collection, segregation, treatment, storage, transport, disposal, and documentation); • ensure the safe transportation, handling, storage, and disposal of wastes; • provide appropriate training for staff and other stakeholders on waste management issues; • Establish dedicated area(s) for the sorting and storage of waste; and • Monitoring, verification and reporting	**Medium**	**Medium:** Limited to project site	Medium

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		of wastes.			
Climate Change	Potential increase in GHG emissions and Carbon footprint	• Undertaking an energy efficiency audit and using this to inform an emissions reduction options analysis to identify equipment alternatives or energy efficiency opportunities. As part of this consider alternatives to coal as a fuel source and renewable energy options. • Undertake benchmarking studies to analyze the performance of the project relative to industry performance in terms of GHG intensity • Review the GHG emissions inventory annually. The review should highlight the biggest contributors and identify any technological developments that could assist in reducing GHG emissions. • Develop a carbon reduction strategy	**Medium**	**Moderate**	Medium

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		and implement actions.			
Job creation	Increase in employment opportunities and income Employment of women	• Socializing the recruitment process to the community, especially about the number of vacancies, qualifications and available positions • Prioritizing the local workforce to be employed according to the qualification and requirements needed • Provide and communicate clear information about the Project's requirements related to employment and business opportunities and priorities locals where feasible.	**Positive**	**Positive**	Negligible
Soil	Pollution of soils due to chemicals and or wastes; and land occupation	• creation of a watertight surface to avoid infiltration and affection to groundwater; • storage of hazardous substances and wastes (i.e. oil) in tanks/containers in	**Small–** Considering the creation of a watertight surface and the mitigation measures in place,	**Low** - Existing soils are unproductive.	Negligible

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		bunded areas;	the potential effect on soils due to the storage of chemicals and wastes is considered limited in extent and temporary in nature, considering any pollution will be cleaned.		
Health, safety and security	Injuries due to lifting, carrying and improper sitting techniques (Ergonomics) Burns due to steam exposure Increased incidence of alcohol and drug use;	• DAI will be committed to ensuring all H&S measures are in place to prevent accidents and reduce the consequences of non-conformance events; • DAI will provide training, awareness and supervision to ensure all of its construction workers comply with the	**Medium-**	**Low-**	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
	Increase in the spread of HIV/ AIDS and other STIs; Slip, Trip and Fall due to uneven surfaces and obstacles; Encroachment by unwanted persons.	OHS procedures; • DAI will provide all appropriate resources i.e. personal protective equipment (PPE) to all workers onsite such as masks, helmets, gloves and earplugs etc. and ensure their usage; • An emergency response procedure and infrastructure will be available on-site to ensure the provision of first aid for personnel in case of an emergency. • Provision of adequate signage and availability of functional First Aid Kit on site. • Adequate and relevant training of all workers especially local hands on safety issues related to their activities.			
Child labour	Loss of quality	• Develop a Company Policy on	**Medium**	**Low**	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
	childhood, health issues, Mental trauma, illiteracy	children's well-being which explicitly mentions the company's commitment to not employ underage workers and to support the education and best interests of children • Create demand for skilled and trained workers • Empowerment of poor people • Check worker's list and make sure that all workers are above the minimum working age;			
Grievances	Conflicts with host communities and third-party agitation	Facilitate implementation of existing MoU between Diaoune Agro Industrie SARL and Host/neighbouring communities Adopt the grievance redress mechanism	**Small**	**Medium**	**Minor**
Occupational Health and Safety	• Falls, temperature, and other factors which can	• Eliminate open defecation by providing separate well-maintained	**Small**	**Medium**	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
	harm the worker without necessarily touching are the major physical hazards inducing fear among workers. • permanent burn marks of the caustic cashew sap in hands which is a chemical hazard • dermatitis and dry skin in workers • Inhalation of smoke results in chronic respiratory illness and allergic asthma in the long term. • Bites and stings from insects such as mosquitoes which cause	toilets for men and women with provision for physically challenged people at least one toilet. • The solid waste generated will be collected and stored in bins to avoid order, and unhygienic conditions and stay animal nuisances. • Maintain walkways and working surfaces to be clean and dry by preventing spillages of water/liquids during operational activities • Provide personal protection equipment (PPE) like helmets, shoes, gloves and ear plugs/ ear muffs to the workers. • Notice boards with all safety measures to be taken within the site and accident-prone areas will be displayed at all strategic locations			

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
	dermatitis and other contagious diseases, and un-hygienically maintained toilets • Repetitive movements, Uncomfortable workplace and Poor body positioning • Joint pain, back pain, wrist pain, neck pain, shoulder pain etc	within the site. • Speed of transport vehicles will be restricted to 20 km/hr and proper sign boards at entry exist, turning and accident-prone areas shall be provided to minimise accidents within the site. • Medical doctor (MBBS) will be available within the site once a week to attend to the medical needs of labours and construction labour. • All workers shall be trained on basic ergonomics principles. • This should cover the correct lifting, carrying and setting down techniques to prevent incidences of hernias, sprains, strains, back injuries and other muscular-skeletal disorders due to improper handling of objects.			

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
Vehicular Traffic Accidents	Increase in traffic density; impact on traffic safety, contaminate/ pollute air, land, plants, disturbance to wildlife Increased road accident/ injuries	• application of the company's road safety policy to operator and contractor vehicles; • optimization of routes and schedule of transport • Development of a Traffic management plan. • Creating parking areas for vehicles. • Conduct public awareness on road safety for the general public • Enforce speed and exhaust limits • Alcohol and substance abuse screening among drivers and machine operators	**Small–**	**Medium-**	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
Fire and explosion hazards		• Major exposed portions of the boiler unit are to be thermally insulated • Regular inspection of safety valves for proper functioning • Optimization of convective exchanger arrangement to prevent corrosion • Necessary measures and training to be given to the personnel operating near the boiler • All employees and labour working in the processing & boiler area should be properly trained and made aware of standard operating procedures/ manuals. • All employees and labour working in the processing & boiler area should be made aware of the risks involved and preventive steps to be taken in case of any discrepancies/ deviations	**Small–**	**Medium-**	**Minor**

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		observed from standard operating procedures. • Defined reporting and escalation mechanisms should be documented and communicated to all employees and labours working in the processing & boiler area. • All electrical wiring, rewiring or extension work must be carried out by licensed electrical contractors. On completion, the contractors should test before the electricity supply is connected. • To ensure electrical safety in the facility, a current-operated earth leakage circuit breaker (ELCB) or residual current circuit breaker (RCCB) set to operate at a very small leakage current is			

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or j Sensitivity	Residual Significance
		recommended. In case of dangerous electrical leakage to the earth, it should automatically cut off the supply of electricity. • An emergency evacuation plan to be prepared • Regular mock drills to create awareness on procedures to be followed in times of emergency situation/evacuation.			

Table 4.6b: Preliminary Assessment – Social Impacts during the Operational Phase

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
Plant operations	Development of economic opportunities	• Targeted community development support in line with Diaoune Agro Industrie SARL's community investment policy.	Positive
	Improved economic situation of the people recruited	• Ensure employment and salary policy are in line with or more favourable than standard Guinean practices.	Positive

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
	Increased inequalities between Households	• Ensure economic opportunities are available for the maximum number of directly impacted households (or districts).	Minor
Labour and working conditions	Exploitation of workers	• Develop transparent human resources policies and procedures for recruitment process, working conditions and Terms of Employment wages, worker-employer relations, Grievance Mechanism, non-discrimination, monitoring, roles and responsibilities following the Guinea Labor Code and ILO conventions. • Provide reasonable, and if applicable negotiated working terms and conditions. • Establish workers' grievance mechanisms, so that potential conflicts can be dealt with in an early and proper way. • No use of child labour (workers under age 18) or forced labour. • Provisions to ensure compliance with labour standards by supply chain and subcontracts, including training if required. • Provide proper workplace facilities for water/sanitation/restrooms. • If the case of retrenchment needs first viable alternatives are analysed and then the adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared. • A worker's grievance mechanism will be in place.	

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
Plant operations	Diseases linked to health and hygiene conditions	• the Project site development will lead to a reduction in stagnant water bodies at the site, hence contributing to malaria prevention in the local area. Diaoune Agro Industrie SARL will reinforce this with malaria prevention & awareness trainings to staff; and • as part of Diaoune Agro Industrie SARL community investment policy, consider supporting the authorities (particularly the local health department) and civil society (especially NGOs) to implement hygiene awareness-raising campaign.	Positive
	Local development support: Improved health services	• consider focusing project investment in the health sector: • involving the communities and local authorities when constructing basic infrastructure or implementing development projects to identify their exact needs (ensure the investment is included in the communes' local development plans); and • carrying out monitoring by implementing a health facilities monitoring plan at the start of the project to ensure service quality is maintained and facilities are used appropriately.	Positive
	Inequalities in access to healthcare	Introduce awareness-raising, communication and information programs for women to facilitate their access to primary healthcare (for themselves and their children).	Positive

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
	Risk of workplace accidents	Respect the measures put in place to ensure workers' safety: wearing personal protective equipment, and applying safety standards.	Minor
	Risks of Gender Based Violence (GBV)	• Include in works contract clauses on mandatory and regular training for workers on required lawful conduct and legal consequences for failure to comply with laws on non-discrimination and GBV • Insert clause requiring contractors and consultants to cooperate with law enforcement agencies investigating cases of gender-based violence • A minimum requirement of female employment should be indicated in contract documents • Contact numbers of representatives on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone • Discuss issues of Gender Based Violence at daily Toolbox meetings • Display on site posters prohibiting sexual exploitation and harassment • Create a clear system for identifying, responding to, and sanctioning GBV incidents • Availability of female nodal officer for women's issues • Regular GBV/SEA sensitization & training for all employees, workers, transporters, drivers and contractors	Minor

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
		• Inclusion of gender issues in code of conduct, and dissemination • Regular consultation/counselling of women employees and workers, including for survivors	Minor
	Increased potential for child labour and Violence against Children (VAC)	• Children must not be employed by the Project (paid or unpaid), and the Project must comply with all relevant local legislation, including labour laws in relation to child labour and the Bank's safeguard policies on child labour and minimum age. • Develop a Company Policy on children's well-being which explicitly mentions the company's commitment to not employ underage workers and to support the education and best interests of children; • Create a system that increases the company's visibility of all its workers and ensures that only workers who are above minimum working age are hired; • Communicate the company's commitment to mitigate the risks of child labour; • Support the provision of basic education; • Ensure rational and achievable work targets so that workers can get minimum wage by working within normal working hours without any help; • Check worker's list and make sure that all workers are above the	

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
		minimum working age; • Create a clear system for identifying, responding to, and sanctioning VAC incidents • Orientation on code of conduct on children's safety, protection and child labour, including for parents; • Establishment of a crèche' for workers' children within the facility;	

Table 4.7a: Preliminary Assessment – Environmental Impacts during the Decommissioning and Closure Phases

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or Sensitivity	Residual Significance
Decommissioning/Closure of project					
Air Quality	Impact on human health associated with air pollutant emissions	• Maintain all equipment in good working order and do not leave running when not in use. • Develop and implement a complaints system and make the community aware of the complaints procedure.	Small	Medium	Minor

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or Sensitivity	Residual Significance
		• Monitoring air quality during decommissioning.			
Ecology and Biodiversity	Disturbances such as road kills and collisions. Removal of vegetation in the area. Direct mortalities due to habitat loss.	• Speed limits must still be enforced to ensure that road killings are limited; • Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited; • No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals. • An Erosion and Sediment Control plan must be compiled and implemented;	Medium	Low-Site or local	Minor

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or Sensitivity	Residual Significance
		• Area must be rehabilitated progressively to reduce the impact of erosion long term.			
Ecosystem Services	Degradation of soil resources/vegetation associated with ecosystem services	• Utilise topsoil in rehabilitation • Revegetate the area with indigenous vegetation	Small	Medium	Minor
Socio-economic Impacts	Impact on household income	• An IFC compliant decommissioning and closure retrenchment plan, which includes measures related to livelihood restoration and creating community independence should be developed with the involvement of the villages and must include a comprehensive stakeholder strategy and disclosure phase	**Small**	**Medium**	Minor
Waste Management	Impact on water and soil resources.	• Implementation of site-specific Land Reclamation & Rehabilitation Plan Implementation of Waste Management Plan	Medium	Low-Site/Local	Medium

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or Sensitivity	Residual Significance
Surface water	Chemical contamination of surface water resulting from accidental spills, handling and runoff	• Store all potential sources of contamination in secure facilities with appropriate Storm Water management systems in place to ensure that contaminants are not released to the water resource through Storm Water runoff.	Small	Medium - Regional	Minor
Groundwater	Contamination resulting from seepage from hazardous materials and waste	• Manage waste in accordance with the Waste Management Plan.	Small	Medium - Regional	Minor
Equipment /Machinery	Disposal of Construction Equipment/Machinery, workshops and other associated facilities	• Honour the terms of agreement in the MoU. • Give monetary compensation to laid-off worker; • Disposal of equipment, machinery, mill, houses, vehicles, spare parts, chemicals and other materials and remediate and restore impacted sites.	Medium	Low-Site/Local	Minor

Aspect	Potential Impact	Mitigation & Management Measures	Impact Magnitude	Receptor Quality, Importance or Sensitivity	Residual Significance
		• The area should be cleaned and all domestic wastes, debris/waste metals, grease and oils must be cleaned up and disposed of in a manner approved.			

Table 4.7b: Preliminary Assessment – Social Impacts during the Decommissioning/Closure Phase

Aspect	Potential Impact	Mitigation/ Enhancement	Residual Significance
Closure	Reduction in local employment opportunities	• DAI supports local entrepreneurship through local community development strategy.	Moderate
	Reduced economic circumstances of the people made redundant and their families	• Provide employees with a severance package in line with Guinean standards or more favourable.	Moderate
	Discontinuation of budget allocations to local development initiatives	• Decrease the amount allocated to community investment over time to phase in the transition. • Gradually withdraw allocations to local institutions' budgets.	Moderate

4.5 Air Quality/Greenhouse Gas Emissions Impact and Mitigation Measures

The values of air quality measurements from this study were all within regulatory limits and below the level before the commencement of the project. The various phase of the project is known to produce pollutants and obnoxious gases that could lead to atmospheric pollution. Some of these air pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM), and sulphur dioxide (SO_2). Greenhouse gases including carbon dioxide (CO_2) can also be emitted.

The Earth's atmosphere contains naturally occurring gases that trap some of the sun's heat near the Earth's surface. This "greenhouse effect" keeps the Earth's temperature stable. Disturbance of this natural balance by producing large amounts of some of these greenhouse gases, including carbon dioxide and methane results in the trapping of more of the sun's heat, causing the Earth's average temperature to rise - a phenomenon known as global warming. Global warming could have significant impacts on human health, agriculture, water resources, forests and wildlife.

Air emissions are related principally to exhaust emissions from the processing plant, equipment and vehicles together with dust. The potential for dust to be emitted during operation and decommissioning is strongly dependent on the type and nature of activities taking place, such as the movements of vehicles and their speed, soil stripping activities, trench excavation, backfill and reinstatement. Wind speed and wind direction relative to receptors are also key factors in determining the magnitude and duration of air quality impacts.

Some atmospheric emissions from activities at the site will include dust generation, odours, particulate and fugitive emissions, greenhouse gases (GHG) and ozone-depleting substances (ODS). Sources of these atmospheric emissions could include clean and contaminated soil, other sediments, vehicle emissions, materials (e.g. asphalt) and fugitive sources from remnant building and infrastructure materials.

Potential sources of dust, gaseous and atmospheric emissions during the operation of the cashew-nut processing plant include:

- General vehicle use/vehicle exhaust emissions;
- Wind erosion of cleared surfaces;
- Process emissions;
- Power generation
- Gaseous and particulate emissions from vehicle exhaust emissions;

Dust generated from many of these activities will increase the particulate matter levels in ambient air. Vehicles and equipment exhaust emissions can lead to increases in levels of nitrogen oxides (NOx), sulphur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$) and carbon monoxide (CO), which are key pollutants of concern with respect to human health.

Mitigation Measures

- Use of cyclone dust collectors and scrubbers as air pollution control measures to control the emission of particulate matter in the flue gas arising from boilers and power generating sets respectively
- Odour (VOCs) generation from the cashew nut steaming process will be treated/ controlled using odour control technologies/equipment
- Ensure an adequate water supply on the site for effective dust/particle suppression, using non-potable water where possible and appropriate.
- Solid waste generated from process activity will be collected and stored in closed bins to minimise the odour problem near storage areas
- Ensure all villages are aware of the grievance mechanism and ensure that all issues raised are actioned.
- Use of PPE (like nose mask, helmet, ear plugs and glasses) shall be mandatory for workers/ employees/ visitors working in these areas.
- Routine inspection and maintenance of engines, vehicles, generators and other equipment to minimise air emissions
- All site employees will receive appropriate training to ensure that they are conversant with the site dust control strategy
- Any exceptional incidents giving rise to dust and or air emissions, either on or off-site should be recorded and the action taken to resolve the situation should be recorded.

4.6 Noise Impact and Mitigation Measures

Based on a worst-case assessment, noise levels near the cashew-nut processing unit are predicted to be high, as would be expected. At further distances from the source, noise levels will reduce considerably, with noise levels at around 30 m from the source dropping to below the industrial guideline rating level of 70 dB(A). From 160 m from the processing activities, noise levels will decrease to below the residential guideline level of 55 dB(A). It is understood that the operation

of the cashew-nut processing plant will only occur during the daytime hours and as such no project-related acoustic impacts are anticipated at night.

It is most likely that most units and processes will be enclosed within buildings with particular reference to the boiler and cashew nut processing units. Boilers are generally enclosed within boiler houses. This will result in significantly lower noise levels experienced in the ambient environment. Overall, the impact of noise during the operational phase is not expected to exceed the Guinean Class 3 and WHO/IFC permissible limits of 70 dB(A) for the industrial guideline rating level.

Mitigation Measures

Noise levels during the operational phase are not envisaged to have significant impacts. Units with significant noise-generating potential should be housed within closed-wall buildings to limit the transmission of noise to surrounding receptors. As per the IFC EHS Guidelines for Noise Management, the following noise reduction options should also be considered:

- Selecting equipment with lower sound power levels;
- Installing silencers for fans;
- Installing suitable mufflers on engine exhausts and compressor components;
- Installing acoustic enclosures for equipment casing radiating noise e.g. power-generating set;
- Improving the acoustic performance of constructed buildings by applying sound insulation;
- Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m^2 to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or the receptor location as to be effective;
- Installing vibration isolation for mechanical equipment;
- Providing workers in the noise-generating area with ear muffs
- Re-locating noise sources to less sensitive areas to take advantage of distance and shielding;
- Siting permanent facilities away from community areas if possible;
- Taking advantage of the natural topography as a noise buffer during facility design;
- Reducing project traffic routing through community areas wherever possible; and
- Developing a mechanism to record and respond to complaints.

4.7 Ecology/Biodiversity Impact and Management Measures

The following potential impacts (amongst others) were considered on biodiversity during the operational phase;

- Displacement and fragmentation of the faunal community due to anthropogenic disturbances (noise, light, traffic, dust, pollution and vibrations);
- Loss of faunal species (poaching);
- Pollution of the natural water source utilised by wildlife;
- Habitat degradation (litter and alien vegetation encroachment); and
- Erosion and movement of topsoil resulting in the loss of habitat.

In addition, the noise, lights and air pollution associated with the project activities will lead to the disturbance of fauna. The risk of noise will be more pertinent in the rainy season when fauna species need to utilise calls for mating. Should suitable lights be used, their impact on bats and nocturnal birds can be mitigated. The influx of people associated with the developments will also increase the likely risk of poaching. The risk of pollution to the nearby water sources especially the stream is regarded as moderate. Alien invasive species spread rapidly in disturbed soil, and have a high likelihood of growing in cleared areas. The increase of these species must be restricted in the project area to prevent the spread to the nearby riparian area. Along with the alien vegetation, the clearing of the area also increases the risk of erosion.

Below are specific impacts and the mitigation measures associated with the ecological assessment for the operational phase of the project.

Impact: Displacement and fragmentation of the faunal community due to anthropogenic disturbances (noise, light, traffic, dust, pollution and vibrations); Loss of faunal species (poaching).

Management Measures

- Monitoring impacts of operational activities on fauna so that adaptive management practices can be implemented if required
- Implement training to ensure that all staff are aware of faunal sensitivity;
- Put protocols in place to deal with fauna that is encountered during operation;

- Install vibration isolation for mechanical equipment with low noise and vibration capacity;
- Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the operational phase. The intentional killing of any animals including snakes, lizards, birds or other animals by project-related personnel should be strictly prohibited;
- No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals.

***Impact*:** Habitat degradation (litter and alien vegetation encroachment); Erosion and movement of topsoil resulting in the loss of habitat

Management Measures:

- Compilation of and implementation of an alien vegetation management plan;
- Waste must be removed from the area weekly to prevent pest species from becoming a problem;
- Waste management must be a priority and all waste must be collected and stored effectively;
    - Litter, spills, fuels, chemicals and human waste in and around the project area;
    - A minimum of one toilet must be provided per 10 persons. Toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area;
    - Sealable and properly marked domestic waste collection bins should be provided and all solid waste collected shall be disposed of at a licensed disposal facility;
        - Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days;
- Where a registered disposal facility is not available close to the project area, a method statement shall provide with regard to waste management. Under no circumstances should domestic waste be burned on site;
- In cases of erosion, erosion berms must be implemented to minimise any further erosion;

- Topsoil should be sourced and replaced in cases where topsoil has been removed by erosion;
- Only the designated access routes are to be used to reduce any unnecessary soil compaction on the unconcretised surfaces.

***Impact*:** Pollution of the natural water sources especially the nearby freshwater stream

Management Measures:

- A spill management plan must be put in place to ensure that in the event of any chemical spill, it does not run into the surrounding areas;
    - Drip trays or any form of oil-absorbent material must be placed underneath vehicles/machinery and equipment when not in use;
    - All contaminated soil / yard stone shall be treated in-situ or removed and be placed in containers; and
    - Leaking equipment and vehicles must be repaired immediately or be removed from the project site to a suitably designed facility to facilitate repair.
- A stormwater management plan must be compiled and implemented;
- Water quality monitoring must be conducted every 6 months for the nearby stream;
- Waste management must be a priority and all waste must be collected and stored effectively.
    - Litter, spills, fuels, chemicals and human waste in and around the project area;
    - A minimum of one toilet must be provided per 10 persons;

4.8 Ecosystem Services

Collectively, ecosystem services can be referred to as the benefits humans derive from their ecosystem. The ecosystem at the project site and a surrounded area within the project AOI, provide services which are important to the wellbeing and survival of the local communities. The key ecosystem services which are fundamental to the local community's livelihood within the project AOI includes;

- *Provisioning services* - Being a rural community without basic amenities of life, the local community members depend majorly on the surrounding ecosystem for basic provision services such as food and fuel wood consumption. As noticed during frequent visits to the project site, the collection of fuel wood is a common activity

amongst members of the local community. The fuel wood serves as a major source of energy for household cooking. Also, the production of charcoal for sale is a major economic activity engaged by some of the rural community dwellers. Though this activity serves as the major source of livelihood for individuals who engaged in it, invariably, it impacts negatively the vegetation of the area. The communities within the project AOI are majorly agrarian. Consequently, the importance of the soil as a medium for crop cultivation is of paramount importance to their livelihood. Interviews with members of the community revealed, the availability of fertile soil within the communities which results in the boost of crops. Cashew plantations and other crops are traded for income by members of the community. Furthermore, various fruit trees such as cashew are collected during the season of abundance for sale by the community dwellers as a source of livelihood. Several fauna species such as birds also depend on these fruit trees for feeding and breeding nest. All these economic activities serve as different sources of livelihood for some members of the rural community.

- *Regulating services* - The ecosystem within the AOI helps to regulate the impact of climate change on humans and biodiversity. The relatively undisturbed habitat in some areas helps to stabilise the soil, thereby preventing erosion. It was observed that members of the community benefit from the regulating services of the ecosystem by engaging in various agricultural activities. Also, the fallow land around the area helps in nutrient cycling within the soils

4.9 Soil Impact and Mitigation Measures

The vulnerability of topsoil resources under current conditions in the area is related to moderate erosion risk, due to erosion by wind or heavy precipitation events, exacerbated by limited vegetation cover. Erosion risk is greatest in disturbed areas with increased slope angles and the proximity of natural watercourses and constructed diversion channels. Current drainage patterns follow the natural incised valley forms but do not sustain permanent flows within the project area so under current conditions, significant erosion only occurs during major precipitation events in the rainy season and periods of high winds.

Mitigation measures

- Ensure minimal vegetation losses and re-plant the economic vegetation species around the site perimeters;
- Using drainage control measures and culverts to control natural runoff and overland flow.

4.10 Socio-economic Impact and Mitigation Measures

Demography

The project requires about 498 workers during the operational stage as the processing design involves manpower and machines, so several operators (both skilled and unskilled) are required. The impacts of the Project on the demographic profile of the area during the operational phase are expected to be more and these include:

- Reversal of youth out-migration trends and increase in the youth demographic;
- Population increase due to the influx of opportunistic job seekers and operation workforce; and
- Change to the ethnic structure of the local area, created by a non-local workforce.

Depending on how this workforce is managed and the degree to which it intermingles with the community, this could have a noticeable impact on the community, particularly in light of existing tensions.

Mitigation Measures

The following mitigation and management measures are recommended to reduce the potential impact on demographics during the operations phase of the Project:

- Develop camp and workforce management protocols. Ensure that these are clearly communicated to all workforce (both DAI and contractors) and ensure that measures are strictly enforced;
- Wherever possible, prioritize local employment for the operations phase workforce;
- Ensure that there is clear communication to all potential workforce in advance of the operations phase, in order to manage expectations and opportunistic influx;
- Ensure that recruitment and training are transparent and equitable (by implementing procedures that prevent payment of bribes for recruitment) and that the training

programmes meet national and international standards for employment and occupational health and safety; and

- Establish a grievance mechanism for communities that allow residents to communicate concerns and have them addressed in a timely and effective manner.

Economy and Livelihood

- *Increased cash flow and stimulation of the local economy within the Communities*

The presence of workers and the influx of ancillary business operators will increase cash flow and stimulate the local economy within the Communities. In addition, there will be an increased food demand and other products to satisfy the needs of the high population.

- *Revenue generation for government and company*

The government at all levels will derive revenue from the establishment and operations of the proposed project through royalties from the sales. Projects such as this will increase the government's yearning for economic diversification.

- *Improved quality of life*

Employment opportunities as a result of the project could improve the quality of life in the community and introduce new commercial/trade and employment dynamics in the area. The likelihood of occurrence is considered high.

- *Increased pressure on existing social amenities/infrastructure*

The increased population arising from the presence of workers and those engaged in others activities will increase pressure on existing social amenities/infrastructure.

- *Inter andintra-community conflicts*

The presence of workers in the project area will heighten the expectations and aspirations to derive maximum benefits from the establishment of the project in their community. This could lead to frequent inter and intra-community conflicts. In a similar vein, this could result in third party agitations.

Mitigation/Enhancement Measures

- Procurement of goods and services required by the Project during operation and decommissioning of the Project may enhance the local economy both directly and indirectly;

- The presence of operation workers in the Project area may enhance the local economy through their purchase of local goods and services.
- Ensure that recruitment and training are transparent and equitable (by implementing procedures that prevent payment of bribes for recruitment, for example) and that the training programmes meet national and international standards for employment and occupational health and safety;

Employment

The operation of the project would generate employment opportunities for some members of the communities. Indirect job opportunities will also be created outside the immediate project area. The impact will be moderate and mostly positive. Project activities require several skilled and unskilled labour and other service providers. All these create opportunities for contracting and employment during the project lifespan. This is likely to improve the economic well-being of the inhabitants and various stakeholders.

Mitigation/Enhancement Measures

The objective of these mitigation/enhancement measures is to optimize opportunities for employment of local people, wherever possible, or that employment of Guineans is prioritized over foreigners. The following measures will be implemented to ensure that the employment of local people is maximized:

- The Project will establish a recruitment policy which prioritizes the employment of local residents (originating from the Local Communities) over in-migrants. Criteria will be set for prioritizing local residents and then others as part of the recruitment process.
- All contractors will be required to recruit in terms of the Project's recruitment policy, where practical.
- The Project will meet with the Local Communities to access any available skills/employment-seekers database for the area.
- The recruitment policy and procedure should promote the employment of women as a means of ensuring that gender equality is attained.
- On-the-job performance and training will be monitored through performance reviews. Training needs will be identified and provided by the Project.

A local procurement policy will be implemented to ensure that local procurement is maximized, the policy will include:

- Reasonable targets for using local suppliers.
- A clause of no discrimination on any grounds of gender, ethnicity, or religion.
- Criteria for monitoring local procurement and reporting on supplier performance management.
- The procurement policy and tendering requirements must be easily accessible to potential suppliers.

The following management measures will be implemented to enhance skills development and on-the-job training:

- Develop internal training 'certification' or reference letter provisions for those who receive internal training.
- Training plans will be developed according to each employee's work agreement and relevant to their job description.

4.11 Traffic Impact and Mitigation Measures

The operation of the cashew nut processing plant will have impacts on the surrounding road network by generating a reasonable volume of additional traffic and road traffic conditions.

Mitigation measures

- Ensure drivers have quarterly training;
- Inspect vehicles for compliance with the national requirements twice per year and ensure compliance;
- Fit all vehicles with speed-limiting devices to limit speeds to 60 km/hr;
- Prohibit driving after 6 pm and before 6 am;
- Provide drivers with a dispatch allowance, arrival allowance, and accident-free bonus;
- Conduct regular driver alcohol/drug tests regularly;
- Road furniture that includes road signs, guard rails, and road markings must be maintained by the local authority on an ongoing basis

4.12 Waste Management and Management Measures

It is recognised that there are waste streams during the operational phase which are unique to the operational phase.

Management Measures:

- Identification and classification of waste into different waste classes;
- Define a waste hierarchy and waste minimization strategy;
- Define and implement procedures for waste handling (i.e. collection, segregation, treatment, storage, transport, disposal, and documentation);
- Ensure the safe transportation, handling, storage, and disposal of wastes;
- Provide appropriate training for staff and other stakeholders on waste management issues;
- Establish dedicated area(s) for the sorting and storage of waste; and
- Monitoring, verification and reporting of wastes.

4.13 Water Resources (Surface and Groundwater) and Management Measures

During operation, the water use requirement for the various operations in the project is estimated at 100m^3/day. Water required for all aspects of the factory operation including domestic and sanitary use in the facility will be sourced from a dedicated borehole drilled in the project site. Due to the large volume of water that is required, there is potential for the over exploitation of the groundwater resources if not properly managed. Over exploitation of the groundwater may result in direct depletion of water resources which may cause harm to ecosystems. Wastewater from the steaming (cooking) and shelling process if not properly channelled can leach into the water aquifer and can have direct impact on water quality. This could result in potentially long-term effects on the water resources at a local and regional level.

Management of groundwater resources

Wastewater effluent from the cashew nut processing operation is generated from the steaming (cooking) process of the cashew nut as a result of the heat energy from the boiler. The wastewater includes condensed boiler water mixed with CNSL. This will be managed by channeling and treatment in an Effluent Treatment Plant comprising an equalization tank,

neutralization cum settling tank and sludge drying bed. The treated effluent is discharged according to industry standards.

Summary of wastewater and management options

Sanitary wastewater – Septic tank and soak pit

Steaming (cooking) condensate mixed with CNSL – Disposed and treated in ETP adopting Phyto-purification and discharged to the ground.

Cleaning and washing – Disposed and treated in ETP and discharged to the ground.

Management of Surface water resources

In addition, drainage channels will be:

- Lined and will be of sufficient capacity to carry storm flows.
- If necessary, water bars will be constructed within working areas and around access routes to control surface water runoff and erosion. Water bars will be designed to simulate the slope contour and direct and diffuse surface water away from disturbed areas.
- Flumes, berms or other similar structures will also be provided to control drainage and migration of sediment where cross drainage is necessary (e.g. if slopes are cut).

4.14 Child Labour Impacts and Mitigation Measures

It is envisaged that the operational phase of the cashew nuts processing plant would increase the risk of child labour in the cashew nuts value chain. Some of the activities these children engage in include harvesting/gathering matured fallen cashew, weeding of cashew plantation, local production or sale of cashew nuts products, manual movement of loaded cashew nuts on their heads for more than 3km distance, watering of cashew plant etc. Some of the impacts of engaging in those activities include:

- Violence against Children (VAC)
- Loss of quality childhood
- Health issues
- Mental trauma
- Illiteracy

- Exploitation

Mitigation Measures

- Develop a Company Policy on children's well-being which explicitly mentions the company's commitment to not employ underage workers and to support the education and best interests of children
- Create a procedure for the age verification of applicants as part of the hiring policy
- Establish a protocol for how to respond when harmful child labour is detected
- Communicate the policy to employees, suppliers/contractors and the community
- Provisions to ensure compliance with labour standards by supply chain and subcontracts, including training if required.
- Develop transparent human resources policies and procedures for the recruitment process, working conditions and Terms of Employment wages, worker-employer relations, Grievance Mechanism, non-discrimination, monitoring, roles and responsibilities following the Guinea Labour Code and ILO conventions.
- No use of child labour (workers under age 18) or forced labour.
- Create demand for skilled and trained workers
- Reward staff for their efforts toward eliminating harmful child labour
- Create a mechanism by which employees and others can report violations with the assurance of confidentiality.

4.14.1 Managing Supply Chain Risks

DAI is aware of EHS issues associated with the supply chain and is committed to taking proactive initiatives to prevent child labour/forced labour. Therefore, to further ensure that the EHS risks associated with the supply chain are identified and necessary mitigation measures are adopted, DAI will assess which farmers and suppliers are actively promoting EHS management practices in their respective supply chain levels. This will include the identification and assessment of supply chains covering their origin and use of child / forced labour.

Management Measures

The following are some of the methods DAI will adopt to manage the cashew supply chain risks related to child labour:

- **Selecting Quality Suppliers**: Choosing suppliers who share similar values and checking their farming practices and cashew plantation in advance can go a long way toward preventing problems down the road. While dealing with multiple suppliers DAI shall have a formalized vendor selection process whereby vendors have to meet a series of stringent requirements before they are approved.
- **Contractual Agreements**: This involves including a clause prohibiting the use of harmful child labour in contractual agreements with suppliers and contractors. For the effectiveness of this approach, monitoring mechanisms must be put in place and DAI shall be prepared to terminate business agreements with partners who do not demonstrate a willingness to comply.
- **Subcontracting Safeguards**: This will be achieved by prohibiting the use of subcontractors. In a situation where this is difficult, DAI shall hold the contractor legally responsible for compliance of the subcontractors with agreed codes of conduct.
- **Supplier Training and Incentives**: DAI shall improve supplier farming practices through training and education on the use of child labour. Also, the use of incentives as a means of encouraging suppliers to stop using child labour.
- **Monitoring, Compliance and Corrective Action**: DAI shall not rely solely on legal agreements and codes of conduct from suppliers to do the job, rather DAI shall actively monitor working conditions through audits and independent inspections of the suppliers' cashew plantation, and exercise their ability to take corrective action up to and including termination of the relationship with partners who violate the law or their contractual terms of engagement.

4.15 Gender-Based Violence Impacts and Mitigation Measures

The following are the potential impacts on workers, particularly women who are casual workers during the cashew-nut processing operation:

- Gender-based violence: The site workers can lure girls, hawkers, food vendors, and other petty traders who supply them with food and other services and defile or rape them. Workers may also abuse themselves and/or supervisors. They can also do the same to their wives, partners, children, hawkers, petty traders and food vendors physically or verbally over a misunderstanding of prices of goods and services and other issues

- Sexual favours could be demanded in exchange for jobs, promotions or other work-related benefits.
- Work-related occupational health and safety issues such as:
    - Falls, temperature, and other factors which can harm the worker without necessarily touching are the major physical hazards inducing fear among workers.
    - permanent burn marks of the caustic cashew sap in hands which is a chemical hazard
    - dermatitis and dry skin in workers
    - Inhalation of smoke results in chronic respiratory illness and allergic asthma in the long term.
    - Bites and stings from insects such as mosquitoes which cause dermatitis and other contagious diseases, and un-hygienically maintained toilets
    - Repetitive movements, Uncomfortable workplace and Poor body positioning
    - Joint pain, back pain, wrist pain, neck pain, shoulder pain etc
    - Injuries due to lifting, carrying and improper sitting techniques (Ergonomics)
    - Burns due to steam exposure
    - Increased incidence of alcohol and drug use;
    - Increase in the spread of HIV/ AIDS and other STIs;
    - Slip, Trip and Fall due to uneven surfaces and obstacles;
    - Encroachment by unwanted persons.
- Women may also be discriminated against and denied employment opportunities and /or their services may be undervalued based on cultural norms.
- Security concerns: Violent behaviour and confrontations between workers and locals. Workers who are deemed to be financially sound could be victims of theft and burglary. Potential conflict over sexual affairs, child labour, drunk driving, accidents and destruction of property.
- Poor labour working conditions: Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or working under poor conditions. If the necessary actions are not put in place to guarantee workers' rights and stipulate conditions of service to ensure that proper working conditions are implemented on the project.

Mitigation Measures

Addressing Gender-Based Violence

To prevent incidences of GBV, legal processes set out by national law must be followed. Policies on Sexual Exploitation Abuse and Sexual Harassment (SEA/SH) should be developed and implemented. Worker contracts should have clauses prohibiting rape, defilement, sexual harassment, child/forced labour and other GBV. An employment quota should be allocated to women. Contact numbers of representatives on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone.

During the operational phase, the risks of Gender Based Violence (GBV) should be addressed by DAI using the following approaches:

- Include in works contract clauses on mandatory and regular training for workers on required lawful conduct and legal consequences for failure to comply with laws on non-discrimination and GBV
- Clauses prohibiting rape, defilement and other Gender-based Violence as well as child and forced labour should be inserted into works contracts
- Insert clause requiring contractors and consultants to cooperate with law enforcement agencies investigating cases of gender-based violence
- A minimum requirement of female employment should be indicated in contract documents
- Establish worker's grievance mechanism, so that potential conflicts can be dealt with in an early and proper way.
- Contact numbers of representatives on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone
- Discuss issues of Gender Based Violence at daily Toolbox meetings
- Display on-site posters prohibiting sexual exploitation and harassment
- Create a clear system for identifying, responding to, and sanctioning GBV incidents
- Availability of female nodal officer for women's issues
- Regular GBV/SEA sensitization & training for all employees, workers, transporters, drivers and contractors

- Inclusion of gender issues in code of conduct, and dissemination
- Regular consultation/counselling of women employees and workers, including for survivors

Addressing Occupational Health and Safety Issues

- DAI will be committed to ensuring all H&S measures are in place to prevent accidents and reduce the consequences of non-conformance events;
- DAI will provide training, awareness and supervision to ensure all of its construction workers comply with the OHS procedures;
- DAI will provide all appropriate resources i.e. personal protective equipment (PPE) to all workers onsite such as masks, helmets, gloves and earplugs etc. and ensure their usage;
- An emergency response procedure and infrastructure will be available on-site to ensure the provision of first aid for personnel in case of an emergency.
- Provision of adequate signage and availability of functional First Aid Kit on-site.
- Adequate and relevant training of all workers especially local hands-on safety issues related to their activities
- Eliminate open defecation by providing separate well-maintained toilets for men and women with provision for physically challenged people at least one toilet.
- The solid waste generated will be collected and stored in bins to avoid order, and unhygienic conditions and stay animal nuisances.
- Maintain walkways and working surfaces to be clean and dry by preventing spillages of water/liquids during operational activities
- Provide personal protection equipment (PPE) like helmets, shoes, gloves and ear plugs/ ear muffs to the workers.
- Notice boards with all safety measures to be taken within the site and accident-prone areas will be displayed at all strategic locations within the site.
- Speed of transport vehicles will be restricted to 20 km/hr and proper sign boards at entry exist, turning and accident-prone areas shall be provided to minimise accidents within the site.
- A medical doctor (MBBS) will be available within the site once a week to attend to the medical needs of labours and construction labour.
- All workers shall be trained on basic ergonomics principles.

- This should cover the correct lifting, carrying and setting down techniques to prevent incidences of hernias, sprains, strains, back injuries and other muscular-skeletal disorders due to improper handling of objects.

Addressing Security Issues

- Provide adequate security by liaising with Police to conduct regular patrols or make private security arrangements.
- Sensitize the local community on cultural tolerance and grievance mechanisms to prevent confrontations.
- Workers and the local community should be sensitized on cultural tolerance and grievance mechanisms to prevent confrontations.
- Adoption of a Stakeholder Engagement Plan, as a framework for early and ongoing community consultation.
- Implementation of a Grievance Redress Mechanisms.
- Works procedures, defining a Code of Appropriate Conduct for all workers, including acceptable behaviour with respect to community interactions should be made available and workers should be made to sign and adhere to a code of conduct which prohibits vices

Addressing Poor labour working conditions

Provide all workers with signed contracts that are consistent with national labour laws as well as welfare facilities such as potable drinking water, shades, restrooms etc. Encourage frequent breaks and job rotation to reduce the impact on the health of workers. Provide workers with appropriate PPE.

CHAPTER FIVE
ENVIRONMENTAL AND SOCIAL MONITORING PLAN

5.1 Introduction

Environmental monitoring is a systematic collection of samples of environmental parameters like air, water, soil, and noise to observe and study the environmental changes if any due to the project activity. Regular monitoring of environmental parameters is very important to assess the status of the environment during project operations. With the knowledge of current conditions, the monitoring program will serve as an indicator for any deterioration in environmental conditions due to the operation of the cashew nut processing plant. The monitoring program will help the project on maintaining the standards as per the existing guidelines. The monitoring program also gives an action plan for how to maintain the standards for each parameter. This shall enable taking up timely measures to mitigate any adverse impacts on the environment.

Established on the predicted and assessed impacts as well as the existing environmental status of the project area, an environmental monitoring program is suggested for implementation during the project implementation. All monitoring strategies and programs have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In all cases, the results of monitoring will be reviewed, analyzed statistically and submitted to concerned authorities.

The project shall implement the environmental monitoring program in line with the planned schedule. DAI shall ensure that necessary requisite facilities are made available as and when required to ensure regular efficient environmental monitoring activities. The monitoring program covers the operational phase activities.

5.2 DAI Organizational Structure

Diaouné Agro-Industrie is a subsidiary of the company Diaouné et frères SARL, with a vision to become a national and international reference in the field of cashew nut processing. DAI's ambition is to bring the best service to her partners by having competent teams and an extremely supple organization allowing adapting itself very easily to the diverse needs of its customers. The industry's organogram defining the DAI Cashew-nut Processing Plant is presented in Figure 5.1 below.

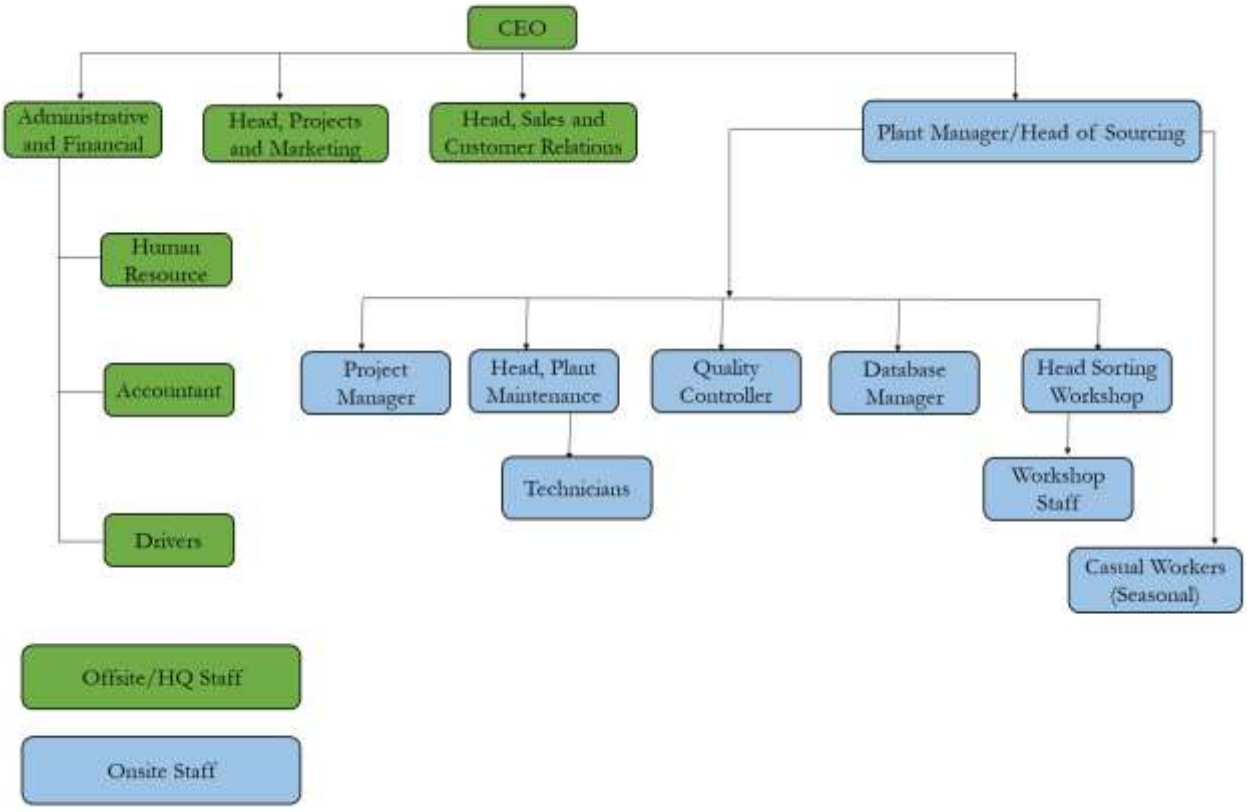


Figure 5.1: DAI organisational structure

5.3 Environmental Monitoring, Evaluation and Reporting Strategy

This environmental monitoring strategy will be implemented to enable regular monitoring of the Project's potential impacts, more specifically of ambient air quality, noise levels, liquid effluent, groundwater and soils. The results of these specific measures will be integrated into the environmental annual report of the Project.

It will be carried out either by a specialized external company or internally by Diaoune Agro Industrie SARL technicians. Roles and responsibilities will be specified at the same time as the monitoring and surveillance methods. This plan is summarized below.

Table 5.1: Environmental and social monitoring plan for Cashew-nut Processing Plant

Environmental Component	Monitoring Parameters	Reference Location/ Monitoring Station	Monitoring Frequency	Implementing Body	Regulatory Body
OPERATION					
Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Locations established during the current assessment	Quarterly	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Noise	Noise Level (dBA)	Locations established during the current assessment	Quarterly	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Wastewater or effluents	pH, TDS, BOD, COD, Hardness, Chlorides & Fluorides	Water inlet for process Water from floor washing ETP water outlet	Quarterly	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Soil quality	EC, bulk density, N, P, K, SAR, Ca, Mg, organic carbon, and micronutrients	Locations established during the current assessment	Once in six months	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Ecology	• monitoring of riparian and ridge habitats for signs of disturbance • monitoring riparian species richness and abundance	Riparian and ridge habitats	Annually	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Waste Management				DAI HSE Dept	BGEEE

Environmental Component	Monitoring Parameters	Reference Location/ Monitoring Station	Monitoring Frequency	Implementing Body	Regulatory Body
	• Disposal of raw cashew nutshell • General housekeeping • Records of all waste and materials.	Waste collection points	Regularly in connection with environmental and safety requirements.	Supervising ESMP Consultant	DFC
Traffic	• Monitoring roadworthiness of all vehicles (DAI, contractors, and sub-contractors) entering or leaving the site. • Monitor speed limits • Monitor and record details of any traffic offences or accidents involving DAI vehicles; and • Driver alcohol/drug tests.	At the site access control point Random points on access roads. To be detailed in accident/ incident records At the site access control point;	Daily (random inspections of a portion of vehicles) – each vehicle is to be inspected at least twice per year; Random tests of a portion of drivers	DAI HSE Dept Supervising ESMP Consultant	BGEEE DFC
Child Labour/forced labour	• Employment Record • No. of reports of child labour/abuse	All units of the facility	Monthly	DAI Supervising ESMP Consultant	BGEEE DFC

Environmental Component	Monitoring Parameters	Reference Location/ Monitoring Station	Monitoring Frequency	Implementing Body	Regulatory Body
	• No. of Community sensitization meetings where VAC issues are discussed • % of children in the cashev supply chain • Reports on progress in enforcement of Codes of conduct to address VAC. • No. of reports of children involved in Project related accidents				
Gender-based violence and sexual harassment	• Number of incidents • No. of women participating in consultations • No. of meetings on GRM	All units of the facility	Monthly	DAI Supervising ESMP Consultant	BGEEE DFC
Labour influx, security Occupational, health and safety risks,	• Monitoring of migrant population (number, demographics) • Number of accidents or	All units of the facility	Monthly	DAI HSE Dept, HR Dept Supervising ESMP Consultant	BGEEE DFC

Environmental Component	Monitoring Parameters	Reference Location/ Monitoring Station	Monitoring Frequency	Implementing Body	Regulatory Body
	injuries • No. of reported cases • Number of items stolen Records from the security unit				
Communities	• Grievance records	Communities within the AoI	Monthly	DAI CLO	BGEEE DFC

5.4 Reporting and Reviewing Procedures

This section presents the proposed reporting and reviewing procedures for DAI. It is expected that this section will be reviewed by DAI and committed to it.

Processing Plant Level Reporting: At the plant level, all the monitored data will be reviewed and scrutinised at the level of the Head of the Section and on monthly basis by the Plant Director. The same review of the data will be done twice a year at the level of the Managing Director. The data will be documented according to the appropriate format at the project level. Where agencies specify a format for reporting, reporting to those agencies will be in the specified format.

Emergency Reporting: In the event of an emergency, DAI will as soon as reasonably practicable, and following the implementation of the emergency response plan, report to the BGEE and the DFC. Reporting on emergencies will include:

- the scale and nature of the emergency;
- the containment and remedial steps are taken, and their effectiveness;
- the root cause and the corrective actions to prevent a recurrence of the emergency; and
- any alterations to the emergency response plan.

Incident reporting: The reporting and investigation of incidents that could have a detrimental impact on human health, the natural environment or property is required so that remedial and preventive steps can be taken to reduce the potential or actual impacts as a result of all such incidents. The actions resulting from any formal or informal investigations will be used to update this ESMP. Incidents will be reported as soon as reasonably practical by the relevant Head of Section to the Director. Incident reporting will include:

- the scale and nature of the incident;
- the root cause; and
- the corrective actions to prevent similar incidents from occurring in the future.

ESMP Reporting and monitoring requirements will include:

- Monthly inspections and audits;
- Quarterly summary report of accidents/incidents; and
- Annual reporting on training.

Transportation monitoring reporting procedures shall be as follows:

The Plant Manager: HS&E shall inspect the condition of areas on monthly basis and shall maintain appropriate records. The inspection shall include:

- Road conditions in and around the main access routes to the plant
- Driver orientation/training; and
- Maintenance and mechanical inspection records for all DAI vehicles.

All trucks shall be inspected for essential systems before each trip. Records will be provided by the fleet manager to the Plant Manager and HS&E who will be responsible for record-keeping.

Monthly Reporting to DAI Cashew-nut Processing Plant General Manager: Regular reporting shall be undertaken via a monthly monitoring report that shall be prepared and submitted by the Plant Manager, HS&E and the Plant Director. Reporting shall include:

- A summary of activities undertaken during the reporting period;
- Any material deviations or non-compliance with this Management Plan;
- Planned activities during the next reporting period;
- Any other issues of concern.

5.5 Training Needs

The technical training that is needed for specific jobs, such as environmental monitoring, or for control of the pollution abatement equipment (e.g., management of the wastewater treatment works or maintenance of filter bag houses), etc. must be identified by the Assistant Director: Human Resources and personnel must be trained accordingly.

In addition to the technical skills and experience that staff requires for their appointed positions, it is generally accepted that Environmental Management Systems benefit from cross-cutting environmental awareness training.

The Plant Manager and HS&E will be responsible for implementing an environmental training program that includes:

- General promotion of environmental awareness plant;
- Material handling and operational posture-related risks & hazards
- Fire & Safety related risks
- Emergency response as required
- Waste Management;
- Quality of life for Women workers
- Issues of Migrant labour, child labour
- Gender at work

- Specific HS&E training of staff working in sensitive areas;
- Updating staff on changes to environmental standards;
- Orientation training program on ESMP measures during operations;
- Reporting to staff on the performance against environmental targets.

5.6 Monitoring ESMP progress

ESMP needs to be monitored to track the progress in implementing the agreed mitigation measures. This should be done on a monthly/ quarterly/ annual basis (on agreed periodicity) to capture details if measures are implemented according to schedule and where delays are encountered, reasons need to be explained and solutions suggested.

DAI should use observations and stakeholder consultations (in particular with affected groups) to judge the measures' effectiveness. The agency is also encouraged to seek synergies with the project's monitoring plan which might include indicators that can be used for judging the effectiveness of mitigation measures (e.g., livelihood indicators of affected groups).

Monitoring should also check for additional environmental or social risks that may have emerged since the project start and establish appropriate mitigation measures for any significant new risk. These risks and their mitigating measures should be added to the ESMP and then reported.

- **Internal monitoring** is conducted by company staff. The company will train members of its staff on the requirements of the labour policy and then empower these employees to conduct inspections of workplace facilities and practices.
- **External monitoring** is generally conducted by auditing firms. The company will hire an auditor to inspect and monitor its workplace facilities and practices.
- **Independent monitoring** is generally carried out by non-governmental organizations or other interest groups. In this case, the monitors are normally not paid for by the company. This is generally believed to lend greater independence and credibility to the monitoring process and its results.

5.7 Auditing and Management Reviews

The ESMP will be periodically audited and updated to ensure sustainability and continuous improvement throughout the Project, from the detailed design phase to the operational phase. It is a key component of all management systems, including ISO 14001 and OHSAS 18001.

At a corporate level, the ESMP will be reviewed within the context of Diaoune Agro Industrie SARL Project audits, focusing on risk identification, the ESMP, specific HSE standards and objectives and

the reporting process for environmental indicators related to the Project. At an operational level, a periodic audit program will be drawn up and implemented aiming to check that the environmental management procedures specified in the ESMP are included in operational procedures, effectively implemented and that their results in terms of improving the environmental efficiency of activities are monitored over time.

Within this context, Diaoune Agro Industrie SARL will establish an audit schedule for the environmental management procedures used by sub-contractors involved with the Project, and their environmental performance. To this end all sub-contractors must draw up an internal verification programme, permitting continuous improvement of the ESMP at their level, between each audit.

The primary purposes of the audit programme are to:

- Verify continued conformance with respect to all applicable laws and regulations and the DAI's internal policies and procedures;
- Confirm the continued existence and efficacy of management systems to ensure compliance and performance; and
- Assist in the identification of actual and/or potential risks.

The benefits of the audit programme are:

- Assistance to management in identifying and prioritizing activities and/or practices that have opportunities for improvement;
- Reduction in risk through identification of areas of concern and triggering of appropriate corrective action; and
- Assistance with benchmarking and measuring improvement in management system performance.

The benefits of the review process are detailed below:

- Assess whether company personnel have complied with policy and procedures using audit reports;
- Review targets, objectives, and environmental performance indicators to establish their continued correctness in the light of changing environmental impacts and concerns, regulatory developments, concerns among interested parties, market pressures, internal changes/organisational activity changes and changes in the environment;
- Determine if targets and objectives are being met;
- Review regulatory compliance and whether EMP requirements have been achieved.
- Determine root causes of systemic non-conformances;
- Determine if the operational controls, procedures, corrective actions, preventative measures and continuous improvement efforts have resulted in enhanced environmental performance;

- Determine if energy efficiencies, accounting practices and information management systems are adequate;
- Determine areas of improvement in organisational structure, staff training, work instructions, processes, pollution prevention programmes, energy utilisation and accounting practices, which may lead to environmental opportunities and increased profit margins;
- Formulate corrective actions and preventative measures as a result of the review of system non-conformance and verify corrective actions are effective and appropriate.

The Plant Manager: HS&E will be tasked with the responsibility for auditing and implementation of environmental and social management measures associated with all phases of the project.

Integration and use of results

The integration of audit and monitoring results will permit periodic evaluation of the relevance and adequate nature of the Project's ESMP. Any change to or adaptation of the ESMP will be the object of written tracking and an update of the checked version of the ESMP. Changes to the ESMP will be communicated to the Project team and their results will be evaluated during the next audits, in a continuous improvement cycle.